

FARM
CHEMICALS
HANDBOOK

"95"



R 614/2011

FARM CHEMICALS HANDBOOK '95

Updated & Revised for '95

PESTICIDE DICTIONARY

FERTILIZER DICTIONARY

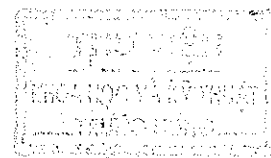
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BUYERS' GUIDE

THE SINE INDEX

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This handy, easy-to-use index includes every product and service mentioned in the HANDBOOK, as well as statistical data and regulations. All products are listed alphabetically and cross-referenced to alternate names. Page numbers are preceded by letters to indicate in which section of the HANDBOOK that particular page can be found. If a product is listed in more than one section, multiple page numbers and letters are shown.

B FERTILIZER DICTIONARY B 1

The Fertilizer Dictionary is divided into three sections: Section 1 - Fertilizer Materials and Processes; Section 2 - Agronomics/Application; and Section 3 - Suppliers/Trade Names/Statistics. Descriptions of fertilizer and fertilizer-related materials and processes used in fertilizer manufacture are included in Section 1. Section 2 provides "how-to-use" information on fertilizers, with an emphasis on proper application and environmental considerations. Included are descriptions on the use of major, macro-, and micronutrients and organic materials, as well as information on how fertilizers impact the environment. For easier reference, terms related to application are grouped, beginning on page B 50. Section 3 contains a guide to nutrient suppliers, a listing of fertilizer products arranged by company and cross-referenced by trade name, and fertilizer consumption/production statistics.

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C PESTICIDE DICTIONARY/BIOCONTROLS DICTIONARY C 1 / C 405

The Pesticide Dictionary is a compilation of experimental and commercial products available in the U.S. and around the world. An easy-to-find format groups information for each product as follows: Identification; Chemistry; Action/Use; Registration Notes; Environmental Guidelines; Safety Guidelines; and Emergency Guidelines. The Dictionary also includes related terms. Names of basic producers and/or principal formulators are listed under each pesticide. Discontinued products are included for reference and are so identified. Chemical structures have been reviewed and revised with the aid of computer software.

The Biocontrols Dictionary is a special supplement to the Pesticide Dictionary and incorporates information on biocontrol products. Additional information on many of these products can be found in the Pesticide Dictionary.

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THE SINE INDEX

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SECTION B

FERTILIZER DICTIONARY

The Fertilizer Dictionary is divided into three sections:

Section 1 — Fertilizer Materials and Processes

Describes fertilizer and fertilizer-related materials and processes used in fertilizer manufacture.

Section 2 — Agronomics/Application

Provides "how-to-use" information on fertilizers, with an emphasis on proper application and environmental considerations. Included are descriptions on use of major, secondary, and micronutrients and organic materials, as well as information on how fertilizers impact the environment. Application terms are grouped for easy reference, beginning on page B 50.

Section 3 — Nutrient Suppliers, Companies/Products, Trade Names, and Statistics.

Contains a guide to fertilizer products arranged by company and cross-referenced by trade name. This section also includes statistical charts showing production and consumption of fertilizer materials.

Suppliers of fertilizers and related materials will be found in the Buyers' Guide, beginning on page F 1. For complete addresses of all companies listed in the Fertilizer Dictionary, see Section G.

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Section 1

FERTILIZER DICTIONARY

Materials and Processes

Edited by Dr. John J. Mortvedt and Charlotte Sine

Section 1 of the Fertilizer Dictionary includes descriptions of fertilizer and fertilizer-related materials and processes used in fertilizer manufacture. Descriptions include a definition, properties, process, agronomic

uses, and cross-references where applicable. The guide to fertilizer products and statistics on production and consumption of fertilizer materials can be found in Section 3 of the Fertilizer Dictionary.

AAPFCO — see Association of American Plant Food Control Officials

Acid

Definition: A compound that dissociates in aqueous solution to yield hydrogen ions (H^+). The acids most commonly made, used, or encountered in fertilizer production are sulfuric, phosphoric, nitric, hydrochloric, fluosilicic, and hydrofluoric acids.

See Also: Black Acid, Filter Acid, Merchant Grade Acid, Phosphoric Acid, Spent Phosphoric Acid, and Superphosphoric Acid.

Acid-Based Fertilizer — see Acid-Type Fertilizer

Acid Fish

Definition: Fish waste which has been rendered and treated with sulfuric acid.

Description: Drying is necessary to prevent decay, and the P_2O_5 is rendered more available. It averages about 6% each of N and P_2O_5 .

See Also: Fish Scrap.

Acid-Forming Fertilizer

Definition: "Capable of increasing the residual acidity of soil." (AAPFCO)

Acid Sludges (Phosphoric)

Definition: Wet process phosphoric acid impurities, largely in crystalline form, derived from ferrous and ferric iron, aluminum, calcium, magnesium, sodium, potassium, fluorine, silicon, and sulfur.

See Also: Sludge Phosphoric Acid, Spent Alkylation Acid.

Acid-Type Fertilizer

Definition: Fertilizers with a relatively high degree of acidity as measured by a pH value less than 3.0.

Process: Made by mixing urea directly with nitric acid, phosphoric acid, and/or sulfuric acid, which results in a wide range of fertilizer grades.

Other Name: Acid-Based Fertilizer.

Acidity and Basicity of Fertilizers

Definition: Acidic residue of any fertilizer in the soil is measured in terms of the calcium carbonate required to neutralize it. The basic residue of any fertilizer is measured in terms of calcium carbonate equivalent.

Properties: The acid- and base-forming nutrients and their equivalent acidities or basicities, in terms of the relative amounts (pounds) of nutrient, are as follows:

Principal Acid-Forming Nutrients — Sulfur (S) 63, chlorine (Cl) 28, phosphoric acid (P_2O_5) 14, nitrogen (N) 36;

Principal Base-Forming Nutrients — Calcium (Ca) 50, magnesium (Mg) 82, potassium oxide (K_2O) 22, sodium (Na) 43.

The acidic and basic nutrients in the common potash salts, excepting potassium nitrate, neutralize each other to form physiologically neutral compounds. Superphosphates have no permanent effect on the soil reaction for the same reason.

Agronomics: Only one-third of the phosphoric acid (P_2O_5) and one-half of the nitrogen (N) applied as fertilizer is estimated to contribute to the residual acidity of the soil. The remainder of the applied phosphorus and nitrogen is used by plants, absorbed by the soil, lost in the drainage water, or otherwise removed from the soil solution. Theoretical values are higher.

Acidulated Bone

Definition: "Ground bone or bone meal that has been treated with sulfuric acid." (AAPFCO)

Acidulated Fish Scrap — see Acidulated Fish Tankage

Acidulated Fish Tankage

Definition: Acidulated fish tankage (acidulated fish scrap) is the rendered product derived from fish treated with sulfuric acid.

Acidulation

Definition: Process of treating a material with an acid.

Process: The most common acidulation process is treatment of phosphate rock with an acid or mixture of acids to increase phosphorus availability.

Activated Sewage Products — see Sewage Sludge

Activated Sewage Sludge — see Sewage Sludge

Activity Index (A.I.)

Definition: AOAC method for determining value of water-insoluble nitrogen in fertilizers.

Activity of Water-Insoluble Nitrogen (WIN) in Mixed Fertilizers

Definition: "The alkaline and neutral permanganate methods distinguish between the better and poorer sources of water-insoluble nitrogen (WIN), and do not show the percentage availability of the materials. The available nitrogen of any product can be measured only after carefully conducted vegetation experiments.

"(a) The methods shall be used on mixed fertilizers containing water-insoluble nitrogen amounting to three-tenths of 1% (0.3%) or more of the weight of the material. If a total nitrogen exceeds the minimum guarantee and is accompanied by a low activity of the insoluble nitrogen, the over-run shall be taken into consideration in determining the classification of the water-insoluble nitrogen.

"(b) The water-insoluble nitrogen in mixed fertilizers showing an activity below 50% by the alkaline material and also below 80% by the neutral method shall be classed as inferior. This necessitates the use of both methods, also the provision as to over-run in (a), before classifying as inferior." (AAPFCO)

Properties: The active insoluble nitrogen determinations given in this dictionary are by the alkaline permanganate method.

Adsorption, Absorption, and Sorption

Definition: Adsorption refers to concentration at the surface — such as the concentration of nutrient ions at the surface of colloidal particles in the soil.

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Absorption refers to uniform penetration — such as the absorption of water by phosphorus pentoxide (P₂O₅) to form phosphoric acid (H₃PO₄), or the absorption of fluorine compounds and ammonia in water by passage of the offgases from fertilizer plants through gas scrubbers.

Frequently, the effects of adsorption are so similar to those of absorption, especially in terms of gases and solids, that the noncommittal term "sorption" is employed.

Agglomeration

Definition: A processing step in the granulation of fertilizers assembling small particles into larger granules.

Agricultural Lime — see Lime; Limestone

Agricultural Liming Materials

Definition: "A product whose calcium and magnesium compounds are capable of neutralizing soil acidity." (AAPFCO)

See Also: Liming Materials.

Agricultural Slag

Definition: "Agricultural slag is a fused silicate whose calcium and magnesium content is capable of neutralizing soil acidity and which is sufficiently fine to react readily in soil." (AAPFCO)

See Also: Liming Materials.

A.I. — see Activity Index

Air-Slaked Lime

Definition: A product composed of varying proportions of the oxide, hydroxide, and carbonate of calcium, or of calcium and magnesium, and derived from exposure of quick lime to air and water.

See Also: Liming Materials.

Alkali

Definition: A compound of hydroxide ions (OH⁻) with one of the ions sodium, potassium, ammonium (NH₄), etc.

Properties: Characterized by high solubility in water and capable of neutralizing acids.

Alkaline Goods

Definition: A mixture of superphosphate and potash salts.

Properties: This mixture with nothing else added gives off free acid. Ground limestone or other basic material is always added to prevent bag rotting.

Other Names: P-K mixtures.

Alkylation Acid (Sulfuric) — see Spent Alkylation Acid

Alumina (Aluminum Oxide; Al₂O₃)

Definition: An impurity found in small quantities in phosphate rock, along with a small percentage of iron and other impurities. The maximum amount of alumina and iron in the rock is often guaranteed in the contract, many contracts being made on the basis of not more than 3% to 4% combined iron and alumina (as oxides).

See Also: Aluminum Phosphate.

Aluminum (Al)

Definition: A widely distributed element, commonly found combined in silicates in various clays and rocks.

Agronomics: While aluminum may be essential to the growth of some plants, the amount required, if any, is very small. Supply in all soils is abundant. Some acid soils contain sufficient exchangeable aluminum to be toxic to plants.

See Also: Aluminum Sulfate, Plant Nutrients.

Aluminum Dross

Definition: A byproduct of refining aluminum metal, consisting of aluminum oxide, aluminum nitride (Al₂N₃), salt, and various other impurities.

Properties: Average N content of 22 samples varied from 0.43% to 11.16%, with an average of 5.33%. Dross is also relatively high in magnesium, copper, manganese, and zinc.

Agronomics: The nitrogen in dross is slowly available in the soil.

Aluminum Oxide — See Alumina

Aluminum Phosphate (AlPO₄)

Definition: Occurs in quantity in the colloidal or soft phosphates found in Florida and in small quantities in all grades of phosphate rock.

Properties: Insoluble in water, with a phosphorus content that is only slightly available in the soil unless treated with an acid. Superphosphate

made with rock with much aluminum phosphate has a tendency to become moist and sticky.

Aluminum Sulfate (Al₂(SO₄)₃ · 18H₂O)

Properties: Soluble in water and usually made by treating bauxite with sulfuric acid.

Agronomics: Sometimes applied to soils to make them less alkaline. Also used to produce an acid condition for such plants as rhododendrons, azaleas, camellias, blueberries, etc.

Alunite

Definition: A hydrated sulfate of aluminum and potash mineral processed during the potash shortage of World War I, but is not competitive with today's sources.

Properties: The potash is insoluble in water, but is rendered soluble by roasting. There are large deposits of alunite in Utah and other western states.

Ammonia (NH₃)

Definition: A chemical compound composed of 82.25% nitrogen and 17.75% hydrogen. "The term ammonia shall mean agricultural anhydrous ammonia (NH₃) fertilizer." (AAPFCO)

Processes: Used for oxidation to nitric acid utilized in the production of nitric phosphates and ammonium, calcium, sodium, and potassium nitrates, and for production of nitrogen solutions, ammonium sulfate, ammonium phosphates, urea, ammoniated superphosphate fertilizers, and liquid fertilizers.

Properties: At ordinary temperatures, it is a colorless, pungent gas about one-half as heavy as air. At 50°F, the dry gas can be liquefied at 6.5 atmospheres pressure. The anhydrous liquid can be stored and transported at normal temperatures in high-pressure cylinders, tanks up to 210-ton capacity, or in low-pressure tanks of 4000 to 30,000-ton capacity at a temperature nearly its boiling point (-28°F) and at a pressure of less than 1 psi.

Specific gravity of liquid ammonia at 60°F is 0.62. Fertilizer-grade liquid normally contains more than 99% NH₃. At 60°F, it weighs 38.45 pounds per cubic foot or 5.14 pounds per gallon. The gauge pressure (psi) with temperature is as follows:

Temperature (°F)	psi
0	16
25	39
50	75
75	126
100	197

Agronomics: Used for direct application to the soil and in irrigation waters. See Also: Ammonia Synthesis.

Ammonia, Cold Liquid Systems

Definition: Application of anhydrous ammonia in liquid state is made possible through use of a converter that can be mounted on most tillage tools.

Process: Normal or "hot" ammonia is metered through a standard meter to converter from tractor saddle tank or nurse tank mounted behind the tillage tool. A converter cools ammonia to -28°F, converts it to a form that is about 85% liquid, and discharges through a distribution pod as a clear, relatively stable liquid. The remainder is a low pressure gas deposited to the soil through separate hose lines.

Ammonia Feedstocks

Definition: The raw material supplying hydrogen for synthesis with nitrogen to produce ammonia. Natural gas is the most widely used source of hydrogen, the remainder coming from naphtha, fuel oils, coal, by-production hydrogen, and refinery gases.

Ammonia Liquor (NH₄OH)

Process: Ammonia and water combine readily to form ammonium hydroxide. This reaction liberates 150 BTU per pound of ammonia. At concentrations above 20% NH₃, care must be taken to dissipate the heat.

At 1 atmosphere pressure, water reactions with NH₃, at various temperatures are as follows:

Temperature (°F)	NH ₃ Dissolved (By Weight)
32	43.7%
50	37.5%
80	28.0%
100	23.0%

Properties: A 25% solution exerts a pressure of 1 psi at 100°F, and 9 psi at 120°F.

Ammonia Oxidation

Definition: Process used commercially to manufacture ammonium nitrate.
Process: When ammonia (NH₃) and air are mixed and passed through a platinum alloy gauze, the ammonia burns, combines with oxygen of the air, and forms nitric oxide (NO). This oxide is converted to nitrogen dioxide (NO₂), which is absorbed in water to form nitric acid (HNO₃).

Ammonia Sulfur Solution

Definition: Solution of sulfur dissolved in liquid anhydrous ammonia.
Process: Crude lump sulfur is placed in a high-pressure mixing tank. The tank is then closed and the required amount of anhydrous ammonia is admitted through the bottom of the tank. After about 30 minutes' agitation, the solution is ready for transfer to applicator tanks or storage.
Properties: Over the temperature range of 32°F to 100°F, the solubility varies inversely with the temperature. A solution will hold 32% S at 32°F and 19% at 100°F.

Moisture-free solutions can be satisfactorily handled in mild steel equipment without corrosion problems. Aluminum equipment appears to be unsuitable at temperatures above 80°F, because of corrosion.
Agronomics: For use on sulfur-deficient soils. The solution may be distributed with anhydrous ammonia applicators; however, some slight modifications may be required, including a 20-mesh screen to filter the solution before it enters the metering device and a flow divider to maintain pressure in the meter and to prevent sulfur precipitation.

Ammonia Synthesis

Definition: The process for production of ammonia involving reaction of nitrogen and hydrogen under high temperature and pressure (N₂ + 3 H₂ = 2 NH₃).
Process: Major steps involved are hydrogen preparation from a feedstock, carbon monoxide conversion, gas purification, and final synthesis.
 Ammonia synthesis was experimentally achieved by Fritz Haber in Germany in 1908. It was developed largely by Carl Bosch of Badische Anilin und Soda-Fabrik (BASF) and the first commercial plant came on stream in Germany in 1913. Known as the Haber-Bosch process, the basic principles remain unchanged but a vast number of improvements and innovations have been made since.

Ammoniated Superphosphate

Definition: "Ammoniated superphosphate is a product obtained when superphosphate is treated with ammonia or with solutions which contain ammonia and other compounds of nitrogen. The guaranteed percentages of nitrogen and of available phosphoric acid shall be stated as part of the name." (AAPFCO)
Process: When superphosphate of any grade is brought into contact with free ammonia, the ammonia immediately reacts with any free acid and acidic phosphates present. Gypsum, when present, also enters the reactions; thus dicalcium phosphate, monoammonium phosphate, and ammonium sulfate are formed.

Ammoniated Zinc Sulfate Solution

Definition: A zinc sulfate solution which has been ammoniated, forming an inorganic complex of ammonia coordinated with zinc cations. The product contains 10% Zn and 10% to 15% N.
Agronomics: This product mixes well with 10-34-0 solutions to provide zinc in fluid starter fertilizers.

Ammoniating Solution — see Nitrogen Solutions**Ammoniation**

Definition: The process of introducing ammonia (liquid anhydrous; ammonia liquor or aqua ammonia; solutions of fertilizer compounds such as ammonium nitrate or urea in a mixture of ammonia and water) into superphosphate and other fertilizer ingredients to make fertilizer mixtures.
Process: The practical ammonia absorption capacity is governed by such physical factors as density, size, and structure of the particle, and free moisture content of the superphosphates; temperature of ammoniation; reaction period; and the concentration of P₂O₅ in the superphosphates or in the fertilizer mixture.
See Also: Ammoniated Superphosphate.

Ammoniation-Granulation of Fertilizer

Definition: A process combining ammoniation and granulation of fertilizer materials in a rotary drum in which the ammoniation of superphosphates and acids, together with water or steam, provides the fluid phase needed to granulate the feed materials.

Ammoniator

Definition: An apparatus for introducing ammonia or its solutions into superphosphate or mixed fertilizers.
Description: The standard type is a rotating drum with tubes discharging the liquid as a spray inside the apparatus or through spargers located beneath the surface of the rolling bed of material, either continuously or in batches.

Ammoniator-Granulator — see Granulation**Ammonium Calcium Nitrate — see Ammonium Nitrate-Limestone****Ammonium Chloride**

Definition: The ammonium salt of hydrochloric acid containing 26% N and 66% Cl.

Ammonium Metaphosphate (NH₄PO₃)

Definition: Produced experimentally by TVA, it contained 16.7% total N, 11.7% water-soluble N, 73.4% total P₂O₅, and 51.2% water-soluble P₂O₅.
Process: Produced by burning phosphorus and reacting the resulting vapor with ammonia and then treating with steam.

Ammonium Nitrate (NH₄NO₃) (Nitrate Of Ammonia)

Definition: "Ammonium nitrate is chiefly the ammonium salt of nitric acid. It shall contain not less than 33% of nitrogen, one-half of which is in the ammonium form and one-half in the nitrate form." (AAPFCO)
Process: The ammonium salt of nitric acid is prepared by treating the acid with ammonia, removing essentially all the water, and prilling or granulating the resulting melt. Two types of prills are produced: (1) low-density prills formed by cooling droplets of concentrated solution (95%) of ammonium nitrate (AN) as they fall through upcoming air in a prilling tower; and (2) high-density prills produced by using a melt (99+%) of AN in a similar system but with a shorter prilling tower.
Properties: The fire hazard involved in the use of ammonium nitrate is considered to be essentially the same as for sodium nitrate — melts at 309°F and decomposes at 390°F. Caked product should not be broken up with dynamite or other explosive. Product should not be stored with combustible materials, nor mixed with organics and superphosphate unless the free acid has been neutralized first.
See Also: Ammonia Liquor, Granulation.

Ammonium Nitrate-Limestone (A-N-L)

Definition: A 60-40 mixture of ammonium nitrate and finely pulverized limestone (or dolomite). "Mixtures of ammonium nitrate and limestone or dolomite shall not be designated as 'ammonium calcium nitrate,' 'calcium ammonium nitrate,' or similar names which imply the presence of either calcium nitrate or ammonium carbonate in such mixture." (AAPFCO)
Properties: Nonexplosive and nonflammable.
Agronomics: Sold under various tradenames that are all guaranteed to contain 20.5% N.

Ammonium Phosphate

Definition: "Ammonium phosphate (fertilizer grade) is a product obtained when phosphoric acid is treated with ammonia (anhydrous and aqueous) and consists principally of monoammonium phosphate and diammonium phosphate, or a mixture of these two salts. The guaranteed percentage of nitrogen and of available phosphoric acid shall be stated as part of the name." (AAPFCO)
Properties: Diammonium phosphate (DAP), made from wet-process and phosphoric acid and ammonia, has a grade of 18-46-0. Monoammonium phosphate (MAP), made with wet-process acid, has a grade of about 10-53-0.
See Also: Diammonium Phosphate, Monoammonium Phosphate.

Ammonium Phosphate Nitrate

Definition: A mixture of ammonium phosphate and ammonium nitrate.
Process: Produced by ammoniating the solution separated from phosphate rock that has been acidulated with an excess of nitric acid.
Description: Average composition is about 27% N and 20% available P₂O₅. Grades such as 30-10-0 and 28-14-0 are made by including neutralization of phosphoric and sulfuric acid in the process.

Ammonium Phosphate Sulfate

Definition: A double salt of ammonium phosphate and ammonium sulfate or a mixture of these two salts. "A product obtained when a mixture of phosphoric acid and sulfuric acid is treated with ammonia. It consists principally of a mixture of ammonium phosphate and ammonium sulfate. The guaranteed percentage of nitrogen and available phosphoric acid shall be stated as part of the name." (AAPFCO)
Description: When first marketed in 1923 this material was guaranteed to contain 16% N and 20% available P₂O₅. It contains about 45% ammonium sulfate. The 13-39-0 grade contains about 20% ammonium sulfate.

Ammonium Polyphosphate (APP)

Definition: Any ammonium salt of a polyphosphoric acid such as triammonium pyrophosphate (NH₄)₂P₂O₇ and pentammonium tripolyphosphate (NH₄)₃P₃O₁₀.
Process: Produced by ammoniating superphosphoric acid or by thermal dehydration of ammonium orthophosphate. TVA developed a direct process

Materials and Processes

for producing 11-55-0 from wet process acid or for making a series of multinutrient low-polyphosphate products (12-57-0, 28-28-0, 21-42-0, 19-19-19, and 24-24-0).

Description: Aqueous solutions of ammonium polyphosphates are used widely in the production of liquid fertilizers, such as 10-34-0 and 11-37-0. The versatile 11-55-0 solid is used for direct application, bulk blending, and in formulating suspension fertilizers.

See Also: Urea-Ammonium Phosphate.

Ammonium Polysulfide (APS)

Definition: Combination fertilizer and soil amendment containing about 20% N and 40% to 45% S.

Description: A red liquid with positive ammonia pressure. Not compatible with acids, acidic solutions, ammonium polyphosphate solutions or other fertilizer solutions containing traces of ortho or polyphosphates. Compatible with aqua ammonia and anhydrous ammonia. Applicable by direct injection into the soil or by application in irrigation water.

Agronomics: Blended with aqua ammonia in all proportions as a nutrient sulfur source. Commonly applied with anhydrous ammonia through separate delivery lines. Ammonium polysulfide is also used for correcting problems in sodic soils.

Ammonium Salts — see Nitrogen**Ammonium Sulfate ((NH₄)₂SO₄) (Sulfate of Ammonia)**

Definition: "Sulfate of ammonia (ammonium sulfate) is chiefly the ammonium salt of sulfuric acid. It shall not contain less than 20.5% nitrogen." (AAPFCO)

Processes: White or grayish crystalline salt made by neutralizing 30%-50% sulfuric acid with ammonia in a saturator. Produced from by-product coke oven gas, from spent sulfuric acid, in synthetic ammonia plants, on a small scale in the manufacture of bone black with spent acid from petroleum refining and other industries, and incidentally produced when overacidulated superphosphate is ammoniated as in the present-day manufacture of granulated fertilizers.

Description: The by-product material averages about 20.7% N and 23.6% S and the synthetic about 21.0% N and 24% S. Large amounts are produced as a by-product from production of the synthetic fiber intermediate, caprolactam.

Agronomics: An ingredient in most mixed fertilizers. Widely used as a separate fertilizer in the western part of the U.S., but seldom used on unlimed acid soils, because of its high physiological acidity. Important source of sulfur for sulfur-deficient soils.

See Also: Acidity and Basicity of Fertilizers.

Ammonium Sulfate-Nitrate (ASN)

Definition: "Ammonium sulfate-nitrate is a double salt of ammonium sulfate and ammonium nitrate which are present in equal molecular proportions. It shall not contain less than 26% N, one-fourth of which is in the nitrate form and three-fourths in the ammonium form." (AAPFCO)

Process: Hot solutions are mixed, or formed in processing, and dried.

Description: Less hygroscopic than ammonium nitrate alone.

Agronomics: An excellent source of readily available sulfur.

Ammonium Thiosulfate ((NH₄)₂S₂O₃)

Definition: Contains 43.1% S and 18.9% N. Normal commercial form is a slightly ammoniacal, 80% aqueous solution containing 12% N and 26% S.

Description: Solubility is 148 pounds/100 pounds water at 32°F. Compatible in any proportion with neutral or alkaline phosphate-containing liquid fertilizers as well as with aqueous ammonia and nitrogen solutions.

Agronomics: Used as liquid fertilizer to amend sulfur-deficient soils.

Analysis

Definition: "The percentage composition of the product expressed in terms that the law requires and permits." (AAPFCO)

Angle of Repose

Definition: The angle with the horizontal of the slope at equilibrium of a pile of loose material. The delivery rate of many distributors varies inversely with the angle of repose.

Anhydride

Definition: An oxide that will react with water to form the corresponding acid or base. P₂O₅ is an anhydride of H₃PO₄. CaO is the anhydride of Ca(OH)₂.

Anhydrite

Definition: Anhydrous calcium sulfate. Used for making sulfuric acid in some countries.

Agronomics: Used for the same purposes as land plaster or gypsum, as a soil amendment.

Anhydrous Ammonia

Definition: Anhydrous ammonia is a widely used nitrogen fertilizer. It contains 82% nitrogen and occurs in the form of a compressed gas. Because it is stored as a pressurized liquid, special storage, handling, and application equipment is required.

Agronomics: Anhydrous ammonia is applied in bands beneath the soil surface. The soil moisture content must be in the correct range so the soil will retain this gas, yet not be so wet that ammonia will be lost because the slits in the soil made by application knives do not seal. While knife spacing affects ammonia concentrations and persistence in the soil, research results show no significant effects on crop yields due to knife spacing.

Conversion of the ammonium form of nitrogen to the nitrate form in the soil is dependent upon microbial action. The high pH and nitrite concentrations in the ammonia band in soil may be toxic to soil microorganisms in that soil. However, microbial populations gradually return to their normal levels and are similar to those of non-fertilized soil about a month after application. In the past, anhydrous ammonia has been perceived as having a detrimental effect on soils. Published research results of long-term (10-20 year) studies have shown no significant chemical or physical property differences in soils fertilized with anhydrous ammonia or other nitrogen fertilizers.

See Also: Ammonia.

Anhydrous Calcium Sulfate — see Anhydrite**Anion**

Definition: The ion in solution carrying one or more negative electric charges depending on its valence or combining power with positively charged cations: e.g., NO₃⁻, H₂PO₄⁻, SO₄²⁻, HB₄O₇⁻, and HMoO₄⁻. Anions and cations are always present in the liquid phase of fertilizers.

A-N-L — see Ammonium Nitrate-Limestone**Anti-Caking Agents — see Conditioners****AOAC — see Association of Official Analytical Chemists****APA**

Definition: Available phosphoric anhydride (P₂O₅), frequently called "available phosphate."

See Also: Available Nutrients; Available Phosphate.

Apatite

Definition: A group of calcium phosphates having the type formula, Ca₁₀(X₂)(PO₄)₆, where X is usually fluorine, chlorine, or the hydroxyl group either singly or together. Fluorapatite, which is the best known of the apatites, is widely distributed as the crystalline mineral. The phosphorus and fluorine in all commercial types of phosphate rock now produced in the U.S. are probably combined in the form of fluorapatite, mixed with impurities, such as clay, sand, etc.

Process: Calcium hydroxy-apatite Ca₁₀(OH)₂(PO₄)₆, or calcium hydroxy-phosphate may be formed to a small extent in ammoniated superphosphate.

Description: Crystalline fluorapatite contains 38.0% to 41.0% P₂O₅ and from 3.2% to 4.3% fluorine. It occurs in small quantities in many parts of the world. There is a large deposit on the Kola peninsula in northern Russia.

See Also: Calcium Phosphate; Phosphate Rock.

APP — see Ammonium Polyphosphate**Apparent Specific Gravity**

Definition: The weight of a fertilizer divided by the weight of an equal volume of water at 40°F expressed in grams per cubic centimeter or pounds per cubic foot. It can vary considerably with such factors as degree of packing, moisture content, and the size and shape of the particle.

Agronomics: Apparent specific gravity determines, in large measure, the rate at which an applicator setting will apply a given fertilizer to the soil.

See Also: Table 1-1.

APS — see Ammonium Polysulfide**Aqua Ammonia — see Ammonia Liquor****Artificial Manure — see Compost****ASN — see Ammonium Sulfate-Nitrate**

Table 1-1
Apparent Specific Gravity of Fertilizer Materials

Material	Mean Ap. Sp. Gr.* g/cc
Ammonia, anhydrous	.62
Ammonia, aqua	.95
Ammoniated superphosphate	.99
Ammonium nitrate, granular	.86
Ammonium nitrate, prilled	.95
Ammonium nitrate-limestone	1.03
Ammonium nitrate solution	1.31
Ammonium phosphate (11-48)	.86
Ammonium phosphate-sulphate (16-20)	.85
Ammonium sulfate	.87
Basic slag, open-hearth	2.30
Blood, dried	.80
Bone meal, raw	.88
Borax	.73
Calcium cyanamide, granular	.95
Calcium cyanamide, pulverized	.83
Calcium nitrate, 15.5% N	.99
Cocoa shells	.48
Coffee chaff	.72
Cork dust	.38
Cottonseed meal	.66
Diammonium phosphate	.73
Diatomaceous earth	.25
Dolomite	1.53
Fish emulsion	1.22
Fish scrap, dried	.49
Furfural waste	.51
Fused tricalcium phosphate	1.25
Garbage tankage	.64
Guanco, Peruvian	1.20
Lime, hydrated	.48
Lime sulfur solution	1.32
Limestone, finely ground	1.60
Manure, dried sheep & cattle	.25
Manure, dried poultry	.66
Manure salts, New Mexican	1.15
Mixed fertilizers, granular	.92
Mixed fertilizers, liquid	1.30
Mixed fertilizers, N-K	.94
Mixed fertilizers, N-P-K	.97
Mixed fertilizers, P-K	1.07
Magnesium sulfate, calcined kieserite	1.40
Magnesium sulfate, epsom salt	.81
Nitrogen solutions, ammonia, and ammonium nitrate	1.20
Nitrogen solutions, urea, and ammonium nitrate	1.32
Peanut hull meal	.50
Peat moss	.22
Peat, reed and sedge	.78
Perlite	.13
Phosphate rock, Florida land pebble	1.28
Phosphoric acid	1.69
Potassium chloride	1.02
Potassium nitrate	1.03
Potassium sulfate	1.40
Precipitated phosphate	.81
Rice hulls	.22
Sewage sludge, activated	.68
Sodium nitrate	1.25
Sulfate of potash magnesia	1.36
Superphosphate, 16-20%	.91
Superphosphate, 42-48%	.96
Tankage, animal	.69
Urea, crystal	.57
Urea, pellet	.66
Urea-form	.45
Vermiculite, exfoliated	.26
Wood ashes	.77

*To convert g/cc to bulk density (lbs./ft.³), multiply by 62.43

**Association of American Plant Control Officials
(AAPFCO)**

Definition: Membership includes: 1) Officers charged by law with execution of state, provincial, dominion, and federal laws in the Continent of North America, Hawaii, and Puerto Rico regulating and enforcing of laws relating to the control of sale and distribution of mixed fertilizers and fertilizer materials; 2) heads or chiefs of experiment stations, departments of agriculture, bureaus, divisions, sections, and laboratories and employees thereof charged by law with the examination of mixed fertilizers and fertilizer materials; and 3) research workers employed by state, provincial, dominion, or federal agencies who are engaged in any investigation concerning mixed fertilizers, fertilizer materials, their effect and/or their component parts.

Function: Since 1948, the AAPFCO has taken the place of the Committee on Definition of Terms and Interpretations of Results of Fertilizers of the AOAC. Decisions of the AAPFCO are final and are not referred to the AOAC for approval. AAPFCO publishes an annual bulletin giving the official regulations and interpretations, many of which are reprinted here.

Association of Official Analytical Chemists (AOAC)

Definition: Established in 1884, the AOAC is an association devoted to the development, testing, validation, and publication of methods of analysis for fertilizers, pesticides, foods, feeds, drugs, water, and other substances related to food, agriculture and public health.

Function: AOAC coordinates the development, testing, and validation of methods each of which undergoes collaborative study before being approved as an official AOAC method. Approved methods are published in Official Methods of Analysis of the AOAC, issued every 5 years. Other AOAC activities include meetings, courses, symposia, training workshops, and publishing of the journal of the AOAC, manuals, proceedings, and other books.

Attapulgite Clay (Fuller's Earth)

Definition: Used in fertilizer production, including conditioning of fertilizer products, and as a suspending agent in suspension fertilizers.

Description: The main constituent is a hydrous magnesium aluminum silicate having high adsorptive and swelling properties.

**Availability of Ammonia — see Activity of Water-
Insoluble Nitrogen in Mixed Fertilizers**

**Availability of Nitrogen — see Activity of Water-
Insoluble Nitrogen in Mixed Fertilizers**

Available Nutrients

Definition: The part of the soil or fertilizer nutrient supply that can be taken up by plants.

Available Phosphate

Definition: "Available phosphate is the sum of the water-soluble and the citrate-soluble phosphates." (AAPFCO)

B-Liquor — see Ammonia Liquor

Base Goods

Definition: Various grades of fertilizer mixtures that can be dry mixed together and with other materials to produce the grade of fertilizer requested by the customer.

Process: High-analysis granular bases, such as 18-46-0 and urea, when mixed with granular potash materials and granular "fillers" containing secondary or micronutrients, can be used to produce any NPK grade of bulk blended fertilizer.

Base Liquor

Definition: A fertilizer solution, usually of ammonium phosphate, used as the sole or chief source of phosphate in a cold-blending operation for preparation of various grades of liquid fertilizer.

See Also: Cold Blending

Basic Fertilizer

Definition: One that, after application to and reaction with soil, decreases residual acidity and increases soil pH.

Basic Lime Phosphate (Lime-Based Superphosphate)

Definition: "A superphosphate to which liming materials can be added in a quantity at least six per cent (6%) calcium carbonate equivalent in excess of the quantity required to convert all water-soluble phosphate to the citrate-soluble form." (AAPFCO)

Description: Originally offered as a substitute for basic slag, it is no longer used in important amounts.

Materials and Processes

Basic Phosphate Slag — see **Basic Slag**

Basic Slag (Thomas Slag; Thomas Phosphate)

Definition: A byproduct produced in the manufacture of steel from phosphatic iron ores or pig iron by the Thomas process. AAFPCO definition states: "... shall contain no admixture of materials other than those resulting from the original process of manufacture. It shall contain not less than 12% of total phosphoric acid, of which at least 80% shall be available phosphoric acid. It shall be ground so that not less than 70% of the material passes through a U.S. No. 50 sieve. A basic phosphoric slag not conforming to this definition shall be designated as low phosphate."

Description: The principal component is silicocarnotite ($5CaO \cdot P_2O_5 \cdot SiO_2$). It usually also contains tetracalcium phosphate ($Ca_4P_2O_9$) and other compounds.

Basic Slag, Open-Hearth

Definition: Basic slag produced in the open-hearth steel process.

Description: Contains 8% to 12% P_2O_5 and about 33% Ca. Also known as blast furnace slag.

Agronomics: Use is limited because of low phosphate content. Some is used as liming material near steel-producing areas.

Basic Zinc Sulfate

Definition: A partially water-soluble form of zinc, also known as zinc oxysulfate.

Agronomics: Can be added to fertilizers or used as a spray or dust application for correction of zinc deficiencies.

See Also: Micronutrient Fertilizers; Zinc Oxysulfate.

Bat Guano — see **Guano**

Batch Reactor — see **Reactors**

Beet Slop — see **Beet Sugar Residue**

Beet Sugar Residue (Beet Slop)

Definition: The liquid product resulting after the beet sugar has been extracted. Formerly, it was used in making wet base goods.

Description: Contains 3% to 4% nitrogen, and from 8% to 10% potash (K_2O).

Beneficiation

Definition: Method of upgrading mined phosphate ore to remove clay, sand, and other impurities.

Bentonite

Definition: A sodium montmorillonite clay that swells tenfold when wetted with water. Like attapulgite clay it is usable as a suspending agent in preparation of suspension fertilizers.

Properties: Bentonite must, unlike attapulgite, be pregelled with 7 parts or more of water before addition to the suspension. This results in lowering of final suspension grade.

See Also: Attapulgite Clay.

Biofertilizers

Definition: Biological organisms which are involved in fixing N_2 from the air into available N, or in increasing the availability of other plant nutrients.

Biuret (Carbamylurea)

Definition: A compound ($NH_2CONHCONH_2 \cdot H_2O$) formed by thermal decomposition of urea.

Description: Toxic to some crops. To be avoided in the manufacture of fertilizer urea.

Black Acid

Definition: Ordinary wet-process phosphoric acid, unpurified, any strength.

Blast Furnace Slag — see **Basic Slag, Open-Hearth**

Blended Fertilizer

Definition: A mechanical mixture of two or more fertilizer materials.

See Also: Bulk-Blended Fertilizer; Mixed Fertilizers.

Blood (Blood Meal)

Definition: "The collected blood of slaughtered animals, dried and ground, and containing not less than 12% of nitrogen." (AAFFCO)

Agronomics: The nitrogen of blood (8% to 12%) quickly becomes available to crops.

Bone Meal — see **Calcium Phosphate**

Bone Phosphate of Lime (B.P.L.) — see **Calcium Phosphate**

Bone Products

Definition: The skeletons of vertebrates containing 20% to 30% P_2O_5 were

the earliest source of fertilizer phosphorus. Now used largely in animal feeds and, to some extent, in specialty fertilizers such as for growing roses.

See Also: Acidulated Bone; Precipitated Bone; Precipitated Phosphate; Steamed Bone Meal.

Borax ($Na_2B_4O_7 \cdot xH_2O$)

Definition: A white crystalline material used in fertilizers to supply the essential element boron.

Process: Impure borax occurs as kernite in crystalline masses and this together with tinca, colemanite, ulexite, and certain brines, are the sources from which refined borax is produced.

Properties: Pure borax contains 11.34% B.

Boron (B)

Definition: An essential mineral element known to be required in trace amounts for growth of plants, especially legumes.

Description: Does not occur in pure form but is commonly found as the oxide in combination with sodium or calcium.

See Also: Borax, Colemanite.

B.P.L. (Bone Phosphate of Lime) — see **Calcium Phosphate**

Brand/Brand Name

Definition: "A brand is a term, design or trademark used in connection with one or several grades of fertilizers. A brand or product name is a specific designation applied to an individual fertilizer. The brand of a fertilizer shall be used by the registrant/licensee in the labeling and by the control official in his reports and publications. No numeral(s) that are misleading or confusing shall be used in the brand of a fertilizer. When the name of a fertilizer material is used as part of the brand name of a fertilizer, as for example blood, bone or fish, the nutrients guaranteed shall be derived from or supplied entirely by the material named." (AAFFCO)

Brimstone — see **Sulfur**

Brucite

Definition: A natural mineral, magnesium hydroxide ($Mg(OH)_2$).

Process: When this material is calcined, magnesium oxide (MgO) remains.

Properties: Calcined brucite contains an average of 44% (39%-48%) Mg. **See Also:** Calcined Brucite.

Bulk-Blended Fertilizer

Definition: A physical mixture of two or more dry granular fertilizer materials to produce a specific ratio and grade.

Bulk Blending

Definition: The practice of mixing dry, individual, granular materials or granulated base materials. The product is a mixture of granulated materials rather than a granulated mixture.

Process: Uniformity in particle size of the ingredients of the bulk blends is essential to avoiding problems of segregation of the ingredients during handling and application. Coating the granules of the blend with finely divided micronutrients ensures uniform distribution of these essential micronutrients. **See Figure 1-1.**

See Also: Blended Fertilizer; Mixed Fertilizers; Size Guide Number.

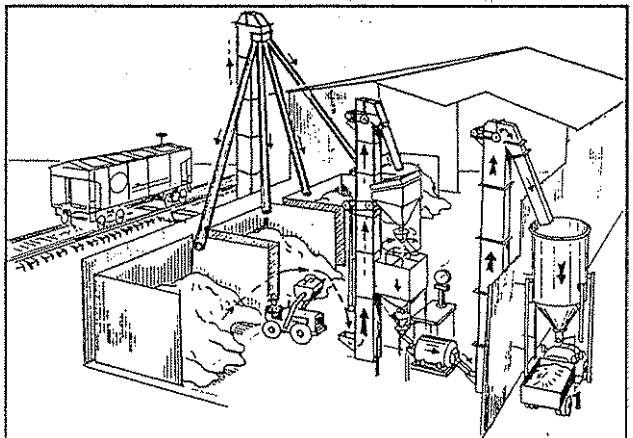


Figure 1-1

This diagram shows one of the most common types of bulk blending plants. Note mixer is charged with front-end loader. (Courtesy TVA)

Bulk Density

Definition: The weight of fertilizer per unit volume, ordinarily reported in pounds per cubic foot.

Calculation: To convert apparent specific gravity values in grams per cubic centimeter to bulk density values in pounds per cubic foot, multiply by 62.43.

Properties: The bulk density of a given fertilizer is altered considerably by such factors as moisture content, degree of packing under the weight of large piles, the degree of aeration, and the size and shape of particles in the material.

See Also: Apparent Specific Gravity.

Bulk Fertilizer

Definition: "Commercial fertilizer delivered to the purchaser either in the solid or liquid state in a non-packaged form to which a label cannot be attached." (AAPFCO)

Burned Lime — see Burnt Lime**Burnt Lime**

Definition: "A material made from limestone which consists essentially of calcium oxide or a combination of calcium oxide with magnesium oxide." (AAPFCO)

See Also: Liming Materials.

By-Product Lime — see Liming Materials**Caking**

Definition: A process by which a solid fertilizer loses its desirable freeflowing property.

Process: The principal reason for caking is change of moisture content. When damp fertilizer is dried, the salts that were in solution, in the form of moisture on the surface of the particle, are crystallized. These crystals adhere tightly and tend to knit the particles together. Plastic substances cake under pressure. Chemical reactions between ingredients of a mixture may also cause severe caking.

Caking can be prevented or lessened by granulation, maintenance of low moisture content in the fertilizer at all times, or by coating the particles with conditioning agents.

See Also: Conditioners.

Calcined Brucite

Definition: "A magnesium product concentrated from brucite limestone. It consists chiefly of magnesium oxide with lesser amounts of calcium hydroxide, silicates, and sesquioxides." (AAPFCO)

Calcined Dolomite — see Selectively Calcined Dolomite**Calcined Kieserite — see Magnesium Sulfate****Calcined Magnesite — see Magnesite****Calcined Phosphate**

Definition: "Phosphate rock which has been heated, with or without one or more catalysts or reagents, sufficient to volatilize and remove most or all organic, carbonate, fluoride, and other impurities, and/or thermally altered to more available calcium phosphate compounds, depending on the process. A significant portion of the phosphorus is citrate soluble and such percentage shall be stated as part of the brand name. Included are products known as fused tricalcium phosphate, defluorinated phosphate, rhenania phosphate, and various trade names." (AAPFCO)

Properties: Fused tricalcium phosphate contains about 24% available P_2O_5 by the 2% citric acid method. Rhenania phosphate contains about 25% available P_2O_5 and is widely used in Germany.

Calcined Rock

Definition: Phosphate rock heated sufficiently to remove the organic matter.

Calcite

Definition: A natural mineral (calcium carbonate - $CaCO_3$).

Calcitic Lime

Definition: Limestone containing mostly calcium carbonate ($CaCO_3$).

Calcium (Ca)

Definition: A hard, brittle metal which is too reactive to use in its elemental state. Familiar forms are the oxide (quick lime), the carbonate (limestone), and various salts.

Agro-nomics: Calcium is essential for plant growth and is one of the secondary fertilizer nutrients.

See Also: Secondary Nutrients.

Calcium Ammonium Nitrate (CAN)

Definition: A trade name for an ammonium nitrate-calcium nitrate mixture.

See Also: Ammonium Nitrate; Calcium Nitrate.

Calcium Ammonium Nitrate Solution

Definition: An aqueous solution of calcium nitrate and ammonium nitrate containing 17% N. It is used extensively in the western U.S.

Calcium Carbonate ($CaCO_3$)

Definition: Also known as limestone, marble, or chalk. Calcitic limestone and oyster shells are composed largely of calcium carbonate. It is also a principal component of dolomite.

Properties: Chalk is a soft limestone. Pure calcium carbonate contains 40% calcium (Ca) or 56% CaO equivalent. Marble (proper) differs from common limestone in being harder and more compact as a result of metamorphism.

Agro-nomics: Used extensively to neutralize soil acids.

See Also: Calcite; Dolomite; Liming Materials; Marl.

Calcium Cyanamide ($CaCN_2$)

Definition: "Cyanamide is a commercial product consisting principally of calcium cyanamide ($CaNCN$) and carbon and it shall contain not less than 19.5% nitrogen." (AAPFCO)

Properties: Cyanamide is guaranteed to contain 21% N in granular form and 22% in powdered form, which corresponds to 60% $CaCN_2$. About 2% of the nitrogen, however, is in the form of other compounds. Calcium cyanamide is poisonous and irritating to the skin and mucous membranes and should be washed off promptly.

Agro-nomics: Small amounts have been used in mixed fertilizers, but it is now used largely for direct application as a plant defoliant and herbicide.

Calcium Dihydrogen Polyphosphate — see Calcium Polyphosphate**Calcium Hydroxyapatite — see Apatite****Calcium Metaphosphate**

Definition: "A vitreous product substantially free from crystalline phosphates, resulting from the treatment of phosphate rock with gaseous phosphorus pentoxide at high temperatures. The guaranteed percentage of available phosphoric acid shall be stated as part of the name." (AAPFCO)

Properties: The fertilizer grade contains 65%-65% citric acid-soluble P_2O_5 and 18% Ca. Only slightly soluble in water, but is equal to superphosphate in promoting crop yields in neutral or acid soils if applied as fine particles. Calcium metaphosphate is not presently produced for fertilizer use.

Calcium Nitrate (Nitrate of Lime)

Definition: "Chiefly the calcium salt of nitric acid. It shall not contain less than 15% nitrate nitrogen." (AAPFCO)

Process: Produced in large quantity in Europe by treating limestone with nitric acid and neutralizing the resulting solution with ammonia. Calcium nitrate is used in making calcium-ammonium nitrate solution containing 17% N.

Properties: $Ca(NO_3)_2 \cdot 4H_2O$ or $5Ca(NO_3)_2 \cdot NH_3 \cdot NO_3 \cdot 10H_2O$. Pure anhydrous salt contains 17.1% N and 24.4% Ca. The fertilizer grade is 15.5% N and 19% Ca.

Calcium Nitrate-Urea ($Ca(NO_3)_2 \cdot 4CO(NH_2)_2$)

Definition: As crystallized from solution this material consists of calcium nitrate with four molecules of urea of crystallization; replacing the water of crystallization.

Properties: Contains about 33% N and 9% Ca.

Calcium Oxide (CaO) — see Lime**Calcium Phosphate**

Definition: The phosphatic part of good superphosphate consists largely of monocalcium phosphate, $Ca(H_2PO_4)_2 \cdot 2H_2O$, which is water-soluble. Precipitated bone is largely dicalcium phosphate, $CaHPO_4$, which is citrate-soluble. Bone meal contains calcium phosphate-carbonate, $3Ca_3(PO_4)_2 \cdot CaCO_3$. Apatite is calcium fluorophosphate or chlorophosphate, and phosphate rock, usually contains a complex calcium fluoro-phosphate. The term "bone phosphate of lime" (B.P.L.) is commonly used to express the content of tricalcium phosphate, $Ca_3(P_2O_4)_2$, in phosphate rock.

See Also: Apatite.

Calcium Polyphosphate

Definition: Any calcium salt of a polyphosphoric acid such as calcium dihydrogen pyrophosphate ($CaH_2P_2O_7$) and dicalcium pyrophosphate ($Ca_2P_2O_7$).

Process: Can be made by thermal dehydration of triple superphosphate.

Properties: Fertilizer grades of calcium polyphosphate generally refer to phosphate mixtures containing a substantial portion of one or more calcium polyphosphates.

Materials and Processes

Calcium Sulfate (CaSO₄) — see Anhydrite and Gypsum**Caliche**

Definition: Mineral ore found in the desert of northern Chile, from which nitrate of soda is derived.

Carbamiurea — see Biuret**Carbon**

Definition: Carbon, in its most important form, is present in a great variety of substances making up the structure and of all plants and animals. This latter group of carbon compounds is essential to life on earth.

Carbon Bisulfide (CS₂)

Definition: A highly inflammable colorless liquid, boiling at 115°F. Used for degreasing seed meals, such as castor, cottonseed, etc.

Carbon Dioxide (CO₂)

Definition: A gas formed by the oxidation of carbon or by the burning of coal or any material containing carbon. It combines with water to form carbonic acid and with calcium and other metals to form carbonates, for example limestone. As a byproduct from production of ammonia, CO₂ is used with ammonia in production of urea.

Agronomics: CO₂ is essential to photosynthesis and plant growth.

Carbonic Acid (H₂CO₃ or CO₂H₂O) — see Carbon Dioxide**Carnallite (MgCl₂·KCl·6H₂O)**

Definition: Commercial muriate of potash was formerly extracted from this material in Germany, France, and Russia, but never has been in the U.S. It occurs in certain U.S. deposits, but contains an average of only 9.8% K₂O.

Castor Pomace

Definition: The ground residue of castor beans, from which the oil has been extracted. Practically the entire production since 1862 has been used as fertilizer. It is never used as a feed, because its ricin content makes it poisonous to animals.

Properties: Contains about 5% N and 93% organic matter.

Caustic Lime — see Liming Materials**Caustic Potash — see Potassium Hydroxide****CDU — see Crotonylidene Diurea****Cement Flue Dust (Potash-Lime)**

Definition: A by-product from cement manufacture. Used to some extent as a source of potash in the U.S. from 1915 until the mid-1920s. None apparently is used in fertilizer at present.

Properties: Contains 4% to 12.8% of potash (K₂O) and averages 30% Ca. An excellent liming material. High content of calcium oxide produces equilibrium pH in suspension of about 12. Should not be mixed with nitrogen solutions in a suspension because of ammonia volatilization.

Chalk — see Calcium Carbonate**Chelated Plant Nutrients**

Definition: "Compounds of metallic secondary and micronutrients with organic chelating agents which have the property of being available under pH conditions in which the nutrients normally form insoluble compounds." (AAPFCO)

See Also: Chelates.

Chelates

Definition: Certain organic chemicals, known as chelating agents, form ring compounds in which a polyvalent metal is held between two or more atoms. Such rings are chelates. AAPFCO defines as "The type of compound or chemical union in which a central metal (cation or anion) is joined to a chelating agent in the same molecule by two or more bonds. Such linkage results in the formation of one or more heterocyclic rings in which the metal is part of the ring."

Among the best chelating agents known are ethylenediaminetetraacetic acid (EDTA), hydroxyethylenediaminetriacetic acid (HEDTA), and diethylenetriaminepentaacetic acid (DTPA).

Agronomics: In the absence of chelates in the soil, iron, copper, manganese, and zinc are all converted to insoluble hydroxides or basic salts even on the acid side of neutrality. Chelates keep these micronutrients soluble in solutions of pH up to 8 or 9.

See Also: Micronutrient Fertilizers.

Chelating Agent

Definition: "Chelating Agent (Sequestering Agent) - A compound having two or more sites of attachment to a metal (cation or anion) to form a chelate." (AAPFCO)

See Also: Chelates.

Chemically Precipitated Sewage Sludge — see Sewage Sludge**Chile Saltpeter — see Sodium Nitrate****China™ Clay — see Kaolin****Chloride of Potash — see Potassium Chloride****Chlorides (Muriates)**

Definition: Salts of hydrochloric (muriatic) acid which may be formed by the action of hydrochloric acid on an alkali or metal.

Chlorine (Cl)

Definition: Fertilizers such as potassium chloride furnish an abundance of chlorine. The AAPFCO has adopted the following policy statement: "Amount of chlorine permissible in fertilizers in which the potash is claimed to be present in form other than chloride: The chlorine in mixed fertilizers in which the potash is claimed in form other than chloride shall not exceed one-half of one percent (0.5%) more than five percent (5%) of the potash found. (Calculate as follows: 0.05 times the percentage of potash found plus 0.5).

Agronomics: Chlorine (chloride) was first recognized as a micronutrient element essential to plant growth in 1954. Its function in the plant is not well known but it is important to the movement of liquids in plants. Chloride has been found to be a limiting factor in plant growth under field conditions. Chlorides also enhance disease resistance in plants.

Citrate-Insoluble Phosphate

Definition: That portion of phosphorus in fertilizer after water and citrate extractions. Phosphate content of fertilizers that is considered to be immediately unavailable to plants.

See Also: Citrate-Soluble Phosphate; Water-Soluble Phosphate.

Citrate-Insoluble Phosphorus — see Ammoniation**Citrate-Soluble Phosphate**

Definition: "That part of the total phosphate in a fertilizer that is insoluble in water but soluble in solution of citrate of ammonia according to the method adopted by the AOAC International." (AAPFCO)

See Also: Reverted Phosphate.

Clam Shells

Definition: Finely ground clam shells are used as a liming material along all sea coasts.

Properties: Mean composition is 38% Ca or about 95% CaCO₃.

Clarity of Solution Fertilizer

Definition: Turbidity of a solution or the extent to which one can see through a fluid fertilizer or detect foreign material contained therein as determined by the amount of visible light that passes through a sample without being absorbed.

Clay

Definition: Naturally occurring inorganic crystalline particles in soils and other parts of the earth's crust. Clay particles are less than 0.002 millimeter in diameter.

Properties: Composed of compounds of silicon, aluminum, hydrogen, and oxygen.

Clear Liquid Fertilizer

Definition: A fluid fertilizer in which the plant nutrients are in true solution.

Coated Slow-Release Fertilizer

Definition: "A product containing sources of water soluble nutrients, release of which in the soil is controlled by a coating applied to the fertilizer." (AAPFCO)

See Also: Controlled-Release Fertilizers.

Cobalt (Co)

Definition: Cobalt is essential for animal nutrition and there is some evidence that it is beneficial to some plants.

Cobalt Sulfate (CoSO₄·7H₂O)

Definition: A pinkish colored crystalline salt soluble in water.

Agronomics: Used in animal feeds and sometimes added in small quantities in mixed fertilizers for use on pastures where the forage is deficient in cobalt.

Cobaltous Sulfate — see Cobalt Sulfate**Cocoa Shell Meal**

Definition: Ground husks of cocoa seeds used as a conditioner in non-granular fertilizers.

Properties: Apparent specific gravity is 0.48. It contains about 85% organic matter and up to 5% of total plant nutrients.

Cocoa Tankage

Definition: The cocoa residue resulting from chemical processing of ground cocoa cake.

Properties: Contains approximately 4% N, 1.5% available P₂O₅, 2% K₂O, and 0.06% Mg. It may contain 20% lime.

Coffee Chaff

Definition: Finely ground pericarps from coffee beans used as conditioner in nongranular goods.

Description: Apparent specific gravity is about 0.12.

Cold Blending

Definition: A fluid fertilizer preparation procedure in which stock solutions or suspensions are simply blended in proper proportions to give desired grades of final solutions or suspension.

Process: Usually depends on the use of a "base liquid" or "base suspension" to furnish all of the P₂O₅ in the final solution or suspension. A variation of the procedure includes the addition of a solid potassium salt to furnish potassium.

Cold Mix

Definition: A liquid or suspension fertilizer prepared by cold blending.

See Also: Cold Blending.

Colemanite (Ca₂B₆O₁₁·xH₂O)

Definition: A natural calcium borate ore containing 10-16% B.

Description: Slightly soluble in water, but readily available to plants if finely ground.

See Also: Boron.

Colloidal Phosphate (Phosphatic Clay)

Definition: A finely divided raw mineral phosphate or phosphatic clay: Occurs in large quantity mixed with Florida hard phosphate rock.

Process: Removed from washing, carried by the wash water to settling basins or ponds and remains after the water has evaporated.

Description: Contains from 50% to 58% B.P.L. and from 9% to 12% iron and aluminum oxides (I and A).

Agronomics: Although sometimes applied directly to the soil, its phosphorus is only slightly available.

See Also: Soft Phosphate.

Compatibility

Definition: The degree in which two materials — for example, two fertilizers or a fertilizer and a pesticide — will remain noninteractive when blended. Some combinations of materials result in undesirable interactions and are said to be incompatible. For example, in bulk blending it is recognized that mixing of urea with ammonium nitrate results in a severely hygroscopic mixture. Figure 1-2 shows the chemical compatibility of most common fertilizer materials available to blenders.

See Also: Hygroscopicity.

		Ammonium Nitrate		Urea		Ammonium Sulfate		Triple Superphosphate		Single Superphosphate		Diammonium Phosphate		Monoammonium Phosphate		Potassium Chloride		Potassium Sulfate	
X																			
OK	OK																		
OK	L																		
OK	L	OK																	
OK	OK	OK	L																
OK	OK	OK	OK	OK															
OK	OK	OK	OK	OK	OK														
OK	OK	OK	OK	OK	OK	OK													

Figure 1-2
Chemical Compatibility of Blend Materials

Complex Fertilizer Plant

Definition: "Complex" is a term usually applied to a fertilizer manufacturing establishment having combined facilities for converting basic raw materials, such as phosphate rock, nitrogen of the air, sulfur, and potash minerals, into fertilizer products.

Compost (Artificial Manure)

Definition: Straw, peanut hulls, sawdust, leaves, and similar organic matter high in cellulose and pentosan, but low in nitrogen, do not decompose readily. Addition of nitrogen fertilizer promotes rapid compost formulation.

Process: If the nitrogen exceeds 1.2% on a dry basis, organic matter listed above will rot rapidly under most slightly alkaline aerobic conditions. Nitrogen fertilizer added at about 20 pounds of nitrogen-equivalent and 50 pounds of ground limestone per ton of compost material promotes rapid compost formation.

In acid soils, a mixture of ammonium salts and ground limestone are generally used. Where soil and water may be too alkaline to permit humification, sulfur and phosphate rock or gypsum are generally employed. After several months in warm weather, the mass will have the appearance and properties of rotten manure.

See Also: Manure.

Compound Fertilizer

Definition: A mixed fertilizer containing at least two of the primary plant nutrients, nitrogen, phosphorus, and potassium, formed by intimately mixing two or more fertilizer materials or granulating them together, usually by the processes that involve chemical reactions of the materials with each other. Compound fertilizers usually are made in registered grades.

See Also: Mixed Fertilizers.

Concentrated Fertilizers

Definition: Mixed fertilizers containing 30% or more of the primary plant nutrients, N + P₂O₅ + K₂O.

Description: The average primary nutrient content of mixed fertilizers in the U.S. was 21.7% in 1945, 27.9% in 1955, 40.7% in 1965, 43.2% in 1980, and 46.23% in 1990-91.

Concentrated Superphosphate — see Superphosphate**Conditioners (Anti-Caking Agents)**

Definition: Inert materials such as rice hull meal, peanut hull meal, vermiculite, peat, and organic waste materials are frequently used as separating agents in nongranular fertilizers to keep the particles from being cemented together in the form of cakes or lumps.

Finely divided, dry, bulk, inert powders such as diatomaceous earth, siliceous dust, and clay are in common use as coating agents to decrease the caking tendency of granular materials.

Modified alkaryl sulfonates are surfactants currently marketed as conditioning agents.

Oils, organic amines, and plastic coatings are used in a few specialty fertilizers.

Description: Conditioning agents will prevent caking only when the moisture content of the product is sufficiently low to inhibit the formation of crystalline bridges between particles or granules. Granular products require 1% to 4% coating agent and nongranular products, from 5% to 15% of conditioning agent.

See Also: Surfactants.

Cone Mixing

Definition: A continuous process of mixing phosphate rock and acid in making superphosphate.

Process: All the mixing is done by the swirling action of injected acid and phosphate rock in a funnel having no moving parts.

Continuous Reactor — see Reactors**Controlled-Availability Fertilizers — see Controlled-Release Fertilizers****Controlled-Release Fertilizers**

Definition: "Slow or Controlled Release Fertilizers. A fertilizer containing a plant nutrient in a form which delays its availability for plant uptake and use after application, or which extends its availability to the plant significantly longer than a reference 'rapidly available nutrient' fertilizer such as ammonium nitrate or urea, ammonium phosphate, or potassium chloride. Such delay of initial availability or extended time of continued availability may occur by a variety of mechanisms. These include controlled water solubility of the material (by semipermeable coatings, occlusion, or by inherent water insolubility of polymers, natural nitrogenous organics, protein

Materials and Processes

Table 1-2 CONVERSION FACTORS¹

No.	A	B	To Convert	
			A to B	B to A
Multiply by				
1	Aluminum oxide, Al ₂ O ₃	Aluminum, Al	0.5293	1.8896
2	Ammonia, NH ₃ (excluding the nitrate equiv.)	Ammonium nitrate, NH ₄ NO ₃	4.7000	0.2128
3	Ammonia, NH ₃	Ammonium sulfate, (NH ₄) ₂ SO ₄	3.8794	0.2578
4	Ammonia, NH ₃	Diammonium phosphate, (NH ₄) ₂ HPO ₄	3.8770	0.2570
5	Ammonia, NH ₃	Monoammonium phosphate, NH ₄ H ₂ PO ₄	6.7541	0.1481
6	Ammonia, NH ₃	Nitrogen, N	0.8224	1.2160
7	Arsenic oxide, As ₂ O ₃	Arsenic, As	0.6519	1.5338
8	Barium, Ba	Barium oxide, BaO	1.3057	0.8957
9	Bone phosphate of lime, B.P.L., Ca ₃ (PO ₄) ₂	Phosphoric oxide, P ₂ O ₅	0.4576	2.1853
10	Boron, B	Boron oxide, B ₂ O ₃	3.2199	0.3106
11	Calcium, Ca	Calcium oxide, CaO	1.3992	0.7147
12	Calcium oxide, CaO	Calcium carbonate, CaCO ₃	1.7848	0.5603
13	Calcium oxide, CaO	Calcium hydroxide, Ca(OH) ₂	1.3211	0.7569
14	Calcium oxide, CaO	Calcium nitrate, Ca(NO ₃) ₂	2.9260	0.3418
15	Calcium oxide, CaO	Calcium sulfate, CaSO ₄	2.4277	0.4119
16	Carbon dioxide, CO ₂	Calcium carbonate, CaCO ₃	2.2742	0.4397
17	Chlorine, Cl	Potassium chloride, KCl	2.1029	0.4755
18	Copper oxide, CuO	Copper, Cu	0.7988	1.4616
19	Ferric oxide, Fe ₂ O ₃	Iron, Fe	0.6994	1.4298
20	Magnesium oxide, MgO	Magnesium, Mg	0.6031	1.6581
21	Magnesium oxide, MgO	Magnesium carbonate, MgCO ₃	2.0917	0.4781
22	Manganese, Mn	Manganese sulfate, MnSO ₄	2.7485	0.3638
23	Manganous oxide, MnO	Manganese, Mn	0.7745	1.2912
24	Molybdenum oxide, MoO ₃	Molybdenum, Mo	0.6665	1.5004
25	Nickel oxide, NiO	Nickel, Ni	0.7858	1.2725
26	Nitrogen, N	Ammonium nitrate, NH ₄ NO ₃	2.8573	0.3500
27	Nitrogen, N	Ammonium sulfate, (NH ₄) ₂ SO ₄	4.7170	0.2120
28	Nitrogen, N	Calcium cyanamide, CaCN ₂	2.8595	0.3497
29	Nitrogen, N	Calcium nitrate, Ca(NO ₃) ₂	5.8575	0.1707
30	Nitrogen, N	Monoammonium phosphate, NH ₄ H ₂ PO ₄	8.2122	0.1218
31	Nitrogen, N	Potassium nitrate, KNO ₃	7.2185	0.1385
32	Nitrogen, N	Sodium nitrate, NaNO ₃	6.0681	0.1648
33	Nitrogen, N	Urea, (NH ₂) ₂ CO	2.1438	0.4665
34	Phosphoric oxide, P ₂ O ₅	Calcium metaphosphate, Ca(PO ₃) ₂	1.3951	0.7168
35	Phosphoric oxide, P ₂ O ₅	Phosphoric acid, H ₃ PO ₄	1.3808	0.7242
36	Phosphoric oxide, P ₂ O ₅	Phosphorus, P	0.4364	2.2914
37	Potash, K ₂ O	Chlorine equivalent, Cl	0.7327	1.3286
38	Potash, K ₂ O	Potassium, K	0.8302	1.2045
39	Potash, K ₂ O	Potassium chloride, KCl	1.5829	0.6318
40	Potash, K ₂ O	Potassium nitrate, KNO ₃	2.1466	0.4659
41	Potash, K ₂ O	Potassium sulfate, K ₂ SO ₄	1.8499	0.5406
42	Silicon oxide, SiO ₂	Silicon, Si	0.4674	2.1393
43	Sodium oxide, Na ₂ O	Sodium, Na	0.7419	1.3479
44	Sulfur, S	Gypsum, CaSO ₄ ·2H ₂ O	5.3696	0.1862
45	Sulfur trioxide, SO ₃	Sulfur, S	0.4005	2.4969
46	Sulfur trioxide, SO ₃	Ammonium sulfate, (NH ₄) ₂ SO ₄	1.6505	0.6059
47	Sulfur trioxide, SO ₃	Calcium sulfate, CaSO ₄	1.7004	0.5881
48	Sulfur trioxide, SO ₃	Copper sulfate, CuSO ₄	1.9935	0.5016
49	Sulfur trioxide, SO ₃	Gypsum, CaSO ₄ ·2H ₂ O	2.1505	0.4650
50	Sulfur trioxide, SO ₃	Magnesium sulfate, MgSO ₄	1.5035	0.6651
51	Sulfur trioxide, SO ₃	Manganese sulfate, MnSO ₄	1.8860	0.5302
52	Sulfur trioxide, SO ₃	Zinc sulfate, ZnSO ₄	2.0163	0.4960
53	Vanadium oxide, V ₂ O ₅	Vanadium, V	0.5602	1.7852
54	Zinc oxide, ZnO	Zinc, Zn	0.8034	1.2447
55	Zinc oxide, ZnO	Zinc sulfate, ZnSO ₄ ·7H ₂ O	3.5337	0.2830

¹ International Atomic Weights for 1961, based on Carbon-12, were used in calculating these factors.

materials, or other chemical forms), by slow hydrolysis of water-soluble low molecular weight compounds, or by other unknown means." (AAPFCO). Also called controlled-availability fertilizers and slow-release fertilizers. **Description:** Limited solubility may be an inherent characteristic of the fertilizer such as in urea-formaldehyde reaction products and magnesium ammonium phosphate; or it may be imparted to a soluble fertilizer by coating the particles with such materials as molten sulfur, waxes, and plastics.

See Also: Urea-Formaldehyde Reaction Products.

Conversion Factors

Definition: Multipliers by which percentages expressed in one kind of chemical term can be converted to another. Table 1-2 provides conversion factors for all commonly used fertilizer materials.

Definition: Essential micronutrient for plants and animals. It is present in sufficient amounts in most soils, but in some areas the addition of a

Conversion Factors (cont.)

small quantity of copper sulfate (CuSO_4), or other copper compounds, has increased crop yields.

Agronomics: Some neutral or alkaline peat and muck soils are unproductive without the addition of a soluble form of copper. Yellow or chlorotic leaves or lack of seed heads may be an indication of copper deficiency. See Also: Micronutrients.

Copper

Definition: A metallic element which forms salts with acids. It is essential for plant growth and is recognized as one of the micronutrients. See Also: Micronutrients.

Copperas — see Ferrous Sulfate**Coprolites**

Definition: Fossil excrements of prehistoric animals.

Description: Contain 25% to 30% P_2O_5 .

Cottonseed Hull Ash

Definition: Clean ash from well-burned cotton hulls is highly esteemed as a tobacco fertilizer in some areas.

Cottonseed Meal

Definition: The ground press cake remaining after the oil is expelled from cooking cottonseed meats. Used largely as cattle feed. Some meal, particularly that which is off-color or moldy, is used as fertilizer.

Description: High-grade meal is deep yellow; fermented meal, red brown; moldy meal, grey brown; and undecorticated (ground without removing the hulls) meal is very dark brown in color. It averages 6% N, 2% P_2O_5 , 1% K_2O , and contains some secondary and micronutrient elements.

Crab Scrap

Definition: The offal collected at canning factories processing blue crabs. **Description:** Contains about 3% each of N and available P_2O_5 and small amounts of secondary and micronutrients. About one-fifth of the nitrogen is in the form of chitin, which has little or no value as fertilizer.

Critical Relative Humidity

Definition: A measure of the relative hygroscopicity of soluble salts, such as fertilizer salts or mixtures. For any specific salt or mixture, its critical humidity is defined as the humidity of the surrounding air, above which the salt or mixture will spontaneously absorb moisture from the air, and below which it will not absorb moisture from the air. Can be used to help predict the likely tendency of a fertilizer to become wet and nonflowable during prolonged storage or field handling under humid conditions.

See Also: Hygroscopicity.

Crotonylidene Diurea (CDU)

Definition: A controlled release nitrogen product made from reaction of urea with crotonaldehyde or acetaldehyde.

Description: It contains about 32% N.

Crude Calcium Sulfate — see Gypsum**Crude Nitrogenous Materials — see Nitrogenous Materials****Crushing Strength of Fertilizer Granules**

Definition: Weight required to crush an individual granule when placed between two surfaces.

Curtain Granulation

Definition: A fertilizer granulation system in which granules of desired particle size are developed by successively dropping the partially formed granule, as a curtain, in front of spray nozzles supplied with high-temperature melt or concentrated fertilizer solution.

Process: Granule growth is by successive layering of solidified melt or solution. Formation of the falling curtain of partially-formed granules is accomplished by special internal design of a rotary drum-type granulator.

See Also: Granulation.

Custom Mixture

Definition: "A fertilizer formulated according to specifications, which are furnished by/for a consumer prior to mixing, shall be labeled to show the net weight, guaranteed analysis, and the name and address of the distributor. If distributed in bulk a written or printed statement of the information required shall accompany delivery." (AAPFCO)

Cyanamide — see Calcium Cyanamide**Cyanoguanidine — see Dicyanodiamide****DAP — see Diammonium Phosphate****Datolite ($\text{CaB}(\text{OH})\text{SiO}_4$)**

Definition: A mineral source of boron sometimes used in making fertilizers containing micronutrients.

DCD — See Dicyanodiamide**Dead-Burned Magnesia — see Magnesia****Defluorinated Phosphate — see Calcined Phosphate****Deliquescent**

Definition: Capable of absorbing moisture from the air and becoming a liquid. See Also: Hygroscopicity.

Desulfurization

Definition: Process of sulfur removal as from flue gases.

Diamido Phosphates

Definition: A series of organic nitrogen phosphates, such as sodium diamido phosphate, which have N-P fertilizer values.

Diammonium Phosphate (DAP)

Definition: Most of the fertilizer grade of diammonium phosphate ($(\text{NH}_4)_2\text{HPO}_4$) is made from wet-process phosphoric acid and ammonia and has a grade of 18-46-0. DAP has an economic advantage over monoammonium phosphate (MAP) because the same amount of acid reacts with twice as much ammonia.

Processes: Substantial quantities of crystalline DAP are produced as by-products from the iron and steel industry. The electric furnace phosphoric acid used for pickling steel, etc., results in a typical DAP grade of 21-53-0.

Diatomaceous Earth

Definition: Remains of diatoms. Used as a conditioner of ammonium nitrate and of mixed fertilizers. The material will absorb several times its own weight of moisture.

Description: A fluffy white amorphous material. Apparent specific gravity from 0.15 to 0.19, with an average of about 0.25. Bulk density is about 15 pounds per cubic foot. Porosity is 60% to 80%. At least 90% of the better grades will pass through a 325-mesh sieve. They contain 80% or more of silica, SiO_2 .

Dicalcium Phosphate (CaHPO_4)

Definition: "A manufactured product consisting chiefly of dicalcic salt of phosphoric acid." (AAPFCO) This product mainly is used for animal feed. See Also: Precipitated Bone; Precipitated Phosphate.

Dicalcium Pyrophosphate — see Calcium Polyphosphate**Dicyanodiamide (DCD)**

Definition: "Dicyanodiamide (cyanoguanidine) is a water soluble organic compound of formula $\text{C}_2\text{H}_4\text{N}_4$ which contains at least 65% nitrogen. It is a source of slowly available nitrogen." (AAPFCO)

Description: An organic amide of the composition $\text{C}_2\text{H}_4\text{N}_4$. The fine-grained crystalline powder is nonhygroscopic and is thermally stable up to 170°C in air. Nontoxic to mammals ($\text{LD}_{50} = 12,000$ mg/kg). DCD can be readily incorporated into solid, fluid, and suspension fertilizers. Its decomposition rate during incorporation and storage of fertilizers is minimal.

Agronomics: Used as a nitrification inhibitor in ammoniacal fertilizers and urea. At high field application rates, DCD has occasionally exhibited phytotoxicity. However, at rates sufficient for use as a nitrification inhibitor (20 kg/ha), no phytotoxicity was exhibited.

Digested Activated Sewage Sludge — see Sewage Sludge**Digested Sewage Sludge — see Sewage Sludge****Dihydrate**

Definition: Refers to the hydrated calcium sulfate compound containing two moles of H_2O ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$); known also as the mineral gypsum, the usual calcium sulfate precipitate in so-called "dihydrate" phosphoric acid processes.

See Also: Gypsum.

Materials and Processes

Dimethylenetriurea

Definition: "Dimethylenetriurea (DMTU) is a water-soluble condensation product resulting from the reaction of two molecules of formaldehyde with three molecules of urea, with the elimination of two molecules of water, and having a minimum total nitrogen content of 41%. It is a source of slowly available nitrogen." (AAPFCO)
See Also: Urea-Formaldehyde Reaction Products.

Dispersant

Definition: Any of various soluble chemicals which, when added in small proportion to a clay-water slurry, will affect the surface charge on the ultimate clay particles in such a manner that the particles become mutually repulsive. The resultant particle repulsion discourages flocculation of particles, promotes wetting of the ultimate particles, and reduces viscosity of the slurry. The chemical dispersant most widely used for fluid-clay preparation is tetrasodium pyrophosphate (TSPP).
Process: Dispersion of gelling clays such as are used in suspension fertilizers is an essential first step in production of a suitably strong gel structure in the final suspension. The dispersion can be effected by premixing the clay with water and chemical dispersant prior to the addition to the fertilizer mixture or, in some fertilizer systems, mechanical dispersion by use of high-shear agitation of clay in the fertilizer mixture is sufficient.
See Also: Fluid Clay; Tetrasodium Pyrophosphate.

Distillery Waste

Definition: Most of the alcohol used for industrial purposes is made from molasses. The residue from distillation of the alcohol is a liquid containing considerable potash and other plant nutrients.
Process: Evaporated to the point where it will burn, the resulting ash is used as a fertilizer. In other cases it is mixed with rice hulls, dolomite, and phosphoric acid and then ammoniated to make a mixed fertilizer.
Description: A typical sample contains 1.0% N, 0.5% P_2O_5 , and 14.4% K_2O .
Agronomics: Sometimes applied directly to the soil or mixed with irrigation water.

DMTU (Dimethylenetriurea) — see Urea-Formaldehyde Reaction Products**Dolomite**

Definition: A natural mineral useful for neutralizing soil acidity; double carbonate of calcium and magnesium ($MgCO_3 \cdot CaCO_3$). Thought of and used in the same manner as limestone in which one-half of the calcium has been replaced with magnesium. "A material composed chiefly of carbonates of magnesium and calcium in substantially equimolar (1-1.19) proportions." (AAPFCO)
Description: Dolomitic limestone reacts more slowly than high calcic limestone with acids and is much less likely to release ammonia from its salts. It also supplies the essential plant nutrient magnesium. The average magnesium content of dolomite used by the fertilizer industry is about 11%.
Agronomics: In theory 100 pounds of dolomite is equal to 109 pounds of calcium carbonate for neutralizing soil acidity.

Dolomitic Lime

Definition: Usually contains about 36% Ca and 20% Mg, although Mg content varies. Lime always contains some silica, iron, and aluminum oxides as contaminants.
See Also: Lime.

Dolomitic Limestone — see Limestone**Double Manure Salts — see Sulfate of Potash Magnesia (SPM)****Double Salts**

Definition: Double salts, such as calcium nitrate-urea, may be formed but ionize as two distinct salts when they are dissolved. Frequently a double salt is less hygroscopic than either of its constituents.
See Also: Hygroscopicity.

Double Superphosphate — see Superphosphate**DPTA — see Chelates****Dried Blood — see Blood****Dried Fish Scrap — see Fish Scrap****Dried Manure — see Manure****Drum Granulator — see Granulation**

Fertilizer Dictionary

Dry Basis

Definition: An analysis on dry basis means the results actually obtained are recalculated to the basis of the dry material.

EDTA — see Chelates**Efflorescent**

Definition: To lose crystalline structure and become powdery on exposure to air, through loss of water of crystallization.

Element

Definition: Pure substances which cannot be decomposed by a chemical change. The simplest form of matter. One of 92 naturally occurring substances, each of which has unique physical and chemical characteristics.

Enriched Superphosphate — see Superphosphate**Epsom Salt — see Magnesium Sulfate****Equivalent Acidity or Basicity of Fertilizer — see Acidity and Basicity of Fertilizers****Essential Elements**

Definition: Elements required by plants to complete their life cycle. There are 17 commonly known essential elements.
See Also: Plant Nutrients.

Eutectic Solutions

Definition: Solution salts which exhibit special influences on one another when mixed together in specific proportions in water.

Felt Waste

Definition: Consists usually of rabbit hair.
Description: Contains 10%-13.6% N, which is largely converted to available forms when made into process tankage.

Ferric Oxide (Oxide of Iron)

Definition: Found in phosphate rock where its actions are similar to alumina. More than 3% to 4% of oxide of iron (Fe_2O_3) will make sticky superphosphate. It is not available to plants, even in powder form.
See Also: Iron.

Ferric Sulfate ($Fe_2(SO_4)_3 \cdot 9H_2O$)

Definition: A yellow brown salt and a quickly available source of iron.
Description: Fertilizer grade contains about 21% Fe.
See Also: Micronutrient Fertilizers.

Ferricammonium Sulfate ($(NH_4)_2Fe_2(SO_4)_4 \cdot 6H_2O$)

Definition: A green crystalline salt used principally in photography, and occasionally as a fertilizer. Other double salts in which the iron is replaced by copper, manganese, or zinc have also been used as micronutrient fertilizers.

Ferro-Phosphorus

Definition: A compound of iron and phosphorus produced as a by-product in the manufacture of elemental phosphorus. It is not used in fertilizers.

Ferrous Sulfate ($FeSO_4 \cdot xH_2O$)

Definition: Both the anhydrous ($FeSO_4$) and the hydrated salts ($FeSO_4 \cdot H_2O$ and $FeSO_4 \cdot 7H_2O$) are used in micronutrient fertilizers. The last is also known as copperas, which contains about 20% Fe.
See Also: Micronutrient Fertilizers.

Fertilizer (Acid Forming, Non-Acid Forming)

Definition: "The term fertilizer means any substance containing one or more recognized plant nutrient(s) which is used for its plant nutrient content and which is designed for use or claimed to have value in promoting plant growth, except unmanipulated animal and vegetable manures, marl, lime, limestone, wood ashes, and other products exempted by regulation by the _____" (AAPFCO)
See Also: Acidity and Basicity of Fertilizers.

Fertilizer Acidity — see Acidity and Basicity of Fertilizers**Fertilizer Additive**

Definition: A substance added to fertilizer or applied alone to alter transformation in the soil, maintain good physical condition, reduce corrosiveness, or serve some purpose other than providing plant nutrients.

Table 1-3: Total Fertilizer Consumed, Years Ended June 30

Kind	United States	
	1992	1993
(short tons of material)		
Multiple Nutrients		
N-F-K	10,109,568	9,952,972
N-P	6,489,887	7,063,133
N-K	889,710	853,424
P-K	583,601	509,459
TOTAL	18,072,765	18,378,988
Nitrogen Materials		
Anhydrous Ammonia	5,005,384	4,366,134
Aqua Ammonia	331,498	329,628
Ammonia Nitrate	1,911,223	1,922,255
Ammonium Thiosulfate	180,763	189,604
Ammonium Sulfate	901,358	872,891
Calcium Nitrate	75,827	85,854
Nitrogen Solutions	8,103,665	8,702,693
Sodium Nitrate	39,616	53,454
Urea	3,545,250	3,946,032
Other	1,042,001	1,147,982
TOTAL	21,136,604	21,616,527
Natural Organic Materials		
Dried Blood	443	951
Compost	29,628	18,210
Dried Manure	149,225	116,718
Sewage Sludge (Activated)	38,460	55,336
Sewage Sludge (Other)	74,311	55,009
Tankage	769	1,518
Other	204,608	186,993
TOTAL	497,444	434,734
Phosphate Materials		
Ammonium Phosphate Sulfate	200,856	204,303
Basic Slag	7,006	4,654
Phosphoric Acids	94,981	145,614
Diammonium Phosphates	3,430,949	3,731,578
Monoammonium Phosphates	1,000,465	1,185,419
Liquid Amm. Phosphate	1,156,128	1,206,023
Normal Superphosphate	27,061	18,371
Triple Superphosphate	497,717	480,532
Other	166,054	184,957
TOTAL	6,581,136	7,161,451
Potash Materials		
Lime Potash	9,893	2,926
Manure Salts	2,148	6,549
Potassium Chloride	5,158,400	5,372,870
Potassium-Magnesium Sulfate	130,577	134,123
Potassium Nitrate	41,864	47,201
Potassium Sodium Nitrate	19,946	19,893
Potassium Sulfate	161,604	201,775
Other	137,177	133,452
TOTAL	5,661,609	5,918,789
Secondary & Micronutrients		
Borax	16,165	18,023
Calcium Chelate	7,379	14,896
Calcium Sulfate (Cypsum)	1,189,293	1,349,942
Copper Compounds	1,775	2,828
Iron Compounds	17,194	16,696
Magnesium Compounds	2,940	2,800
Manganese Compounds	6,021	6,636
Sulfur	97,915	121,257
Sulfuric Acid	40,274	45,396
Zinc Compounds	42,684	45,783
Other	352,941	410,226
TOTAL	1,774,581	2,034,483
TOTAL ALL FERTILIZERS	47,793,366	49,078,447

Source: "Commercial Fertilizers," December 1993

Fertilizer Ammoniation-Granulation — see Ammoniation-Granulation of Fertilizer

Fertilizer Basicity — see Acidity and Basicity of Fertilizers

Fertilizer Conditioner — see Conditioners

Fertilizer Consumption — see Table I-3

Fertilizer Control Officials — see State Control Officials List in Section D (Regulatory File)

Fertilizer Filler — see Filler

Fertilizer Formula

Definition: The quantity and grade of the stock materials used in making a fertilizer mixture. For example: 800 pounds of diammonium phosphate (18-46-0), 800 pounds of ammonium nitrate (34% N), and 400 pounds of potassium chloride (60% K₂O). The 2000-pound total of this mixture would have an analysis of 20.8%N, 18.4% P₂O₅ and 12% K₂O.

Fertilizer Formulation

Definition: The grade of a fertilizer indicates the nutrient content expressed in terms of percentages of N, P₂O₅, and K₂O. "The minimum guarantee of available plant food expressed in terms of total nitrogen (not ammonia), available phosphate or phosphorus, and soluble potash or potassium. The numerals for nitrogen (N), available phosphate (P₂O₅), soluble potash (K₂O), or available phosphorus (P) and soluble potassium (K) appearing as the grade must coincide with the guaranteed analysis statement. Only one set of numerals may be used in the grade designation." (AAPFCO)
See Also: Grade.

Fertilizer Material

Definition: "A fertilizer material is a fertilizer which either:
"A. Contains important quantities of no more than one of the primary plant nutrients: nitrogen (N), phosphorus (P), and potassium (K), or
"B. Has 85% or more of its plant nutrient content present in the form of a single chemical compound, or
"C. Is derived from a plant or animal residue or by-product or natural material deposit which has been processed in such a way that its content of plant nutrients has not been materially changed except by purification and concentration." (AAPFCO)

Fertilizer Nutrient Solubility

Definition: The quantity of a given nutrient which can be extracted by different means under specified conditions and express percentage of the nutrient by mass of the fertilizer.

Fertilizer Ratio

Definition: The relative proportions of primary nutrients in a fertilizer grade divided by the highest common denominator for that grade: e.g., grades 10-6-4 and 20-12-8 have the ratio 5-3-2.

Fertilizer Segregation — see Bulk Blending; Size Guide Number; Segregation

Fertilizer Solubility — see Solubility of a Fertilizer

Fertilizer Solution — see Solution Fertilizer

Fertilizer Unit

Definition: Twenty pounds of plant food or 1% of a 2000-pound ton of a fertilizer. A unit and a percentage value of the fertilizer are interchangeable.

Filler

Definition: "A substance added to fertilizer materials to provide bulk, prevent caking or serve some purpose other than providing essential plant nutrients." (AAPFCO)

Filter Acid (Phosphoric)

Definition: Unconcentrated wet-process acid containing 26% to 32% P₂O₅.

Fines

Definition: Fertilizer particles that are smaller than the size of particles intended to be manufactured for sale. Fines at the retail dealer level usually create problems in uniform application of the fertilizer.

Materials and Processes

Fish Meal, Fertilizer Grade — see Fish Scrap

Fish Scrap

Definition: Dried fish scrap is processed non-edible fish, such as menhaden and dogfish, from offal (heads, tails, entrails, etc.) from fish canneries and spoiled edible fish. In recent years almost the entire supply has gone into animal feed. The little still used for fertilizer goes into the home-garden market.

Description: Averages about 9% N, 7% P₂O₅, and contains small amounts of K₂O, secondary and micronutrient elements.

Fish Tankage

Definition: "Fish tankage (fish scrap, dry ground fish, fish meal fertilizer grade) is a dried ground product derived from rendered or unrendered fish." (AAPFCO)

Fixed Phosphate

Definition: Phosphate precipitates usually in the form of aluminum, iron, and calcium phosphates with type of precipitates related to soil pH.

Floats

Definition: Pulverized rock phosphate which may be a dust collector product and which is sometimes applied to the soil in the raw state or used as a phosphatic filler in mixed fertilizer.

Flocculant

Definition: Any of various soluble materials that have the rheological effect of destroying the dispersed state of solids in solid-liquid mixtures. In the case of clay dispersions, almost any fertilizer salt solution has the effect of a flocculant.

Process: When fluid clay is added to fertilizer slurries in preparation of suspension fertilizers, flocculation occurs, but not to the point of sedimentation. Because of the low concentration of the clay, flocculation progresses only to a thixotropic, gel-type lattice configuration that is effective in suspending fertilizer salts in the suspension.

See Also: Dispersant; Fluid Clay.

Flotation

Definition: A process in which finely crushed ore is mixed in a liquid (ordinarily water) with surfactants and through which air may be blown.

Process: Sodium chloride may be floated away from potassium chloride particles in a saturated solution of both. Flotation is used to refine potash salts, and to separate finely divided particles of phosphate rock from sand and clay. The BPL of Florida land pebble rock is raised by flotation, but the process is seldom used with other types of rock.

Description: The surfactant selectively coats one kind of particle and not the others. Air bubbles attach themselves to the coated particles and float them to the top in a froth, which is skimmed off.

See Also: Surfactants.

Fluid Clay

Definition: Used as the suspending agent in production of suspension fertilizers.

Description: Usually clays (attapulgite and sometimes bentonite or sepiolite) that have been dispersed in water or a nonelectrolyte such as urea solution. To aid the dispersion of the clay, some amounts of chemical dispersants, such as tetrasodium pyrophosphate, are frequently added.

See Also: Suspension Fertilizers.

Fluid Fertilizer

Definition: Liquid, slurry or suspension fertilizer.

See Also: Liquid Fertilizers.

Fluid Lime

Definition: A suspension mixture of fine limestone or other liming agents in water.

Description: A 50/50 mixture is common with 93% of material passing a 200 mesh sieve and suspended with 0.5% clay and dispersed with either tetrasodium-pyrophosphate (TSPP) or sodium tripolyphosphate (STP). Water or urea-ammonium nitrate (UAN) solution may be used as the suspending fluid.

Fluid-Bed Granulation of Fertilizer

Definition: Granulation process using a stationary, enclosed chamber in which controlled upward airflow suspends a bed of granules onto which melt or concentrated solution is sprayed.

Fluorapatite — see Apatite

Fluorine (F)

Description: An acid-forming element (gas) similar in many ways to chlorine. Phosphate rock usually contains from 3% to 4% fluorine combined with calcium and phosphorus.

See Also: Apatite; Plant Nutrients.

Fluorine Recovery

Definition: The process of removing silicon tetrafluoride (SiF₄) and hydrofluoric acid (HF) from the off-gases of the phosphate plant to form fluosilicic acid and fluosilicate salts which are useful intermediates in producing other valuable fluorine compounds.

Fluosilicic Acid (H₂SiF₆)

Definition: When silicon tetrafluoride (SiF₄) together with the other gases given off during the mixing of phosphate rock with sulfuric acid is sprayed with water in the condensing towers usually used, fluosilicic acid is formed.

Forestry Grade

Definition: Refers to a special particle size of fertilizer, usually urea, specifically designed for aerial application of the fertilizer to forests.

Description: The forestry-grade size is somewhat larger than that of the usual granular fertilizer in order to reduce wind drift and lodging of granules in tree branches. Table 1-4 provides a particle-size comparison of typical forestry-grade urea with standard granular urea intended for bulk blending.

Table 1-4
Particle-size comparison

Tyler screen mesh	Urea	
	Standard granular	Forestry grade
+3	0	5
-3+4	0	70
-4+5	0	25
-5+6	0	0
-6+7	1	0
-7+8	43	0
-8+9	39	0
-9+10	14	0
-10	3	0

Formula, Fertilizer — see Fertilizer Formula

Francolite

Description: Carbonate fluorapatite (Ca₁₀F₂(PO₄)₆·xCaCO₃), the principal constituent of phosphate rock.

Free Acid

Definition: As applied to superphosphate and mixed fertilizers, it is not generally free sulfuric acid, but rather free phosphoric acid (H₃PO₄).

Frits (Fritted Micronutrients)

Definition: Special glasses which provide controlled release with as high as 50% of micronutrient elements incorporated. Potash, phosphorus, calcium, and magnesium are also fritted and can be included in these glasses.

Agronomics: Because of their low water solubility, these sources are used for maintenance programs in sandy soils.

Fuming Sulfuric Acid (Oleum)

Definition: Sulfuric acid (100% H₂SO₄) containing varying amounts of SO₃ in solution. Less concentrated sulfuric acid is sometimes erroneously called "oleum."

Furfural Residue

Definition: A sterilized organic conditioner. A by-product of steam and acid digestion of agricultural wastes such as cottonseed hulls, oat hulls, corn cobs, or mixture.

Description: Consists of about 85% cellulose and lignin and is unfit for feed. Has been used as a fertilizer conditioner for nongranular goods.

Fused and Noncrystalline Phosphate Products

Definition: "Fused and noncrystalline phosphate products shall be marketed with an adequate statement concerning size of particles, in terms of percentages of the total product which pass through U.S. Standard sieves of stated size." (AAPFCO)

Fused Tricalcium Phosphate

Definition: A product resulting from the fusion of phosphate rock under conditions which result in a product consisting chiefly of the alpha form of tricalcium phosphate. The guaranteed percentage of available phosphoric acid is stated as a part of the name.

See Also: Calcined Phosphate.

Garbage Tankage

Definition: "The rendered, dried, and ground product derived from waste household food materials." (AAPFCO)

Garden Products — see Lawn and Garden Products

Gellation — see Gelling

Gelling, Gellation

Definition: A gel is an apparently homogenous semisolid substance that may be elastic, jelly-like or more or less rigid such as silica gel. Gelling or gellation results from formation of the gel by coagulation of a liquid or slurry with the addition of certain compounds composed of small, usually elongated crystals or of certain compounds (usually organic) having large molecules.

Description: The material most used for producing the gel in suspension fertilizers is attapulgite clay.

See Also: Fluid Clay.

Grade

Definition: "The grade of a fertilizer shall be used by the registrant/licensee in the labeling and by the control official in his reports and publications. No numeral shall be used in the grade of a fertilizer except those referring to Total Nitrogen (N), Available Phosphate (P_2O_5), and Soluble Potash (K_2O)." (AAPFCO)

Granular Fertilizer

Definition: Fertilizer in the form of particles sized between an upper and lower limit or between two screen sizes, usually within the range of 1-4 millimeters and often more closely sized.

Process: The desired size may be obtained by agglomerating smaller particles, crushing and screening larger particles, controlling size in crystallization processes, or prilling.

See Also: Granulation.

Granulated Fertilizers — see Granulation

Table 1-5
Sieve Descriptions

Sieve Opening Retaining 85% or More of the Product			Sieve Opening Passing the Largest Particle in the Product			Maximum Range of Particle Size	
Mesh	U.S. No.	mm	Mesh	U.S. No.	mm	Mesh	
20	20	0.841	6	6	3.36	-6	+20
16	18	1.00	5	5	4.00	-5	+16
14	16	1.19	4	4	4.76	-4	+14
12	14	1.41	3 1/2	3 1/2	5.66	-3 1/2	+12
10	12	1.68	0.265 in.	0.265 in.	6.73	-0.265 in.	+10
8	8	2.38	3/8 in.	3/8 in.	9.51	-3/8 in.	+8

Granulation (Granulated/Pelleted Fertilizers)

Definition: A method of processing that has been widely adopted as a means of improving the storage and handling properties of fertilizers. "Granular fertilizer - one in which 95% or more of the product is retained on a series of sieves within the range of U.S. No. 4 (4.75 mm opening) to and including 20 mesh (0.841 mm opening), and in which the largest particle passes through a sieve having an opening not larger than four (4) times that of the sieve which retains 95% or more of the product." (AAPFCO).

Process: Methods of granulation may be divided into two broad classes —slurry and non-slurry processes.

The slurry process consists of wetting or coating undersized or seed granules of the product with a slurry of the fertilizer during suitable agitation, then drying, and screening the granules, and recycling the undersize particles in the process until they are built up, "onion-skin" fashion, to the desired granular size.

The non-slurry process consists of wetting relatively finely divided dry fertilizers with the minimal proportion of liquid to cause agglomeration of the

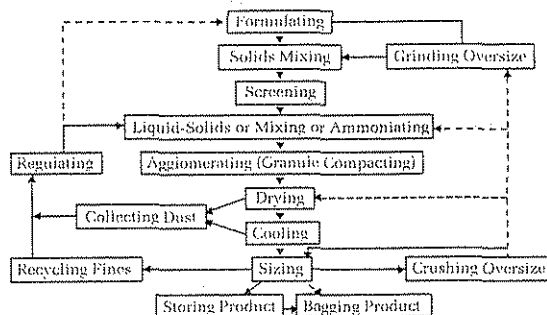


Figure 1-3
Steps in the continuous granulation process.

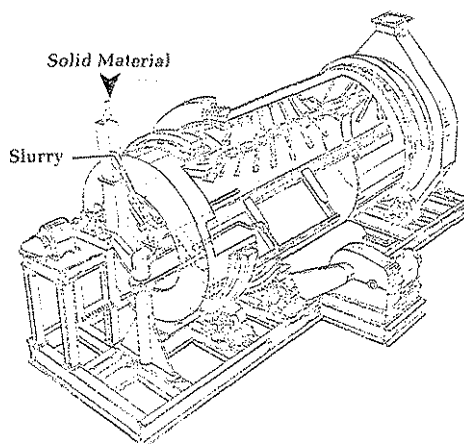


Figure 1-4
Diagram of TVA ammoniator-granulator. (Courtesy TVA)

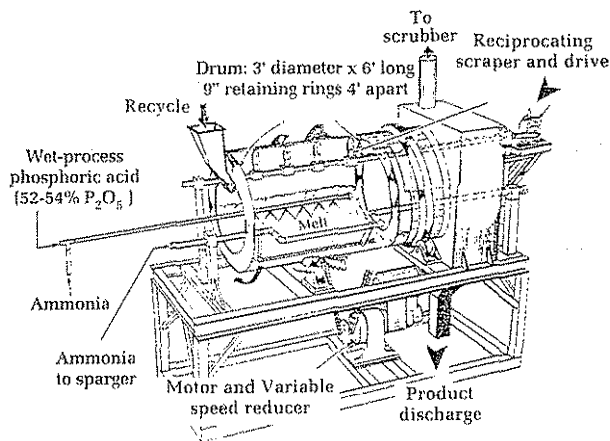


Figure 1-5
Pipe reactor and rotary drum granulator. (Courtesy TVA)

particles and form stable granules. The product is dried and screened and the ground oversize and fines are recycled in the process. Table 1-5 provides sieve descriptions. Figures 1-3, 1-4, and 1-5 illustrate granulation.

Ground Limestone

Definition: "Ground limestone (coarse ground limestone) is calcitic or dolomitic limestone ground sufficiently fine for effective use as a liming material." (AAPFCO)

See Also: Liming Materials.

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Ground Shell Marl

Definition: "The product obtained by grinding natural deposits of shell marl so that at least 75% shall pass a U.S. Standard No. 100 sieve (150 µm opening)." (AAPFCO)

See Also: Liming Materials.

Ground Shells

Definition: "The product obtained by grinding the shells of mollusks so that not less than 50% shall pass a U.S. Standard No. 100-mesh sieve. The product shall also carry the name of mollusk from which said product is produced." (AAPFCO)

See Also: Liming Materials.

Guano

Definition: Partially decomposed excrements of birds, bats, seals, or other animals.

Guanylurea (NH₂(CNH)NH-COHN₂)

Definition: An organic nitrogen material which may be reacted with magnesium or pentachlorophenol to form a controlled release nitrogen product.

Guaranteed Analysis

Definition: The minimum percentage of plant nutrients claimed.

Description: The AAPFCO Uniform Fertilizer Bill states:

"The term Guaranteed Analysis shall mean the minimum percentage of plant nutrients claimed in the following order and form:

- "A. Total Nitrogen (N) percent
- Available Phosphate (P₂O₅) percent
- Soluble Potash (K₂O) percent

"B. For unacidulated mineral phosphatic material and basic slag, bone, tankage, and other organic phosphatic materials, the total phosphate and/or degree of fineness may also be guaranteed.

"C. Guarantees for plant nutrients other than nitrogen, phosphorus, and potassium may be permitted or required by regulation by the _____. The guarantees for such other nutrients shall be expressed in the form of the element. The source (oxides, salts, chelates, etc.) of such other nutrients may be required to be stated on the application for registration and may be included on the label. Other beneficial substances or compounds, determinable by laboratory methods, also may be guaranteed by permission of the _____ and with the advice of the Director of the Agricultural Experiment Station. When any plant nutrients or other substances are guaranteed, they shall be subject to inspection and analysis in accord with the methods and regulations prescribed by the _____."

Gypsum (Lard Plaster)

Definition: "Gypsum lard plaster or crude calcium sulfate is a product consisting chiefly of calcium sulfate with combined water (CaSO₄·2H₂O) and is incapable of neutralizing soil acidity. It shall contain not less than 70% CaSO₄·2H₂O." (AAPFCO)

Description: Gypsum occurs in large deposits of soft crystalline rock and as sand. A granulated (-6 + 16 mesh, 67-71 pounds/cubic feet bulk density) form has been developed for application as a calcium source or sulfur source either alone or in a blend with other fertilizers.

Agronomics: Lard plaster is widely used for growing peanuts and sometimes for other crops. In arid regions, large tonnages are used to treat alkali soils. Calcium from gypsum replaces sodium on the soil exchange complex. The sodium ions are then leached from the soil. In irrigated agriculture it is used to increase permeability of soils. An acre-foot of water dissolves about 250 pounds of gypsum. This increases the penetration of the water from 30% to 170%, according to initial soil conditions.

Habit Modifiers

Definition: Substances that modify the crystal forms of certain fertilizer salts. These effects are specific for individual salts and may have little effect on mixtures containing them. Small amounts greatly reduce caking of some salts.

Hair

Definition: Waste hair from tanneries and other sources is not suitable for fertilizer in its raw state, but was formerly used in making wet base goods and also in process tankage.

Description: The chief component of hair is keratin which contains 17.01% N and 3.25% S. The N content of waste hair varies from 8% to 14%.

Half-Life — see Radioactive Isotopes

Hardsalt (Hartsalz)

Definition: A salt similar to kainite or sylvinite containing an average of 15.8% K₂O.

Hardwood Ashes — see Wood Ashes

Hartsalz — see Hardsalt

Heavy Metals

Definition: Metallic elements which are located in the transitional series of the periodic chart of elements. These metals are usually not required in plant nutrition and usually are found in relatively small amounts in nature. Examples are cadmium (Cd), chromium (Cr), cobalt (Co), lead (Pb), nickel (Ni), and vanadium (V).

Agronomics: Toxicity to plants could result with high concentrations of some heavy metals in soil, and problems in animal and human health may result if heavy metal concentrations in the diet are above certain critical levels. Vanadium application has recently had positive effects on cotton yields, however.

HEDTA — see Chelates

Hemihydrate

Definition: The hydrated calcium sulfate compound containing one-half mole of H₂O, CaSO₄·1/2H₂O.

Description: Water content varies somewhat with preparation conditions. It is the usual calcium sulfate precipitate in so called "hemihydrate" processes for the direct production of relatively strong phosphate (about 40% P₂O₅).

High-Analysis Superphosphate — see Superphosphate

High Calcic Liming Materials

Definition: "Liming materials containing at least 25% calcium. Further, at least 91% of the total calcium and magnesium is calcium." (AAPFCO)

See Also: Liming Materials.

High-Grade Residue

Definition: The filter cake separated in the manufacture of monosodium phosphate.

Description: Largely calcium sulfate, but also contains from 6% to 8% P₂O₅.

See Also: Hygrade Neutral Phosphate.

High Magnesian Liming Materials

Definition: "High magnesian liming materials are those containing at least 6% of magnesium." (AAPFCO)

See Also: Liming Materials.

Hoof and Horn Meal

Definition: "Hoof and Horn Meal is processed dried, ground hoofs and horns." (AAPFCO). Introduced to the trade in 1873 as a fertilizer, but no longer of significant importance to the trade.

Description: Contains about 13% N.

Hot-Mix Fertilizer Plant

Definition: A fluid fertilizer plant in which acid is neutralized in the mixing process, thereby releasing chemical heat.

Hydrated Lime (Ca(OH)₂)

Definition: A strong base (Ca(OH)₂), similar to household lye. "A dry product consisting chiefly of calcium and magnesium hydroxides." (AAPFCO)

Agronomics: Reacts quickly with acid soil to increase soil pH.

See Also: Liming Materials.

Hydrochloric Acid (HCl)

Definition: A colorless, incombustible, pungent gas, commonly known in the form of its aqueous solution.

Process: Occasionally used in treating phosphate rock in the manufacture of phosphoric acid and in the production of ammonium chloride.

Hydrofluoric Acid (HF)

Definition: Produced in the off-gases from phosphate rock acidulation.

Hydrogen (H)

Definition: A colorless, highly inflammable gas (H₂) important to the fertilizer industry in the manufacture of ammonia.

Process: May be made by various processes, such as 1) by passing steam over hot coke. H₂O + C = 2H + CO; 2) from methane (CH₄) in natural gas by passing the latter through a suitable catalyst; 3) by-product of petroleum refining; 4) electrolysis of water; and others. Natural gas is the chief U.S. source.

Table 1-6
The hygroscopicities of some pure compounds that may occur in fertilizers and their mixtures follow:

Fertilizer salt	Critical relative humidity at which the salt or its mixture with other salts begins to absorb moisture at 86°F. ^a													
Calcium nitrate Ca(NO ₃) ₂ ·4H ₂ O											47			
Ammonium nitrate NH ₄ NO ₃										59	24b			
Sodium nitrate NaNO ₃									72	46b	38b			
Urea CO(NH ₂) ₂								73	46b	18b	67c			
Sodium chloride NaCl							75	53b	68b	d				
Ammonium chloride NH ₄ Cl						77	69b	58b	42-52e	51b				
Ammonium sulfate (NH ₄) ₂ SO ₄					79	71b		56b	d	62b				
Potassium chloride KCl				84	d	74b	72b	60b	d	d	e			
Potassium nitrate KNO ₃			91	79b	62-69e,f	55-68e,f	61-67c	65b	65b	60b,f	31b			
Monoammonium phosphate NH ₄ H ₂ PO ₄			92	60e,f	d	76b	74b		65b	49-64e	58b	d		
Potassium phosphate KH ₂ PO ₄			93	91b	90b	83b	d	73e,f		70b	63c	d	d	
Calcium phosphate Ca(H ₂ PO ₄) ₂			94	91b	89b	44-88e	78e	d	74e		65b	36-68e	26-53e	46b
Potassium sulfate K ₂ SO ₄	96	d	94b	79e,f	88b	83b	81b	71e,f		72b	d	d	d	
Calcium sulfate CaSO ₄			93-94e	77-82e	80-82e									

- a. The first value is the approximate critical relative humidity of the salt alone. Read down or across to find the critical relative humidity of its mixture with most of the other salts listed.
- b. Nonreacting salt pairs. Data for solution saturated with both salts.
- c. The double salt, Ca(NO₃)₂·4CO(NH₂)₂.
- d. Unstable salt pair of reciprocal salt pairs. See stable salt pair.
- e. Stable salt pair of reciprocal salt pairs.
- f. Solid phases include solid solutions.

Hydrogen Ion Concentration — see pH

Hydrogen Sulfide (H₂S)

Definition: Present in sour natural gas and sour crude oil, hydrogen sulfide gives these materials their characteristic odor of rotten eggs. Desulfurization of refinery gases yields some by-product sulfur used in making sulfuric acid.

Hydrolysis

Definition: The process by which fertilizer salts react with water.

Hygrade Neutral Phosphate

Definition: A by-product of the manufacture of trisodium phosphate and detergents.

Description: Mixture of iron and aluminum phosphates containing 32%-37% available P₂O₅. High Grade Residue is a different material. See Also: High Grade Residue.

Hygroscopic Point — see Hygroscopicity

Hygroscopicity

Definition: The tendency of salts to adsorb water whenever the vapor pressure of moisture in the air exceeds that of a saturated solution of the salt.
Description: The hygroscopicity of some salts changes little with normal changes in temperature, but ammonium nitrate, calcium

nitrate, and urea adsorb water at lower humidities in summer than in winter. A mixture of two salts is usually more hygroscopic than either alone. Potash salts and phosphates are relatively non-hygroscopic. See Table 1-6.

See Also: Compatibility; Critical Relative Humidity; Double Salts; Nonreacting Salt Pair; Reciprocal Salt Pairs; Relative Humidity; Solid Solutions.

I and A

Definition: Iron and aluminum content, expressed as the oxides Fe₂O₃ and Al₂O₃.

Impact Resistance of Granular Fertilizer

Definition: Resistance to granule breakdown as a result of impact as determined by a specified procedure.

Industrial By-Product

Definition: Waste materials from various industrial processes which contain plant nutrients. These products may be converted into fertilizer materials, depending upon their physical condition and on their content of possibly undesirable contaminants.

Inorganic Fertilizer

Definition: A fertilizer material in which carbon is not an essential component of its basic chemical structure.

Materials and Processes

Insoluble

Definition: As applied to potash and nitrogen it refers to insolubility in water.

As applied to phosphates in fertilizer, it refers to that portion of the total that is soluble in neither water nor neutral ammonium citrate solution.

As applied to phosphate rock it refers to the portion insoluble in sulfuric acid, e.g., H_2SO_4 .

Intermediate

Definition: The compound formed in a step between the starting materials and the final product.

Iodine (I)

Definition: An acid-forming element similar in many of its reactions to chlorine occurring in the Chilean deposits of nitrate of soda and in kelp.

Agronomics: Essential in animal nutrition, but not for plants.

Iron (Fe)

Definition: A micronutrient widely distributed in soils.

Agronomics: Seldom needed to be applied to crops, except on calcareous or alkaline soils. Many plants become chlorotic in such soils unless fertilized with available iron sources. Pineapples grown on manganese soils usually need soluble iron as a fertilizer.

Iron Phosphate ($FePO_4$)

Definition: Occurs in small quantities in practically all phosphate rock and in rather large quantities in some of the lower grades of rock.

Description: Insoluble in water and its phosphate content is practically unavailable unless treated with a mineral acid such as sulfuric acid. When present in large amounts, it impairs the physical and chemical condition of superphosphate.

See Also: Iron.

Iron Pyrites — see Sulfur**Isobutylidene Diurea**

Definition: "A condensation product of isobutyraldehyde and urea having a minimum total nitrogen content of 30%. It is a source of slowly available nitrogen by virtue of particle size, solubility decreasing with increase in particle size. Material conforming to the description of a granular fertilizer will have 90% of its nitrogen content in the water-insoluble form prior to grinding as tested by method AOAC 945.01 (15th Edition)." (AAPFCO)

Isotope — see Radioactive Isotopes**Kainite**

Definition: "A potash salt containing potassium and sodium chlorides and sometimes sulfate of magnesia, with not less than 12% soluble potash (K_2O)." (AAPFCO)

None has been available on the U.S. market for many years. Most of the kainite formerly on the market was really a mixture of carnallite, sylvinite or hard salt with rock salt.

Kaolin

Definition: China clay. A common, non-swelling type of clay useful in fertilizer production as an inexpensive anti-caking coating agent for granules.

Process: When used as an anti-caking agent, a large proportion of the clay should be of particle size less than 1 micron, and moisture content should be less than 1%. Not suitable for preparation of suspension fertilizers.

Kelp

Definition: *Ascophyllum nodosum*, a seaweed commonly known as Norwegian kelp, grows along the shorelines of the North Atlantic Ocean, and is the richest marine plant available for agricultural use. In Canada, it is harvested from the ocean in its live state.

Process: For kelp meal, the seaweed is dehydrated immediately after harvesting to a specified moisture content by sun-drying and/or mechanical dehydration, then ground into kelp meal to a specified particle size. Seaweed extract is produced from fresh, live plants which are processed into a soluble powder or liquid concentrated seaweed extract.

Description: A source of potassium, micronutrients and organic matter.

See Also: Kelp Meal; Seaweed Extract.

Kelp Meal

Definition: Used as an animal feed supplement as a source of trace minerals and vitamins. Sometimes used as a soil conditioner.

See Also: Kelp.

Kieserite

Definition: Hydrated magnesium sulfate ($MgSO_4 \cdot H_2O$). Occurs abundantly in potash deposits of Stassfurt, Germany.

See Also: Magnesium Sulfate.

Kola Phosphate — see Apatite**Label**

Definition: "The term label means the display of all written, printed, or graphic material, upon the immediate container, or a statement accompanying a fertilizer." (AAPFCO)

Labeling

Definition: "The term labeling means all written, printed, or graphic material upon or accompanying any fertilizer, or advertisements, brochures, posters, television and radio announcements used in promoting the fertilizer." (AAPFCO)

Land Plaster — see Gypsum**Langbeinite — see Sulfate of Potash-Magnesia****Lawn and Garden Products**

Definition: Specialty fertilizers, such as granules, tablets, and liquids for potted houseplants, "light-weight" fertilizers for lawn and gardens, fertilizer-pesticide mixtures, and preparations for use in greenhouses, exhibition gardens, etc. Controlled release fertilizers are featured in some such products.

"LB" Urea

Definition: Low-biuret urea, commonly defined as urea with less than 0.25% biuret, commonly recommended for use in foliage sprays.

See Also: Urea.

Leached-Zone Ore

Definition: A low-grade Florida rock phosphate.

Description: High in aluminum phosphate and contains more uranium than other natural phosphates. It is not suitable for manufacturing ordinary superphosphate, but it can be used in making nitric phosphates.

Leather Tankage

Definition: Leather wastes from tanneries are used to make a processed tankage.

Description: Without treatment, leather wastes are valueless as a fertilizer. When treated with steam, dried and milled, leather wastes contain from 5% to 13% N and produce a tankage. Chrome-tanned leather tankage contains about 2.5% Cr or trivalent Cr, which readily sorbs on clay particles and soil organic matter or precipitates as Cr_2O_3 after leather decomposition in soil. Trivalent Cr is not toxic to plants or animals except at very high application rates.

Leonardite

Definition: A naturally oxidized lignite. Large deposits occur in North Dakota and Wyoming.

Description: Contains calcium and iron salts of humic and other organic acids.

Leucite

Definition: A potassium aluminum silicate mineral.

Description: Leucite-containing rocks in the Leucite Hills near Green River, Wyoming, contain about 10% K_2O . Attempts were made to produce potash commercially from this deposit during World War I, but failed.

Light-Weight Fertilizer

Definition: Specialty fertilizers containing highly soluble plant-nutrient compounds absorbed on light-weight materials such as peat, expanded vermiculite, and perlite.

See Also: Specialty Fertilizers.

Lime

Definition: Agricultural lime.

Process: Generally the term lime, or agricultural lime, is applied to ground limestone (calcium carbonate), hydrated lime (calcium hydroxide) or burned lime (calcium oxide). In the strict chemical terminology, lime refers to calcium oxide (CaO) which can be prepared by calcining materials consisting largely of calcium carbonate ($CaCO_3$), such as limestone, marl, or oyster, clam or fossil shells.

See Also: Dolomitic Lime; Limestone.

Lime, Fluid

Definition: A mixture of lime solids in water using attapulgite clay as suspending agent.

Lime, Hydrated — see Liming Materials**Lime, Waste**

Definition: "Waste lime (by-product lime) is any industrial waste or by-product containing calcium or calcium and magnesium in forms that will neutralize acids. It may be designated by prefixing the name of the industry or process by which it is produced, i.e., gashouse lime, tanners' lime, acetylene lime-waste, lime-kiln ashes, etc." (AAPFCO)

Description: Usually consists of calcium hydroxide and/or calcium carbonate with various impurities. Lactic acid and soda waste limes are high in gypsum. Oxygen waste lime is largely CaO.

Agronomics: Gashouse lime contains cyanides and sulfites which may be harmful to plants but decompose in the soil. This type of waste lime should be applied well in advance of planting.

See Also: Liming Materials.

Lime-Based Superphosphate — see Basic Lime Phosphate**Limestone**

Definition: "A material consisting essentially of calcium carbonate or a combination of calcium carbonate with magnesium carbonate capable of neutralizing soil acidity." (AAPFCO)

Description: Pure calcium carbonate contains 40% Ca and 12% C.

Agronomics: Neutralizes soil acidity, improves tilth of soil, and supplies large quantities of the secondary nutrients, calcium, and magnesium to crops.

See Also: Dolomite; Liming Materials; Standard Ground Limestone.

Limestone, Phosphatic

Definition: A limestone, high in phosphate, sometimes used in fertilizers.

Description: Contains calcium carbonate (CaCO_3) mixed with calcium fluorophosphate ($\text{Ca}_{10}\text{F}_2(\text{PO}_4)_6$). It contains about 13% P_2O_5 and 36% Ca.

Limestone Slurry Method — see Sulfur Dioxide**Lime-Sulfur Solution**

Definition: Aqueous solutions of calcium polysulfide used as a source of calcium and sulfur.

Agronomics: Used to improve physical condition of alkaline soils. Also used as a fungicide and insecticide.

Liming Materials

Definition: "Agricultural liming material means a product whose calcium and magnesium compounds are capable of neutralizing soil acidity." (AAPFCO)

Description: "Quicklime, burned lime, caustic lime, lump lime, unslaked lime are calcined materials comprised chiefly of calcium oxide in natural association with lesser amounts of magnesium, and which are capable of slaking with water." (AAPFCO)

Process: The American Society for Testing and Materials (ASTM) has standard methods for the chemical analysis and physical tests of liming materials used in agriculture. The ASTM standard specification, C602-69, appears in Part 9, ASTM Book of Standards.

See Also: Air Slaked Lime; Burnt Lime; Ground Limestone; Ground Shell Marl; Ground Shells; High Calcic Liming Materials; High Magnesium Liming Materials; Hydrated Lime; Lime, Waste; Limestone; Marl.

Linseed Meal

Definition: The product resulting from grinding the cake produced when flaxseed is pressed to recover linseed oil. Only batches unfit for feed, as a rule, are now used in fertilizers.

Liquefied Natural Gas — see LNG**Liquefied Petroleum Gas — see LPG****Liquid (Fluid) Fertilizers**

Definition: This term applies to anhydrous and aqua ammonia, nitrogen solutions, and liquid mixed fertilizers including clear liquids, suspensions of solids in liquids, and slurry-type mixtures requiring constant stirring to keep the solids suspended in the liquid.

AAPFCO's official definition indicates that the control officials interpret the term somewhat differently, as follows: "Liquid fertilizer is a fluid in which the plant nutrients are in true solution."

Processes: Hot-mix manufacture involves NH_3 neutralization of wet process phosphoric acid to give 8-24-0 ammonium phosphate solution, or of superphosphoric acid to give 10-34-0 or 11-37-0 ammonium polyphosphate solutions, with added urea- and ammonium nitrate solutions, and chloride and/or nitrate of potash. (See Figure 1-6.)

Cold-mix operations involve mixing the above-mentioned products to give the grade of liquid mixture desired. (See Figure 1-7.)

Description: Clear liquids with low salting-out temperatures can be stored. Slurries should be applied soon after mixing. Suspensions may be stored for reasonable periods if stirred occasionally.

See Also: Slurry Fertilizer; Suspension Fertilizers.

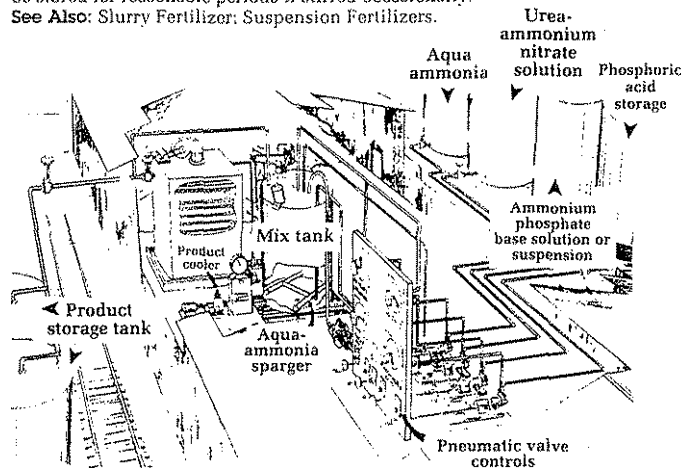


Figure 1-6
Diagram of a typical liquid hot-mix plant. (Courtesy TVA)

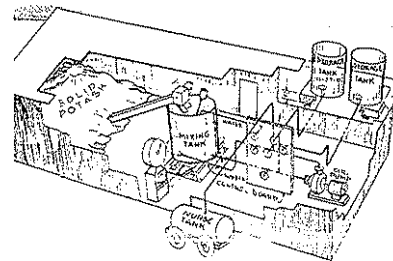


Figure 1-7
Diagram of a typical liquid cold-mix plant. (Courtesy TVA)

LNG (Liquefied Natural Gas)

Definition: Largely methane obtained from driven wells into the gas strata of the earth. One of its major uses is in the production of synthetic ammonia.

Lot

Definition: "An identifiable quantity of fertilizer that can be sampled according to AOAC procedures, up to and including a freight car load of 50 tons maximum, or that amount contained in a single vehicle, or that amount delivered under a single invoice." (AAPFCO)

Low Biuret Urea — See "LB" Urea**Low Phosphate — see Basic Slag****LPG (Liquefied Petroleum Gas)**

Definition: Contains propane and butane derived from the processing of petroleum. Used largely in heating and in chemical manufacture.

Lump Lime — see Liming Materials**Macronutrients**

Definition: Nutrients that plants require in relatively large amounts.

Description: Nitrogen, phosphorus, potassium, calcium, magnesium, and sulfur are considered secondary nutrients.

See Also: Plant Nutrients; Primary Nutrients; Secondary Nutrients.

Magnesia (MgO)

Definition: Several commercial forms of magnesia are used in the manufacture of mixed fertilizers, especially for potatoes and for tobacco in several states.

Description: Products made by selectively calcining magnesite to above 662°F are called calcined magnesite. That prepared from seawater is called seawater magnesia.

Materials and Processes

Agronomics: Dead-burned magnesia, normally used as refractory, is totally unavailable as a plant nutrient.
See Also: Brucite; Magnesium.

Magnesite

Definition: A natural mineral (magnesium carbonate — $MgCO_3$).
See Also: Dolomite; Magnesite.

Magnesium (Mg)

Definition: An essential plant nutrient that occurs in nature as the carbonate ($MgCO_3$) (magnesite) and widely as the carbonates of magnesium and calcium ($MgCO_3 \cdot CaCO_3$) (dolomite), as the sulfate ($MgSO_4$) and as sulfate of potash-magnesia ($K_2SO_4 \cdot 2MgSO_4$).
Agronomics: An essential element of chlorophyll, the green pigment of plants, magnesium is recognized as one of the secondary nutrients. Where deficient, the leaves turn yellow or red between the veins.

Magnesium Ammonium Phosphate

Definition: This material ($MgNH_4PO_4 \cdot H_2O$) is sometimes formed in mixed fertilizers when a magnesium compound (dolomite or magnesium sulfate), superphosphate, and an ammoniacal solution are mixed together.
Description: Normal analysis of a commercial grade sold in the U.S. is: Magnesium 15%; nitrogen 7%, and phosphoric oxide (P_2O_5) 40%.

Magnesium Carbonate ($MgCO_3$) — see Magnesite

Magnesium Nitrate ($Mg(NO_3)_2$)

Definition: Magnesium nitrate solution is designed to provide a convenient and economic means for direct foliar and irrigation application of both magnesium and nitrogen.

Process: Prepared by reacting nitric acid with magnesium oxide, magnesium carbonate, or magnesium hydroxide.

Description: The solution form contains a minimum of 6.6% Mg and 7.1% N, with a density of about 11.4 pounds per gallon. Crystallization temperature is 36°F, but the crystals redissolve readily above 60°F.

Because magnesium nitrate is a strong oxidizing agent, there is a fire and explosion risk when it is in contact with organic materials.

Agronomics: Magnesium nitrate solution is highly adaptable for crops grown in alkaline soils.

Magnesium Oxide (MgO) — see Magnesite

Magnesium Phosphate

Definition: A by-product of cellulose and paper manufactured by the magnesium bisulfite process.

Description: Contains about 6% Mg and 17% P_2O_5 .

Magnesium Sulfate ($MgSO_4$)

Definition: "Magnesium Sulfate - A product consisting chiefly of that material with or without combined water: epsom salts ($MgSO_4 \cdot 7H_2O$), kieserite ($MgSO_4 \cdot H_2O$), and calcined kieserite ($MgSO_4$)." (AAPFCO)

Description: A white, easily soluble magnesium salt of sulfuric acid. The salts may be mixed with most of the ordinary fertilizer materials.
See Also: Magnesium.

Manganese (Mn)

Definition: Essential for plant growth, it is recognized as a micronutrient.

Description: Forms salts with acids; for example, manganese sulfate ($MnSO_4$), soluble in water.

Agronomics: Is usually present in sufficient amounts in soils, especially if the soil is acid. Effect of manganese deficiency is a chlorotic condition of the upper leaves of the plant.

See Also: Micronutrient Fertilizers.

Manganese Agstone

Definition: A considerable deposit of limestone occurs in Arkansas that contains 10%-15% Mn soluble in dilute organic acids. It is in the form of manganese carbonate.

Manganese Carbonate ($MnCO_3$) — see Manganese Agstone; Manganese Oxide

Manganese Dioxide (MnO_2)

Definition: Occurs in the ore, pyrolusite, and is used in producing manganese sulfate and manganous oxide. Manganese dioxide is not available to plants.

See Also: Manganese Oxide.

Manganese Oxide

Definition: There are several oxides of manganese. Two of the important ones are manganous oxide (MnO) and manganese dioxide (MnO_2).

Agronomics: Powdered manganous oxide is available to plants, but manganese dioxide is not available to plants.

See Also: Manganese Oxysulfate; Manganese Sulfate; Manganous Oxide.

Manganese Oxysulfate

Definition: A fertilizer containing manganese oxide which has been partially acidulated with sulfuric acid.

Description: The percentage of the total manganese in water-soluble form is directly related to the degree of acidulation. Products are sold in powdered or granular form.

Agronomics: Availability to plants of manganese in granular manganese oxysulfate is related to the percentage of total manganese in water-soluble form.

See Also: Micronutrient Fertilizers.

Manganese Slag

Definition: A by-product of the manufacture of ferromanganese.

Manganese Sulfate ($MnSO_4$)

Definition: Manganese sulfate is on the market in a variety of forms, all of which are readily available as sources of manganese. "The term Manganese Sulfate, when applied to an ingredient of a mixed fertilizer, shall designate anhydrous manganese sulfate ($MnSO_4$)." (AAPFCO)

Description: Several hydrates, $MnSO_4 \cdot H_2O$, $MnSO_4 \cdot 3H_2O$, and $MnSO_4 \cdot 4H_2O$ are all used as fertilizers. Double salts, $2MnSO_4 \cdot CaSO_4$ and $2MnSO_4 \cdot MgSO_4$, and several grades containing ammonium sulfate are also used as by-products of photographic supply and chemical manufacture. They contain about 2% nitrogen.

See Also: Micronutrient Fertilizers.

Manganous Oxide (MnO)

Definition: Used in mixed fertilizers to supply manganese.

Process: May be prepared by reduction of pyrolusite (manganese dioxide, MnO_2).

Description: Pure manganous oxide contains 77.5% manganese.

Agronomics: Although not water soluble, in slightly acid soil it is gradually available to plants, especially when applied in powder form. Also used as a spray or dust directly on plant foliage.

Manipulation

Definition: "Processed or treated in any manner, including drying to a moisture content of less than 30%." (AAPFCO)

See Also: Manure.

Manure

Definition: In the United States, manure generally means the excreta of animals — dung and urine with the straw or other materials used as the absorbent. Cattle, poultry, sheep, and goat manure are dried and sold as such for use as fertilizers.

"Dried, pulverized, shredded, composted, or otherwise processed, manipulated or treated animal manures shall contain no more organic bedding materials, or other materials than is necessary to follow good dairy barn, poultry house, etc., practice in order to maintain proper sanitary conditions, to conserve plant food elements in excreta, and to absorb adequately the liquid portion." (AAPFCO)

Description: The plant nutrients of feces are almost entirely present in insoluble compounds that must be decomposed before these nutrients are available to plants. Those in urine, on the other hand, are immediately available. Most of the urinary nitrogen is present as urea. See Table 1-7 for average composition.

Table 1-7
Manure Composition

Constituent	Cattle %	Horse %	Sheep %	Swine %	Chicken %
N	0.53	0.55	0.89	0.63	0.89
P_2O_5	.29	.27	.48	.46	.48
K_2O	.48	.57	.83	.41	.83
Ca	.29	.27	.21	.19	.38
Mg	.11	.11	.13	.03	.13
Cu	.00079	.00079	.00079	.00016	.0006
Mn	.003	.003	.003	.0008	.003
Zn	.0016	.002	.002	.0006	.0021
Cl	.03	.08	.08	.03	.08
S	.036	.036	.06	.03	.06
B	.016	.016	.016	.0005	.016
Org. matter	16.74	27.06	30.70	15.50	30.70
Moisture	81.33	68.85	64.82	77.56	64.82
Ash	2.06	6.70	4.72	6.02	4.72

Table 1-8
Pounds of micronutrient source necessary per ton of mixture to meet the micronutrient guaranteed percentages of formulations with micronutrient sources.

Analysis of Micronutrient Source	0.0005%	0.005%	0.01%	0.02%	0.03%	0.04%	0.05%	0.10%	0.20%	0.30%	0.40%	0.50%	1.0%
1%	1.0	10.0	20.0	40.0	60.0	80.0	100.0	200.0	400	600	800	1000	2000
2	0.5	5.0	10.0	20.0	30.0	40.0	50.0	100.0	200	300	400	500	1000
4	0.25	2.5	5.0	10.0	15.0	20.0	25.0	50.0	100	150	200	250	500
6	0.167	1.67	3.34	6.7	10.0	13.4	16.7	34.0	67	100	134	167	334
8	0.125	1.25	2.50	5.0	7.5	10.0	12.5	25.0	50	75	100	125	250
10	0.100	1.00	2.00	4.0	6.0	8.0	10.0	20.0	40	60	80	100	200
12	0.084	0.84	1.67	3.34	5.0	6.67	8.4	17.0	34	50	67	84	167
14	0.072	0.72	1.43	2.86	4.3	5.73	7.2	14.0	29	43	58	72	143
16	0.063	0.63	1.25	2.50	3.75	5.00	6.3	13.0	25	38	50	63	125
18	0.056	0.56	1.12	2.24	3.36	4.48	5.6	11.0	23	34	45	56	112
20	0.050	0.50	1.00	2.00	3.00	4.00	5.0	10.0	20	30	40	50	100
25	0.040	0.40	0.80	1.60	2.40	3.20	4.0	8.0	16	24	32	40	80
30	0.034	0.34	0.67	1.34	2.00	2.67	3.4	7.0	14	20	27	34	67
35	0.029	0.29	0.58	1.16	1.74	2.30	2.9	6.0	12	18	23	29	58
40	0.025	0.25	0.50	1.00	1.50	2.00	2.5	5.0	10	15	20	25	50
45	0.023	0.23	0.45	0.90	1.34	1.78	2.3	4.5	9	13	18	23	45
50	0.020	0.20	0.40	0.80	1.20	1.60	2.0	4.0	8	12	16	20	40
55	0.019	0.19	0.37	0.74	1.10	1.47	1.9	3.7	8	11	15	19	37
60	0.017	0.17	0.34	0.68	1.00	1.34	1.7	3.4	7	10	14	17	34
80	0.0125	0.125	0.25	0.50	0.75	1.00	1.25	2.5	5	7.5	10	12.5	25

Manure, Artificial — see Compost

MAP — see Monoammonium Phosphate

Marble — see Calcium Carbonate

Marl

Definition: A chalky substance used as a liming material found in certain swamp and lake bottoms, and former lake or stream beds. "A granular or loosely consolidated earthy material comprised largely of shell fragments and calcium carbonate precipitated in ponds." (AAPFCO)

Process: Formed by precipitation of lime from fresh water by natural processes.
Description: Contains about 35% Ca, 0.5% Mg, and 4% acid-insoluble matter. The principal component is calcium carbonate (CaCO₃) in an amorphous form.

See Also: Liming Materials.

Matrix

Definition: In the U.S. phosphate mining trade, matrix refers to the raw phosphate ores of sedimentary deposits. The term "phosphate rock" is used in the mining trade to refer to product concentrates prepared from raw matrix.

Description: Consists of microcrystalline carbonate-apatite (francolite) admixed with clays, silica, silicates, and other accessory mineral impurities.

See Also: Phosphate Rock.

MDU — See Methylenediurea; Urea-Formaldehyde Reaction Products

Melamine

Definition: "A sparingly water soluble organic compound of formula C₃H₆N₆ which contains at least 66% N." (AAPFCO)

Merchant Grade Acid (Phosphoric Acid)

Description: Contains 51% to 54% P₂O₅ and less than 1% of suspended solids.

Metaphosphoric Acid (HPO₃) — see Phosphoric Acid

Methylene Urea — see Urea-Formaldehyde Reaction Products

Methylenediurea (MDU)

Definition: "Methylenediurea is a water soluble condensation product resulting from the reaction of one molecule of formaldehyde with two molecules of urea, with the elimination of one molecule of water. It has a minimum total nitrogen content of 42% and is a source of slowly available nitrogen." (AAPFCO)

See Also: Urea-Formaldehyde Reaction Products.

Micron

Definition: A unit of length equivalent to 39.37 millionths of an inch or 0.001 millimeter. One millimeter equals 1000 microns.

Description: A useful unit in dealing with particle size. A 200-mesh sieve has a screen opening of 74 microns.

Micronutrient Fertilizers

Definition: Various materials or mixtures that supply micronutrient elements in forms available to plants.

Description: Includes water soluble chelates and salts such as borates and nitrated or sulfated forms of copper, iron, manganese, and zinc; less soluble (citrate or acid soluble) oxides of copper, iron, manganese, and zinc; and controlled released materials which may be relatively insoluble, such as frits.

See Also: Fertilizer product and supplier charts (Section 3).

Micronutrients

Definition: Sometimes also referred to as trace or minor elements. "Secondary and Micronutrients — Those other than the primary nutrients that are essential for normal growth of plants and that may need to be added to the growth medium. Micronutrients shall include boron, chlorine, cobalt, copper, iron, manganese, molybdenum, sodium and zinc." (AAPFCO) See Table 1-8.

Agronomics: Required in small amounts, but in amounts more than a trace. Used in excess, they can be harmful to plants; this is especially true of boron and molybdenum.

See Also: Fertilizer product and supplier charts (Section 3); Plant Nutrients; Secondary Nutrients.

Microprill

Definition: A prilled material, usually urea, of relatively small size, smaller than the size usually preferred for fertilizer use. Microprilled urea is produced chiefly for use as a nitrogen supplement in animal feed mixtures. The small size assures uniform mixing with other feed ingredients.

Description: Typically, about 90% of the particles are in the particle size range between 12- and 28-mesh Tyler screens.

Mine Run Potash Salts

Definition: "Potash salts containing a high percentage of chloride and from 20% to 30% soluble potash (K₂O)." (AAPFCO)

Minor Elements — see Micronutrients

Mixed Fertilizers

Definition: "A mixed fertilizer is a fertilizer containing any combination mixture of fertilizer materials." (AAPFCO)

Description: Two or more fertilizer materials mixed, or granulated together into individual pellets. The term includes dry mixed powders, granulates (bulk blends), granulated mixtures, and clear liquid mixed fertilizers, suspensions, and slurries.

Materials and Processes

AAPFCO has adopted the following policy statement: "A deficiency in an official sample of mixed fertilizer resulting from non-uniformity is not distinguishable from a deficiency due to actual plant nutrient shortage and is properly subject to official action." Table 1-9 shows the changes that have occurred in quantities and composition of the mixed fertilizers used in the United States.

Table 1-9
Mixed Fertilizer Quantities and Consumption

Fiscal Year	Mixed Fertilizer Consumed (million tons)	Average primary nutrient content			
		N %	Available P ₂ O ₅ %	K ₂ O %	Total %
1880	0.350	2.4	9.1	2.0	13.5
1900	1.771	2.0	9.4	2.5	13.9
1920	4.062	2.3	9.2	2.4	13.9
1940	5.513	3.8	9.6	6.5	19.9
1960	15.650	6.5	13.0	12.1	31.6
1970	20.961	9.3	17.7	12.7	39.7
1975	20.647	10.1	18.0	12.4	40.5
1980	23.270	10.8	19.5	12.8	43.1
1985	20.171	11.6	21.1	11.3	44.1
1991	20.443	10.9	11.7	14.6	37.2
1992	20.943	11.0	11.6	14.3	36.9

Moisture

Definition: Free water held by solids, as distinguished from water of crystallization or water of constitution, which are in chemical combination and no longer have the properties of water.

Moisture Content — see Ammoniation

Mole Ratio — see Molecular Ratio

Molecular Ratio

Definition: The relative proportion between two or more chemical substances in terms of the number of gram molecules of each.

Molybdenum (Mo)

Definition: Molybdenum is essential in very small amounts to the growth of plants, but is usually present in sufficient amounts. It is recognized as a micronutrient.

Description: Applied to soils usually as sodium molybdate, known in the trade as "moly."

Agronomics: Deficiencies have been discovered in a few very highly acid soils. When these soils are limed, ample molybdenum is usually released. The normal amount of Mo in the soil is 1 to 3 ppm. More than 10 ppm in the soil may be injurious to some plants and animals. Recent tests and practice have indicated soybean response to molybdenum in most of the soybean growing areas of the Midwest and some of the southern states.

Monocommonium Phosphate (MAP)

Definition: A very important fertilizer material, production and use of monoammonium phosphate (NH₄H₂PO₄) have increased steadily.

Processes: Granular product, made with wet-process acid, has a grade of about 10-53-0. Some by-product MAP made with furnace acid has a grade of 12-61-0 and is used mainly in production of liquid fertilizers. Nongranular (powder) MAP is used in formulations for granular NP and NPK fertilizers, which it can react with additional ammonia and aid granulation.

See Also: Ammonium Phosphate; Diammonium Phosphate.

Monocalcium Diammonium Pyrophosphate

Definition: A product of the hydrolysis of calcium metaphosphate in ammonium hydroxide solution.

Description: Ca(NH₄)₂P₂O₇·H₂O is the calcium ammonium pyrophosphate stable in aqueous solutions with pH 7 or above.

Monocalcium Phosphate — see Calcium Phosphate

Monopotassium Phosphate — see Potassium Phosphates

Mowrah Meal

Definition: The residue from the extraction of fat from the seed of the mowrah buttertree of India.

Description: Contains about 6% total plant nutrients.

Agronomics: When used on lawns or golf greens and sprinkled with water, it is a combination worm eradicator and fertilizer.

Muck — see Peat

Multinutrient Mixtures — see Mixed Fertilizers; Polynutrient Fertilizer

Muriate of Potash

Definition: "Muriate of potash (commercial potassium chloride) is a potash salt containing 48% to 62% soluble potash (K₂O), chiefly as chloride." (AAPFCO)

See Also: Potassium Chloride.

Muriates — see Chlorides

Muriatic Acid — see Hydrochloric Acid

Mushroom Soil, Spent

Definition: Well-rotted horse manure that has been used to grow mushroom, but is no longer satisfactory for this purpose, is used as fertilizer.

See Also: Manure.

Natural Organic Fertilizer

Definition: "This term shall refer to materials derived from either plant or animal products containing one or more elements (other than carbon, hydrogen and oxygen) which are essential for plant growth. These materials may be subjected to biological degradation processes under normal conditions of aging, rainfall, sun-curing, air drying, composting, rotting, enzymatic, or anaerobic/aerobic bacterial action, or any combinations of these. These materials shall not be mixed with synthetic materials or changed in any physical or chemical manner from their initial state except by physical manipulations such as drying, cooking, chopping, grinding, shredding or pelleting." (AAPFCO)

Natural Organics

Definition: By-product from processing of animal or vegetable substances that contain sufficient plant nutrients to be of value as fertilizers.

Description: This class of fertilizer includes dried blood, castor pomace, cottonseed meal, tankage, bone meal, tobacco stems, and many similar substances. The nitrogen in them is combined with carbon, hydrogen, and oxygen and sometimes other elements to form very complex compounds, which must decompose in the soil before the nitrogen is available. Bone meal is primarily a phosphatic fertilizer and tobacco stems a potassic fertilizer.

See Also: Nitrogen; Organic Fertilizer.

Net Weights

Definition: "The weights appearing on packages of fertilizers, agricultural lime, and liming materials shall always mean net weights." (AAPFCO policy statement)

Nitrate of Ammonia — see Ammonium Nitrate

Nitrate of Lime — see Calcium Nitrate

Nitrate of Potash — see Potassium Nitrate

Nitrate of Soda — see Sodium Nitrate

Nitrate of Soda-Potash

Definition: A mixture of sodium and potassium nitrates produced from Chilean caliche containing a high percentage of nitrate of potash.

Description: Contains not less than 15% N and 14% potash (K₂O), and from 0.05% to 0.16% B, with an average of 0.12%. These are high percentages of boron as compared with other fertilizer material. "Nitrate of soda and potash (sodium and potassium nitrate) is chiefly the sodium and potassium salts of nitric acid. It shall contain no less than 15% nitrate nitrogen, 10% soluble potash, and 18% sodium." (AAPFCO)

See Also: Caliche; Sodium Nitrate.

Nitrates

Definition: The salts of nitric acids may be formed by the action of nitric acid on metals or alkalis.

See Also: Nitrogen.

Nitric Acid (HNO₃)

Definition: A strong mineral acid which, combined with metals or alkalis, forms nitrates. Used in the production of nitrate fertilizer compounds including nitric phosphates. Some is used as an oxidant for carbonaceous material that causes the black color in liquid fertilizers made with commercial phosphoric acid.

Process: Now made synthetically on a large scale by passing ammonia (NH₃) and air through a platinum gauze catalyst, where the ammonia burns to the oxide.

See Also: Ammonia Oxidation.

Nitric Phosphate (Nitrophosphate)

Definition: The product obtained by acidulation of phosphate rock with nitric acid. The complex mixture of nitrates and phosphate thus obtained does not contain nitrate nitrogen and phosphorus in the same molecule. The process is subject to modification designed to remove the hygroscopic calcium nitrate formed. Such modifications include ammoniation, physical separation, co-acidulation with sulfuric and phosphoric acids, or subsequent treatment with carbon dioxide." (AAPFCO)

Process: Involves treatment of phosphate rock with nitric acid or a mixture of nitric and sulfuric or phosphoric acid or all three acids, usually followed by ammoniation.

Description: The products usually contain dicalcium phosphate, ammonium nitrate, and monoammonium phosphate, although other compounds may be present. Water solubility of the phosphorus content may vary over a wide range. Products made in the U.S. contain up to 80%, or more, of their phosphorus in water-soluble forms. Some of the common grades of nitric phosphates are: 12-12-12, 15-15-15, 10-15-20, 13-13-21, 6-12-18, 20-20-0, and 20-10-0.

See Also: Urea-Nitric Phosphate.

Nitrogen (N)

Definition: A colorless, odorless, inert gas constituting about four-fifths of the air.

Process: For the commercial manufacture of ammonia, nitric acid, ammonium nitrate, urea, and cyanamid, nitrogen is obtained from the air by several methods. When mixtures of nitrogen and hydrogen in proper proportions are compressed in the presence of a suitable catalyst, ammonia (NH₃) is formed.

Description: There are four general classes of fertilizer materials containing fixed nitrogen: 1) nitrates, 2) ammonium salts, 3) natural organics, and 4) synthetic organic chemicals.

Agronomics: Nitrogen is a constituent of every living cell. It is a part of chlorophyll, protein, and many other substances in animals and plants. As a fertilizer, large amounts are needed by all growing crops to promote growth of leaf and stem and increase plant vigor, add crispness to leaf crops and improve their quality, increase the protein content of food and feed crops, help increase the yield of many crops, and to ensure a dark, green color in leaves containing chlorophyll. It is recognized as a primary nutrient.

Nitrogen Activity — see Activity of Water-Insoluble Nitrogen in Mixed Fertilizers**Nitrogen Solutions**

Definition: Solutions of nitrogenous fertilizer chemicals in water. Used in manufacturing liquid or dry mixed fertilizers and/or applied to the soil either with special applicators or in irrigation water.

Description: Urea-ammonium nitrate (UAN) solution, made from a mixture of urea and ammonium nitrate solutions, contains 28%-32% N. UAN stores well and is convenient to ship, since it does not contain any free ammonia and is at atmospheric pressure.

A typical nitrogen solution is characterized by a code number, e.g., 414 (19-66-6) indicating that it contains 41.4% total nitrogen, 19% free ammonia, 66% ammonium nitrate, 6% urea, and, by difference, 9% water. More than 100 nitrogen solutions having significant differences in composition are marketed to fit different requirements for ammoniation in mixed fertilizer manufacture and for direct application to the soil.

Nitrogen Stabilizer

Definition: Slows or eliminates ammoniacal nitrogen losses in the soil by inhibiting the *Nitrosomonas* bacteria, the organism which oxidizes ammoniacal nitrogen to nitrite in the process of nitrification, and thus controls nitrate leaching.

See Also: Nitrification Inhibitor (Section 2 — Agronomics).

Nitrogenous Materials

Definition: Materials which contain nitrogen, whether in organic or inorganic form.

Description: Some are highly available plant foods and others, even

though they contain fairly high percentages of nitrogen, such as hoofs, hair, and plastic and leather scraps, are not.

The AAPFCO defines as: "Crude, inert, or slow-acting nitrogenous materials are unprocessed organic substances relatively high in nitrogen, but having a very low value as plant food and showing a low activity by both the alkaline and neutral permanganate methods (below 50% and 80%, respectively)."

Nitrophosphate — see Nitric Phosphate**Nominal Grade**

Definition: The fertilizer grade with each nutrient designation rounded off to the nearest whole number.

Non-Acid-Forming Fertilizer

Definition: A fertilizer which when mixed with soil, does not increase residual soil acidity.

See Also: Acidity and Basicity of Fertilizers.

Noncrystalline Phosphate Products — see Fused and Noncrystalline Phosphate Products**Non-Farm Fertilizer**

Definition: Fertilizers used for lawns, gardens, and other non-farm purposes, such as turf and shrubbery of golf courses, factories, cemeteries, parks, highways, and for many other classes of usage.

See Also: Lawn and Garden Products.

Nonreacting Salt Pair

Definition: A mixture of two salts having a common ion, such as potassium chloride and potassium nitrate having the potassium ion in common, or potassium nitrate and ammonium nitrate having the nitrate ion in common.

See Also: Hygroscopicity.

Nonslurry Process — see Granulation**Non-Water-Soluble Phosphate**

Definition: That part of the phosphate in a fertilizer that is insoluble in water.

Normal Superphosphate — see Superphosphate**Nucleation**

Definition: A term frequently used to denote slurry granulation, in which the slurry is applied and dried at the surface of undersize particles (nuclei) in successive recycle steps until the granule of the product has the desired size.

See Also: Granulation.

Nutrient — see Plant Nutrients**Oleic Acid**

Definition: Used as a defoaming agent in the wet-process phosphoric acid process.

Description: C₁₈H₃₄O₂. Reported to enlarge gypsum crystals by 75% and thus aid in the filtration step.

Oleum — see Fuming Sulfuric Acid**Olive Pomace**

Definition: The residue from olives pressed for oil and usually consumed as feed. It is rarely used as a conditioner for mixed fertilizer.

Order of Terms

Definition: "The order of terms in mixed fertilizers shall be nitrogen first, available phosphate second, and potash third." (AAPFCO)

Ordinary Superphosphate — see Superphosphate**Organic Fertilizer**

Definition: "A material containing carbon and one or more elements other than hydrogen and oxygen essential for plant growth." (AAPFCO)

Originally the term was confined to carbon compounds in organisms, but now includes carbon compounds of synthetic origin.

Organic Matter

Definition: Any carbonaceous material of animal or vegetable origin, including substances in any state of decomposition.

Organic Soil Conditioner

Definition: Vegetable or animal organic matter applied to soil to improve physical and biological properties.

Materials and Processes

Orthophosphate Fertilizer

Definition: A general class of phosphate compounds manufactured from orthophosphoric acid (H_3PO_4) including primarily ammonium and calcium salts.

Description: Typical compounds in this class include: monocalcium phosphate $Ca(H_2PO_4)_2$, monoammonium phosphate $NH_4H_2PO_4$, and diammonium phosphate $(NH_4)_2HPO_4$. Orthophosphate is the main form of phosphorus in normal (ordinary) and triple (concentrated) superphosphate.

Orthophosphoric Acid — see Phosphoric Acid

Overall Index Value — see Value

Overrun

Definition: The excess of plant nutrient found by chemical analysis over guarantee.

Process: A small overrun is necessary in order to avoid penalties because of lack of complete uniformity of all parts of a mixture, changes of moisture content, segregation, etc.

Description: The average overruns of N, P_2O_5 , and K_2O in mixed fertilizers are about 0.08%, 0.31%, and 0.25% respectively. Thus on the average a 5-10-10 grade, for example, contains 5.08% N, 10.31% available P_2O_5 , and 10.25% K_2O .

Oxide of Iron — see Ferric Oxide

Oxygen

Definition: A colorless, tasteless, odorless gas. An essential part of most fertilizer materials, it combines with most of the elements to form oxides.

Process: Generally produced commercially from liquid air by the Linde process, oxygen is separated from the nitrogen by fractional distillation.

Description: Oxygen is the most abundant and most widely distributed element in nature. In the free state, it makes up about 21% by volume of the air, in which it is mixed with nitrogen. In the combined form it constitutes nearly 90% by weight of water and a considerable proportion of the constituents of the earth's crust.

Agronomics: An essential constituent of all vegetable and animal tissues and fluids, and essential to plant and animal life.

See Also: Nitrogen.

Oyster Shells

Definition: Used as a liming material where available.

Description: Ground in large tonnages. The usual material contains 31% to 36% Ca.

See Also: Calcium Carbonate.

Particle Density — see Ammoniation

Particle Size — see Ammoniation

Parts Per Million — see ppm

Peanut Hull Meal

Definition: Ground peanut hulls or shells are sometimes used in mixed fertilizers as a filler or conditioner.

Description: The apparent specific gravity of finely ground meal averages 0.38. Dark, damp meal averages about 0.55.

Pearl Ash — see Potassium Carbonate

Peat

Definition: "Partly decayed vegetable matter of natural occurrence. It is composed chiefly of organic matter that contains some nitrogen of low activity." (AAPFCO)

Description: Used as a fertilizer filler or conditioner. Fertilizer filler peat can hold moisture on the average 64 times its own weight. Reedsedge peat is widely used, but must be dried for this purpose below 10% moisture, and screened. Some sphagnum peat can hold up to 20 times its own weight of moisture.

Agronomics: Acid peat and peat moss are widely used for soil improvement, especially in growing rhododendrons, azaleas, and camellias.

Pebble Phosphate

Definition: Refers to the coarse (+10 mesh) fraction of phosphate rock matrix that is separated during the beneficiation process. Depending on P_2O_5 grade and impurity content, pebble phosphate may either be used for wet-process acid production, or discarded as mine waste backfill.

Description: Consists of dense, hard cemented agglomerates of the phosphate (apatite) and accessory minerals.

Pelleted Fertilizer

Definition: "A form, uniform in size and usually of globular shape, containing one or more nutrients produced by one of several methods including: (a) solidification of a melt while falling through a counter-current stream of air, (b) dried layers of slurry applied to recycling particles, (c) compaction, (d) extrusion, (e) granulation." (AAPFCO)

See Also: Granulation.

Pelletized Fertilizer — see Pelleted Fertilizer

Perlite

Definition: Used as a soil conditioner and as a carrier of fertilizer salts in light-weight fertilizers.

Description: A volcanic glass that contains considerable water. When finely ground and heated it expands. The apparent specific gravity varies from 0.07 to 0.20 with an average of 0.13. Unless very finely ground after expansion it may segregate in mixtures.

Peruvian Guano — see Guano

pH (Reciprocal Log of Hydrogen Ion Concentration)

Definition: The pH value of any solution, soil or compound is simply a number denoting its degree of acidity or alkalinity. A neutral solution has a pH value of 7.0; values above 7.0 denote alkalinity and those below 7.0 denote acidity, on a logarithmic scale. Thus pH 5 is 10 times as acid as pH 6 and so on.

Phosphate

Definition: A salt of an ester of phosphoric acid. In the fertilizer industry, however, the term phosphate is usually applied to any phosphate material used as a fertilizer. AAPFCO also defines as phosphorous pentoxide (P_2O_5).

Description: In the U.S., these primarily are the calcium phosphates and the ammonium phosphates with only very small amounts of ground and colloidal rock phosphate, basic slag, and phosphoric acid.

See Also: Available Phosphate; Fused and Noncrystalline Phosphate Products; Phosphate Rock.

Phosphate By-Product — see Hygrade Neutral Phosphate

Phosphate Fertilizers — see Polyphosphate Fertilizers

Phosphate Rock

Definition: "A natural rock containing one or more calcium phosphate minerals of sufficient purity and quantity as to permit its use, either directly or after concentration, in the manufacture of commercial products." (AAPFCO) In the mining trade refers to product concentrates prepared from raw matrix.

Process: About 84% of the U.S. production comes from North Carolina and Florida. The remaining U.S. production is chiefly from Idaho, Montana, Utah, and Wyoming.

Description: Classed as an apatite mineral. In the trade, apatite refers to a nonporous, dense, macrocrystalline fluorapatite of igneous origin, whereas phosphate rock is a porous, lower-density, microcrystalline calcium fluorophosphate of sedimentary origin. Phosphate rock mined in Florida has higher proportions of Fe, Al, Mg, and other impurities than in the past. The western U.S. phosphates contain high proportions of these impurities. This has resulted in substantial problems in beneficiation and wet-process phosphoric acid production.

See Also: Calcium Phosphate.

Phosphate Slag — see Basic Slag

Phosphate Solubility — see Ammoniation

Phosphate Tetraurea

Definition: A fertilizer produced by saturating a solution of phosphoric acid and monocalcium phosphate with urea.

Description: $Ca(H_2PO_4)_2 \cdot 4CO(NH_2)_2$. The high melting point (118°C) indicates stability and its possible production by the nitric phosphate route.

Phosphatic Clay — see Colloidal Phosphate

Phosphatic Guano — see Guano

Phosphogypsum

Definition: Dried by-product calcium sulfate from the manufacture of phosphoric acid.

Phosphoric Acid

Definition: An acid produced by reaction of phosphorous pentoxide, P_2O_5 , with water.

Process: Phosphoric acid in the form of 50% to 80% solution of H_3PO_4 in water is used in the manufacture of concentrated superphosphates, various ammonium phosphates, and solid and liquid mixed fertilizers.

Description: An amorphous, white powder which is never used as such in fertilizers combines readily and actively with water to form several phosphoric acids as follows:

Metaphosphoric acid (HPO_3).
Tetrapolyphosphoric acid ($H_6P_4O_{13}$)
Tripolyphosphoric acid ($H_5P_3O_{10}$)
Pyrophosphoric acid ($H_4P_2O_7$)
Orthophosphoric acid (H_3PO_4) — the most common form of phosphoric acid. May be made by the wet process of treating phosphate rock with sulfuric acid. May also be made by the pyrolytic or furnace process, electric or blast furnace. Pure solid H_3PO_4 contains 72.44% P_2O_5 . The maximum concentration of the liquid phosphoric acid is 68% H_3PO_4 , or 63.75% P_2O_5 .

Wet-process phosphoric acid (53%-54% P_2O_5), commonly referred to as merchant grade, is the type most widely used as an intermediate for use in production of phosphate fertilizers. Acid of 40% P_2O_5 content is used in production of diammonium phosphate and monoammonium phosphate. TVA-developed wet-process superphosphoric acid is used widely in preparation of liquid fertilizers of high quality.

Agronomics: In the form of 50% to 80% solution of H_3PO_4 in water, used as a fertilizer for direct application in the West to calcareous soils. **See Also:** Acid Sludges; Calcium Phosphate; Polyphosphate Fertilizers; Superphosphate; Superphosphoric Acid.

Phosphoric Filter Acid — see Filter Acid**Phosphorite — see Phosphate Rock****Phosphorus (P)**

Definition: An acid-forming element which combines readily with oxygen to form the oxide, P_2O_5 , which in turn combines readily with water to form orthophosphoric acid (H_3PO_4).

Process: Made on a large scale by reduction of phosphate rock with coke and sand in an electric furnace.

Description: Normally a yellow wax-like substance which catches fire spontaneously when exposed to the air. To avoid burning, it may be kept covered with water or converted to red phosphorus, which is not poisonous nor so readily flammable. Yellow phosphorus is very poisonous and never used in fertilizers.

Agronomics: Many soils are naturally deficient in phosphorus. It is absolutely indispensable to life. Every cell contains it as a necessary constituent. A plentiful supply in the soil promotes rapid growth, hastens maturity, and stimulates flower, seed, and fruit production. It is recognized as a primary or macronutrient.

See Also: Phosphoric Acid.

Phosphoryl Triamide ($PO(NH_2)_3$)

Definition: An ultra high-analysis compound which has promise as a fertilizer material on the basis of its mobility in the soil and its agronomic effectiveness. It has been tested as an experimental fertilizer only.

Description: Contains 44% N and 74% P_2O_5 .

Pipe Reactor — see Reactors**Pipe-Cross Reactor — see Reactors****Plant Food**

Definition: A marketing term used to express plant nutrients in a fertilizer.

Plant Food Content of Fertilizer

Definition: Total percentage content of the guaranteed plant nutrients in a fertilizer.

Plant Food Ratio — see Fertilizer Ratio**Plant Nutrients**

Definition: Elements required for normal growth and development of plants. **Description:** Carbon, oxygen, and hydrogen form the plant structure. They are readily obtained from air and water. Normally, the plant obtains its remaining nutrients from the soil solution. The primary nutrients nitrogen, phosphorus, and potassium, and the secondary nutrients calcium, magnesium, and sulfur, are referred to as macronutrients — macro meaning "large" — because they are required by growing plants in relatively large amounts. The micronutrients boron, chlorine, cobalt,

copper, iron, manganese, molybdenum, and zinc are so-called because — micro meaning "small" — they are required by the growing plant in relatively small amounts.

Sodium is not known as essential to plant growth but it is present in all plant materials and is used advantageously by some plants, especially when a low supply of potassium is likely to limit plant growth.

Fluorine, iodine, silicon, aluminum and other elements are present in soil-grown plants but are not known to be essential to plant growth. Cobalt appears to be essential to some plants.

Plastic Coated Urea (PCU)

Definition: "A coated slow release fertilizer consisting of urea particles coated with a thermoplastic resin containing a surfactant additive. It typically contains about 40% nitrogen. It is a source of slowly available nitrogen." (AAPFCO).

Polyacrylamides

Definition: Synthetic water-soluble polymers and copolymers made by polymerizing acrylamide ($CH_2CHCONH_2$) and other monomers.

Agronomics: Only the linear polymers are water-soluble and have application to stabilize structureless or poorly structured soil to prevent surface crusting, water run-off, erosion, and soil compaction while improving aeration, friability, pore space, and ease of tillage. Cross-linked polyacrylamides are water-insoluble but swell in the presence of water and are used to aid in providing moisture at the time of planting.

Polyhalite

Definition: A triple sulfate of potassium, magnesium, and calcium ($K_2SO_4 \cdot MgSO_4 \cdot 2CaSO_4 \cdot 2H_2O$). Large deposits 2.5 feet to 8 feet thick occur throughout the Permian Basin in Texas and New Mexico.

Description: Insoluble in water and therefore unsuitable for fertilizer use under present economic conditions, but constitutes a large reserve of potash for the future.

Polynutrient (Multinutrient) Fertilizer

Definition: Containing two or more nutrients.

Polyphosphate Fertilizers (Condensed Phosphates)

Definition: A general term for a class of phosphate fertilizers characterized as condensation products of orthophosphates.

Description: Available as either solid or fluid forms but fluid forms are more common. Mainly available as ammonium salts which will sequester micronutrients such as zinc and iron.

Polyphosphoric Acid

Definition: Any of a series of phosphoric acids whose molecular structure contains more than one atom of phosphorus such as pyrophosphoric acid ($H_4P_2O_7$), tripolyphosphoric acid ($H_5P_3O_{10}$), tetrapolyphosphoric acid ($H_6P_4O_{13}$), etc.

See Also: Phosphoric Acid.

Potash (K_2O ; Potassium Oxide)

Definition: Potassium oxide is a strongly corrosive alkali, which when dissolved in water forms caustic potash. It is never used as such in fertilizers. The trade term "potash" is used interchangeably with the word "potassium" and expresses the percentage of potassium oxide (K_2O) in potash salts and mixtures. "The term potash designates potassium oxide (K_2O). Soluble potash is that portion of the potassium contained in fertilizer or fertilizer materials which is soluble in aqueous ammonium oxalate, aqueous ammonium citrate, or water, according to an applicable AOAC method." (AAPFCO).

Process: Potash is extracted from brines of the Great Salt Lake in Utah, from Searles Lake in California, from deep wells in Michigan and solution mined in Utah. Major production in the U.S. is from sylvinite in New Mexico but the largest production in North America is from sylvinite and sylvite deposits in Saskatchewan where reserves are estimated at around 6-7 billion tons. New Brunswick deposits are also a significant potash source.

Potash beds are believed to have been formed by the evaporation of sea water confined to lakes which were without outlet. As the water level in these lakes sank, fresh supplies ran in until, gradually, from continued evaporation and concentration, immense layers of salts were deposited. The various layers differed widely in composition from rock salt, containing practically no potash, to carnallite, containing about 9% potash; kainit, from 12% to 16% potash; and hardsalt, or sylvinite, from 16% to 17% potash. Other salt layers contain salts of calcium, magnesium, etc., also mixtures of all these materials. The higher grade potash salts, muriate and sulfate, are obtained by refining the lower grades and potassium nitrate from the reaction of muriate with nitric acid.

Description: Potash, as used in fertilizer, is usually in the form of the chloride, sulfate, or nitrate, and occasionally as the carbonate or phosphate.

Materials and Processes

Potash-Lime — see Cement Flue Dust**Potassium (K)**

Definition: Pure metallic potassium is a soft, bright metal which looks somewhat like lead. When exposed to air it oxidizes rapidly, and with water it combines to form caustic potash. To preserve the metal, it must be covered with oil. Much of the potassium present in soils is in the form of insoluble silicates and can only become available when the rock is weathered.

Agronomics: Available potassium stimulates the growth of strong stems, imparts resistance to disease, and increases the yield of tubers and seed. It is necessary to form starch, sugar, and oil and transfer them through plants. It is one of the primary nutrients.

Potassium Azide (KN₃)

Definition: A soluble compound which acts as a nitrification inhibitor and gives promise as an agent to control nitrification in the soil, an aquatic weed killer in rice crops, and a soil fumigant. Caution — This compound is highly toxic by ingestion and is corrosive to the skin and eyes.

Potassium Carbonate (K₂CO₃)

Definition: A salt of carbonic acid and potassium. Cottonseed hull ashes, sunflower plant ash, vegetable potash, and wood ashes are all impure forms of potassium carbonate. Pearl ash is potassium carbonate made from wood ashes.

Description: High grade salts made from potassium chloride, as well as the impure forms, have all been used in the manufacture of tobacco fertilizers. It is also used in Florida to some extent. High grade potassium carbonate averages about 63% K₂O, and pearl ash about 33% K₂O.

See Also: Cottonseed Hull Ash; Wood Ashes.

Potassium Chloride (KCl; Chloride of Potash; Muriate of Potash)

Definition: The potassium salt of hydrochloric (muriatic) acid.

Process: Produced in New Mexico by underground mining of sylvinit, in Utah by solution mining of sylvinit, in Utah, California and Michigan by recovery from brines, in Saskatchewan both by underground mining and solution mining of sylvinit and sylvite, and in New Brunswick by underground mining.

Description: Available in uniformly fine particle size for liquid suspensions and in standard, coarse, and granular sizes for granulating processes and bulk blending. Fertilizer grade KCl is 60% to 62% K₂O.

See Also: Muriate of Potash; Potash.

Potassium Cyanate (KOCN)

Definition: A combination fertilizer and weed killer.

Description: Rapidly decomposes in the soil to form potassium nitrate, which fertilizes the plants remaining. Pure potassium cyanate contains 17.2% N and 58.07% K₂O.

Agronomics: When properly applied it kills crabgrass, chickweed, smartweed, and various other plants. In the concentrations used it does not injure ordinary grasses, onions, gladioli, peas, flax, or cabbage.

Potassium Fluosilicate (Potassium Silico-Fluoride; K₂SiF₆)

Definition: When the gases from the superphosphate mixers and dens are sprayed with water the fluorine compounds are largely recovered. The solution thus obtained is mixed with potassium chloride, when potassium fluosilicate is precipitated, filtered, and dried.

Potassium Hydroxide (KOH; Caustic Potash)

Definition: A white deliquescent solid dissolving in water with evolution of much heat to form strongly alkaline and caustic liquid. Use in liquid fertilizer permits the production of neutral solutions low in nitrogen but high in potassium and phosphorus. Use is also justified when low chlorine content fertilizer is desired. Its use has resulted in liquid fertilizers of exceptionally high plant food concentration.

Description: Present cost of production limits its use as an intermediate in liquid fertilizers where its high solubility permits production of such grades as 0-25-25, 6-18-18, 8-24-8, and 11-11-11.

Potassium Magnesium Sulfate — see Sulfate of Potash-Magnesia**Potassium Metaphosphate (KPO₃)**

Definition: The potassium salt of metaphosphoric acid (HPO₃).

See Also: Phosphoric Acid.

Potassium Nitrate (KNO₃)

Definition: The potassium salt of nitric acid. Also known as "saltpeter" and "nitrate of potash." Small deposits of this salt occur in various parts of the world. "Nitrate of potash (potassium nitrate) is chiefly the potassium salt of nitric acid. It shall contain not less than 12% nitrate nitrogen and 44% soluble potash (K₂O)." (AAPFCO).

Process: Manufactured either by the direct reaction of potassium chloride with concentrated nitric acid to produce potassium nitrate and chlorine, or by the action of nitric acid on caustic potash or carbonate of potash.

Description: Pure KNO₃ contains 13.68% N and 46.58% K₂O. Production is available in either prilled or standard crystalline form and has the following representative analysis: N, 14%; K₂O, 41%; Cl, 0.2%; acid insoluble, 0.1%; and moisture, 0.1%.

Potassium Oxide — see Potash**Potassium Phosphate Solutions**

Definition: Used as liquid fertilizers.

Description: Contain an average 10.6% P₂O₅ and 14.5% K₂O. The pH in a 1 to 400 dilution is 10, indicating that the salt in solution is dipotassium phosphate (K₂HPO₄). These solutions have an average weight of 10.5 pounds per gallon.

Potassium Phosphates (Mono-, KH₂PO₄; Di-, K₂HPO₄; Tri-, K₃PO₄)

Definition: The properties of the mono- and di- salts give them excellent potential as fertilizers, but heretofore they have received scant attention by the industry because of high costs of production. The products should be particularly attractive to liquid manufacturers who need highly soluble potash intermediates. It is reported that liquid grades such as 16-8-8, 13-13-13, 11-22-11, 9-27-9, 7-14-14, and 5-15-15 have been made satisfactorily.

Description: Orthophosphate grades produced by the bisulfate route are liquids 0-31-11, 0-20-20, 0-25-20, and solids 9-48-16 (ammoniated), 5-46-30 (ammoniated), and 0-47-31.

See Also: Potassium Polyphosphate.

Potassium Polyphosphate

Definition: The name given to a heat-treated or polymerized mixture of mono- and dipotassium phosphates prepared by the Pennzoll-Goulding process.

Description: The proportion of dipotassium phosphate in the mixture determines the water solubility of the product which can range from 3% in KPO₃ to nearly 100% in K₃P₂O₇. Grade 0-50-40 is preferred and is called potassium polyphosphate. Potassium triphosphate (K₃P₃O₁₀) is an experimental material showing considerable fertilizer value.

Potassium Silico-Fluoride — see Potassium Fluosilicate**Potassium Sulfate (K₂SO₄; Sulfate of Potash)**

Definition: The potassium salt of sulfuric acid. It is widely used in the manufacture of tobacco fertilizers, and premium grade fertilizers for potatoes, grapes, citrus, and other crops. "Sulfate of potash (commercial potassium sulfate) is a potash salt containing not less than 48% soluble potash (K₂O), chiefly as sulfate, and not more than 2.5% chlorine."

Process: Potassium sulfate made at Marysvale, Utah in 1915 from alunite was the first potash produced commercially in the U.S. from anything other than wood ashes. Sulfate has also been made from cement mill dust, langbenite, and from muriate by treatment with sodium or magnesium sulfate, or with sulfuric acid. Large quantities are produced from brine from the Great Salt Lake in the U.S.

Description: Pure potassium sulfate contains 54% K₂O and 18% S. Practically all fertilizer grade material sold since 1960 has contained over 50% K₂O.

See Also: Chlorine.

Pourability of Fluid Fertilizers

Definition: The extent that fluid fertilizers can be drained from their container by gravity or pumped or otherwise removed from a container, as determined by an empirical procedure.

ppm (parts per million)

Definition: An expression of concentration. One percent is equivalent to 10,000 ppm. One ppm of nutrient in the soil is equivalent to 2 pounds per acre (about 2 million pounds of soil in the 6-inch surface layer).

Precipitated Bone

Definition: A by-product in the manufacture of glue-stock from bones. Most of the production is used in the manufacture of feed, but some low-grade material is used as fertilizer.

Precipitated Bone (cont.)

Process: The bones are treated with hydrochloric acid, which dissolves the mineral portions, including the bone phosphate. This hydrochloric acid solution is separated from the nitrogenous material (glue-stock) and the phosphoric acid precipitated with lime or limestone.
Description: The P_2O_5 content varies from 35% to 46%. The phosphorus in this material is mostly in the form of dicalcium phosphate ($CaHPO_4$), and is sufficiently soluble in the soil solution to be highly available.
See Also: Bone Products; Dicalcium Phosphate.

Precipitated Magnesium Hydroxide — see Magnesia

Precipitated Phosphate (Dicalcium Phosphate)

Definition: "Precipitated phosphate is a product consisting mainly of dicalcium phosphate obtained by neutralizing with calcium hydroxide the acid solution of either phosphate rock or processed bone." (AAPFCO).
Process: Dicalcium phosphate (feed grade and fertilizer grade) is produced on a large scale by the action of lime on phosphoric acid.
Description: Dicalcium phosphate is normally marketed as the dihydrate ($CaHPO_4 \cdot 2H_2O$). When pure, it contains 41% P_2O_5 .

Primary Nutrients

Definition: Nutrients required by plants in relatively large amounts and are frequently applied as fertilizers.
Description: Nitrogen, phosphorus, and potassium.
See Also: Macronutrients.

Quicklime — see Lime

Rapeseed Meal

Definition: The ground residue of rapeseed, from which oil has been extracted, is normally used as animal feed. Damaged meal, called Ravison Meal, is available as fertilizer.
Description: Ravison meal may contain up to 6% N, 2% P_2O_5 , 2% K_2O , and smaller amounts of other nutrient elements.

Ravison Meal — see Rapeseed Meal

Raw Sewage Sludge — see Sewage Sludge

Reaction Period — see Ammoniation

Reactors

Definition: Equipment in which chemical reaction is made to occur. Usually, it is constructed of corrosion-resistant materials.
Description: General types are:
 1. Batch reactors — open vessels or autoclaves equipped with stirrers and jacketed for retention, addition, or subtraction of heat and pressure.
 2. Continuous reactors — generally jacketed cylindrical tubes or pipes (pipe reactor) in which gases and liquids may be brought together for reaction, with or without the aid of catalysts, under various conditions of temperature, pressure, and flow rate. The potential for use of continuous reactors in fertilizer manufacture is expanding rapidly. (See Figure 1-8.)
 3. Pipe-cross reactor — developed by TVA working closely with the fertilizer industry, the pipe cross reactor is highly energy-efficient. It allows simultaneous feeding of phosphoric and sulfuric acids to produce granular NP and NPK fertilizers. Commercial pipe-cross reactors ordinarily are 6 inches to 8 inches in diameter and 8 feet to 10 feet long. (See Figure 1-9.)

Reciprocal Log of the Hydrogen Ion Concentration — see pH

Reciprocal Salt Pairs

Definition: A mixture of salts not having a common ion, such as potassium chloride and ammonium nitrate which is the unstable salt pair that can react in solution to precipitate another pair of salts. In this case, potassium nitrate and ammonium chloride, known as the "stable salt pair" of the reciprocal pairs.
See Also: Hygroscopicity.

Recycle

Definition: In a fertilizer process, recycle is a portion of the finished product, or partially finished product, that is returned to an earlier stage of the process for an additional pass through the subsequent processing steps.
Description: It is a common practice in fertilizer granulation to return undersize product and crushed oversize product as recycle to the granulator. Such recycling not only reclaims these off-size materials but also

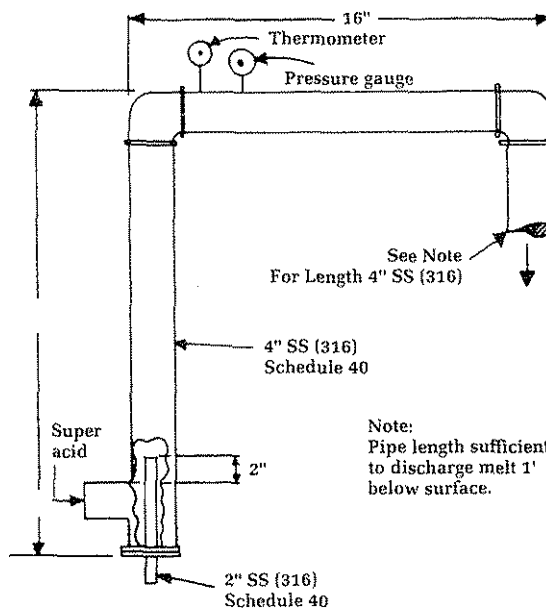


Figure 1-8
Plant-size pipe reactor (Courtesy TVA)

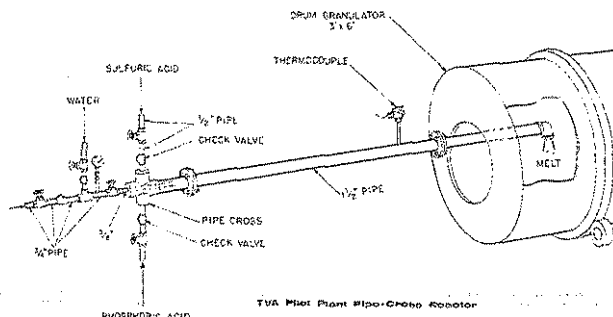


Figure 1-9
TVA pipe-cross reactor

serves the important functions of reducing moisture content and lowering temperature in the granulator. The latter functions are of such importance that frequently it is beneficial to also crush and recycle some product-size material.

Regular Superphosphate — see Superphosphate

Regulatory Services — see Sampling Fertilizers

Relative Humidity

Definition: The amount of water vapor in the air, expressed as the maximum amount that the air will hold at a given temperature.
See Also: Hygroscopicity.

Residual Acidity and Basicity of Fertilizer

Definition: The ultimate acidity (or basicity) that develops from fertilizer in a particular horizon after the residual salts are removed from that horizon by leaching. The level of residual acidity depends on the extent that any ammonium nitrogen in the fertilizer nitrifies, the extent that plants differentially absorb cations and anions as well as the initial composition of the fertilizer.
See Also: Acidity and Basicity of Fertilizers.

Materials and Processes

Residual Basicity of Fertilizer — see Residual Acidity and Basicity of Fertilizer

Residual Fertility

Definition: Available nutrient content of a soil carried over to the next crop after fertilizing the previous crop.

Reverted Phosphate

Definition: The phosphorus in phosphate fertilizers may be divided into three parts: 1) water-soluble, 2) insoluble in water but soluble in neutral ammonium citrate, and 3) insoluble in neutral ammonium citrate or water. Reverted phosphate is that which has been changed from the water-soluble to the water-insoluble form.

Description: The addition of lime, limestone, cyanamide, ammonia or similar basic materials may cause some revision of phosphorus to less soluble forms. As used by some fertilizer manufacturers, reverted phosphate refers to an increase in the citrate-insoluble phosphate, with a corresponding reduction of the available portion.

See Also: Citrate-Soluble Phosphate.

Rhenania Phosphate — see Calcined Phosphate

Rice Hulls, Ground

Definition: Ground rice hulls, or chaff from rice grain, are sometimes used in mixed fertilizers as a filler or conditioner.

Description: The material is very light in weight, bulky, and contains about 0.5% N, from 0.2% to 0.3% total P₂O₅, and from 0.1% to 0.8% K₂O.

Riffle

Definition: A mechanical device, of which there are various designs, capable of "splitting" a sample of fertilizer or other particulate material into one or more parts of equal volume and composition. Chief use is in reducing samples of relatively large volumes to the smaller sizes required for laboratory analytical procedures.

Salt (NaCl)

Definition: The sodium salt of hydrochloric acid.

Description: Pure sodium chloride contains 39% Na and 61% Cl.

Salt Index

Definition: Salt index is a measure of the relative tendency of a fertilizer to increase the osmotic pressure of the soil solution as compared to the increase caused by an equal weight of sodium nitrate as a reference material. An excessively high concentration of soluble salts in the soil solution may develop an osmotic pressure of the solution exceeding that of the plant sap and cause dehydration, permanent injury, or even death of the plant.

Description: The lower the salt index, the lesser the risk of causing crop injury in periods of extreme drought or with localized placement of fertilizers. Table 1-10 gives data for calculating the salt index of fertilizer mixtures. The salt index per ton of mixture is obtained by multiplying the salt index per unit of plant nutrient in each ingredient by the total number of units which the respective material supplies in the mixture and adding the resulting value.

When sulfuric acid and/or phosphoric acids are used in formulating ammoniated mixtures, the value per 100 pounds of acid is multiplied by the hundredweight of acid used and the resulting value added to that of the other materials used in the mixture. The salt index of the ammonia reacting with the acid is included in the salt index of the acid, and must not be counted again as contributing to the salt index of the mixture.

Salt-Out Temperature of Solution Fertilizer

Definition: The temperature below which crystallization of dissolved constituents begins and above which the last crystals dissolve.

Sampling Fertilizers

Definition: The fertilizer regulatory services of each state in the U.S. maintain a force of inspectors who have the primary duty to enforce the State Fertilizer Laws and to collect samples of fertilizers during manufacture, storage, transport, or use; such samples to be analyzed for adherence to nutrient guarantees, labeling, registration, etc.

Screen Analysis

Definition: A procedure for determining the particle size distribution in a sample of particulate matter, for example a granular fertilizer.

Description: The graduation of test sieve sizes usually conforms to established standard series. The two series most used in the U.S. are the "U.S. Standard Sieve Series" and the "Tyler Screen Series."

See Also: Sieve Numbers; Size Guide Number.

Table 1-10
Salt Index of Fertilizer Materials and Soil Amendments

Material and Analysis	Per equal weights of materials (Basis: sodium nitrate = 100)	Salt Index Per unit (20 lbs.) of plant nutrients
NITROGEN		
Ammonia, 82% N	47.1	0.572
Ammonium nitrate, 34% N	104.0	3.059
Ammonium sulfate, 21% N, 24% S	68.3	3.252
Urea, 46% N	74.4	1.618
Urea-ammonium nitrate solution		
28% N (39% a. nitrate, 31% urea)	63.0	2.250
32% N (44% a. nitrate, 35% urea)	71.1	2.221
Calcium nitrate, 15.5% N	65.0	4.194
Sodium nitrate, 16.5% N	100.0	6.060
PHOSPHATE		
Ordinary or single superphosphate		
20% P ₂ O ₅	7.8	0.390
Triple superphosphate		
45% P ₂ O ₅	10.1	0.224
Monoammonium phosphate		
11% N, 55% P ₂ O ₅	26.7	0.405
10% N, 50% P ₂ O ₅	24.3	0.405
Diammonium phosphate		
18% N, 46% P ₂ O ₅	29.2	0.456
Ammonium polyphosphate		
10% N, 34% P ₂ O ₅	20.0	0.455
POTASH		
Potassium chloride, 60% K ₂ O		
Potassium sulfate		
50% K ₂ O, 18% S	42.6	0.852
Potassium nitrate		
13% N, 44% K ₂ O	69.5	1.219
Sulfate of potash-magnesia		
22% K ₂ O, 11% Mg, 22% S	43.4	1.971
Monopotassium phosphate		
52.2% P ₂ O ₅ , 34.6% K ₂ O	8.4	0.097
Potassium thiosulfate		
25% K ₂ O, 17% S	68.0	2.720
SULFUR		
Ammonium thiosulfate (12% N, 26% S)		
Ammonium polysulfide (20% N, 40% S)	90.4	7.533
	59.2	2.960
MISCELLANEOUS		
Dolomite, 12% Mg	0.8	0.042
Magnesium oxide, 60% Mg	1.7	0.002
Gypsum, 23% Ca	8.1	0.247
Calcium carbonate, 40% Ca	4.7	0.083
Magnesium sulfate, 9.8% Mg	44.0	2.687

Scrubbers, Wet

Definition: Wet scrubbers of a variety of types are used in fertilizer granulation plants to remove dust and fumes from exhaust gases by washing gas streams with aqueous solutions.

Description: Some of the main types commonly used in the fertilizer industry include spray towers, cyclonic scrubbers, venturi scrubbers, and dynamic precipitators. A combination of venturi and cyclonic scrubber probably is used more widely than any other type of wet scrubber.

SCU — see Sulfur-Coated Urea

Seawater Magnesium Oxide (SMO) — see Magnesia

Seaweed — see Kelp

Seaweed Extract

Definition: When extracted from freshly harvested Canadian *Ascophyllum nodosum* seaweed, it is a source of naturally chelated micronutrients, complexing agents, and natural plant growth regulators. Sold in soluble powder or liquid concentrate form.

Agronomics: Can be used in pure form and as a base or supplement to nutritional formulations. Apply as foliar or soil feed, transplant solution, and seed treatment.

Secondary Nutrients

Definition: Calcium, magnesium, and sulfur are called secondary nutrient elements because they are essential to plant growth in lesser quantity than the primary nutrients and in greater quantity than the micronutrient elements. AAPFCO officially defines as: "Secondary and micro plant nutrients — Those other than the primary nutrients that are essential for the normal growth of plants and that may need to be added to the growth medium. Secondary plant nutrients shall include calcium, magnesium, and sulfur."

Description: Salts containing the secondary nutrient elements, such as calcium nitrate, magnesium nitrate, and ammonium sulfate, are used in solid form, and in solution form as liquid fertilizer or foliar sprays.

Agronomics: Calcium and magnesium usually are supplied in calcitic and dolomitic lime. Sulfur has frequently been called the fourth major nutrient because of the frequency of sulfur deficiencies and the relatively large quantities used by plants.

See Also: Micronutrients; Plant Nutrients.

Seed Meal

Definition: Seeds from which the fat has been extracted are used for feed, or if not fit for this use, for fertilizers.

Description: Valuable chiefly for its nitrogen content, seed meal also contains a small amount of phosphoric oxide, potash, magnesium, and traces of all the micronutrients. When finely ground and dried, also a good conditioner for nongranular fertilizers.

Segregation

Definition: The reversion of a previously well-mixed fertilizer, usually a bulk blend, to a state of nonuniform mix.

Description: Mechanical handling of fertilizer mixtures, such as occurs during conveying, piling, loading, and spreading, promotes segregation of fertilizer ingredients unless the particles of all ingredients are closely matched in regard to physical properties. Matching of particle density and shape is of much less significance and usually can be ignored.

See Also: Size Guide Number.

Selectively Calcined Dolomite

Definition: When dolomite (calcium and magnesium carbonates, CaCO_3 and MgCO_3) is completely burned, CO_2 is expelled, and the resulting product is the oxide (CaO.MgO). CaO tends to revert phosphates and expels ammonia from its salts, but fertilizer grade MgO does not to any serious extent.

Process: The CO_2 in the magnesium carbonate is expelled at 662°F and from the calcium carbonate at 1517°F . It is possible, with proper temperature control, to obtain a partially calcined product ($\text{CaCO}_3.\text{MgO}$).

Description: The magnesium in MgO is more readily available as a plant nutrient than in MgCO_3 . A typical analysis is: magnesium oxide (MgO) 27%; calcium oxide (CaO) 2%; calcium carbonate (CaCO_3) 67%.

Semi-Granular

Definition: Frequently used to describe products that are derived from a granular process but containing substantial proportions of particles finer than 20 mesh.

See Also: Granulation.

Sepiolite

Definition: A naturally occurring clay found in many parts of the world, sepiolite has some use as a suspending agent in production of suspension fertilizers.

Description: Magnesium silicate. Grayish white clay, having a crystalline structure similar to attapulgite clay, but containing less aluminum. Is more reactive than attapulgite. Having a slightly acidic liquid phase which weakens the gel, sepiolite is not recommended for use with acidic fertilizers.

Sequestering Agent — see Chelates**Sequestration**

Definition: Usually refers to the complexing of metallic ions so that they are held from participation in precipitation reactions, e.g., polyphosphates sequester the impurities in wet-process acid and decrease sludge formation.

Serpentine (Pulverized $\text{H}_4\text{Mg}_3\text{Si}_2\text{O}_9$; Olivine Flour ($\text{MgFe})_2\text{SiO}_4$)

Definition: Greyish-green mineral rock belonging to that group of rock material which is close to the earth's central core. Billions of tons came to the surface in New Zealand. It also occurs in the northwestern part of the U.S.

Description: Contains 30% to 35% MgO , 35% SiO_2 , and traces of Co, Zn, Mn, and other micronutrients. One part of serpentine mixed with 3 parts of fresh, hot superphosphate is reported to make a product of higher fertilizer quality than superphosphate alone.

Agronomics: Used as a soil amendment.

Settling Properties of Suspensions

Definition: Attributes of suspension fertilizers such as size, weight, and shape of suspended crystals that determine the rate at which suspended particles settle. Specific gravity of the solution phase and strength of the gel also affect settling properties.

Sewage Sludge

Definition: Solids removed from sewage by screening, sedimentation, chemical precipitation or bacterial digestion.

Description: Five types of sludge are produced as follows: 1) raw; 2) digested; 3) activated; 4) digested activated; and 5) chemically precipitated. Air-dried digested sludge contains roughly 3% to 6% primary nutrients and 10% to 30% moisture. This bulk material is relatively high in micronutrient content.

"Activated sewage products are those made from sewage freed from grit and coarse solids, and aerated after being inoculated with microorganisms. The resulting flocculated organic matter is withdrawn from the tanks, filtered, with or without the aid of coagulants, dried, ground, and screened." (AAPFCO).

SGN — see Size Guide Number**Sheep Manure — see Wool Waste****Shell Marl — see Marl****Shredded Manure — see Manure****Sieve Numbers**

Definition: Test sieves for determining particle size distribution of particulate materials are constructed to vary in wire size, mesh, and opening size in accordance with any of several "standard" test sieve series used throughout the world. The specification of greatest interest is the opening size, since this dimension corresponds to the diameter of the largest particle that will pass the indicated screen.

Description: Table 1-11 on page B31 shows the relationship between sieve numbers and opening size for the major test series used throughout the world. In the cases of the standard sieve sizes of Germany, Italy, and Russia, no screen numbers are used other than a designation of screen opening size, in millimeters.

"Sieve numbers designate sieve openings conforming to specifications of the U.S. Standard Sieve Series according to ASTM specifications E-11-81 and ISO 565." (AAPFCO).

See Also: Screen Analysis.

Sieving

Definition: The process of separating mixtures of particles by their sizes with multiple sieves.

Silica (Silicon Dioxide, SiO_2)

Definition: A very abundant ingredient of the earth's crust. Immense stores of potash are locked up in the form of insoluble silicates.

Description: Sea sand and quartz are nearly pure silica. Silica is insoluble in the common acids and combines with alkalies under suitable conditions to form silicates.

See Also: Silicon.

Silicon (Si)

Definition: An element not found free in nature, but widely distributed as silica (sand or quartz) and silicates in all soils.

See Also: Plant Nutrients.

Silicon Dioxide — see Silica**Silicon Tetrafluoride (SiF_4)**

Definition: Evolved as a gas during the acidulation of phosphate rock.

Simple Superphosphate — see Superphosphate**Size Guide Number (SGN)**

Definition: A number that defines the median particle size of a granular fertilizer material for the purpose of size matching the materials in fertilizer blending operations.

Description: The relationship is:

$$\text{SGN} = (\text{Median particle diameter, mm}) \times 100$$

For example, in a granular fertilizer with an SGN of 200, the median particle diameter would be $200/100 = 2.0$ millimeters. Half the weight of the fertilizer batch would have particle diameter greater than 2.0 millimeters, and half would have diameter smaller than 2.0 millimeters.

The SGN of a fertilizer material may be determined by performance of a sieve analysis. A graphic plot of the analysis results on a "cumulative"

FERTILIZER DICTIONARY / SECTION 1

Materials and Processes

Table 1-11
Standard Test Sieve Series of Several Countries

United States and Canada ^a										
U.S. Standard Series ^b		Tyler Series ^c		France ^d		England ^e		Germany ^{f,i}	Italy ^g	C.I.S. ^{h,i}
Opening, mm	Sieve No.	Opening, mm	Sieve No.	Opening, mm	Module No.	Opening, mm	Sieve No.	Opening, mm	Opening, mm	Opening, mm
7.925	5/16 in.	7.925	2.5	-	-	-	-	8.0	-	-
6.731	0.265 in.	6.680	3	-	-	-	-	6.3	-	-
5.664	3.5	5.613	3.5	-	-	-	-	-	-	-
4.750	4	4.699	4	5.00	38	-	-	5.0	-	-
3.987	5	3.962	5	4.00	37	-	-	4.0	4.0	-
3.353	6	3.327	6	-	-	3.353	5	-	3.35	-
-	-	-	-	3.15	36	-	-	3.15	3.15	-
2.819	7	2.744	7	-	-	2.812	6	-	2.8	-
-	-	-	-	2.50	35	-	-	2.5	2.5	2.5
2.380	8	2.362	8	-	-	2.411	7	-	2.33	-
1.999	10	1.981	9	2.00	34	2.057	8	2.0	2.0	2.0
1.679	12	1.651	10	-	12	1.676	10	-	1.7	-
-	-	-	-	1.60	33	-	-	1.6	1.6	1.6
1.410	14	1.397	12	-	-	1.405	12	-	1.4	-
-	-	-	-	1.25	32	-	-	1.25	1.25	1.25
1.191	16	1.168	14	-	-	1.204	14	-	1.18	-
1.001	18	0.991	16	1.00	31	1.003	16	1.0	1.0	1.0
0.841	20	0.833	20	-	-	0.853	18	-	0.85	0.9
-	-	-	-	0.80	30	-	-	0.800	0.80	0.8
-	-	-	-	-	-	-	-	-	0.75	-
0.706	25	0.701	24	-	-	0.699	22	-	0.71	0.07
-	-	-	-	0.63	29	-	-	0.630	0.63	0.63
0.594	30	0.589	28	-	-	0.599	25	-	0.6	0.56
0.500	35	0.495	32	0.50	28	0.500	30	0.500	0.5	0.5
0.419	40	0.417	35	-	-	0.422	36	-	0.425	0.45
-	-	-	-	0.40	27	-	-	0.400	0.4	0.4
0.353	45	0.351	42	-	-	0.353	44	-	0.355	0.355
-	-	-	-	0.315	26	-	-	0.315	0.315	0.315
0.297	50	0.295	48	-	-	0.295	52	-	0.3	0.28
0.249	60	0.246	60	0.250	25	0.251	60	0.250	0.25	0.25
0.211	70	0.208	65	-	-	0.211	72	-	0.212	0.224
-	-	-	-	0.200	24	-	-	0.200	0.2	0.2
0.178	80	0.175	80	-	-	0.178	85	-	0.18	0.18
-	-	-	-	0.160	23	-	-	0.160	0.16	0.16
0.150	100	0.147	100	-	-	0.152	100	-	0.15	0.14
0.124	120	0.124	115	0.125	22	0.124	120	0.125	0.125	0.125
0.104	140	0.104	150	-	-	0.104	150	-	0.106	0.112
-	-	-	-	0.100	21	-	-	0.100	0.1	0.1
0.089	170	0.089	170	-	-	0.089	170	0.090	0.09	0.09
-	-	-	-	0.080	20	-	-	0.080	0.08	0.08
0.074	200	0.074	200	-	-	0.076	200	0.071	0.075	0.071
0.064	230	0.061	250	0.063	19	0.064	240	0.063	0.063	0.063
-	-	-	-	-	-	-	-	0.056	-	0.056
0.053	270	0.053	270	0.050	18	0.053	300	0.050	0.05	0.050
0.043	325	0.043	325	-	-	0.044	350	0.045	-	0.045
0.038	400	0.038	400	0.040	17	-	-	0.040	0.04	0.040

a. Canadian standard series corresponds to U.S. standard series.
b. American Society for Testing Materials, Specification E-11-70.
c. W.S. Tyler, Mentor, Ohio.
d. French Standard Specification AFNOR NF-X11-501.
e. British Standards Institution, London BS-410-62.
f. German Standard Specification DIN 4188
g. Italian Specification UNI-2332.
h. Specification GOST 3684-63.
i. Sieves in German, Italian, and C.I.S. series are specified only by mm-opening size.

Size Guide Number (SGN) (cont.)

basis (cumulative wt. % retained vs. screen-opening diameter) will identify the screen-opening diameter that would retain exactly 50% of the material. This diameter, in millimeters, multiplied by 100 gives SGN.

Materials differing in SGN greater than 20% have been shown by TVA to exhibit severe segregation tendency when blended. Matching within a 10% variation is recommended.

See Also: Granular Fertilizer; Segregation.

Slag — see Agricultural Slag; Basic Slag; Blast Furnace Slag**Slaked Lime**

Definition: Calcium hydroxide produced by reacting calcium oxide and water.

Agronomics: Occasionally used as a liming agent for soils.

Slow-Release Fertilizers — see Controlled-Release Fertilizers**Sludge Phosphoric Acid**

Definition: The high-impurity side stream resulting from the clarification steps during the concentration of wet-process phosphoric acid to make a merchant-grade acid suitable for shipping. The "sludge acid," which contains most of the impurities that precipitate during concentration and subsequent aging, is often used to make granular triple superphosphate or monoammonium phosphate (MAP) products.

See Also: Acid Sludges (Phosphoric).

Sludge Sulfuric Acid

Definition: Sludge sulfuric acid is the resulting acid from concentrated sulfuric acid used in the refining of petroleum to remove water and other objectionable impurities. This "sludge acid" is sometimes used in the manufacture of superphosphate, and the product is referred to as "sludge superphosphate" because of its characteristic pungent odor.

Sludge Superphosphate — see Acid Sludges**Slurry Fertilizer**

Definition: A thick form of suspension fertilizer. "A fluid mixture containing dissolved and undissolved plant nutrient materials which requires continuous mechanical agitation to assure homogeneity." (AAPFCO).

See Also: Liquid Fertilizers; Fluid Fertilizer.

Slurry Process — see Granulation**SMO (Seawater Magnesia Oxide) — see Magnesia****Sodium (Na)**

Definition: Pure metallic sodium.

Description: A soft waxy material at ordinary temperatures. Burns in air to form sodium oxide which readily takes up water to form sodium hydroxide. Combined with hydrochloric acid, it forms sodium chloride (common salt), and with nitric acid, it forms sodium nitrate.

Agronomics: Sodium can substitute for or replace part of the potassium needed by some plants. It appears to have some value of its own for such crops as oats, table beets, etc. This, however, may be due to the fact that it can release potassium in the cation exchange complex and thus may temporarily increase the available potassium in the soil.

See Also: Plant Nutrients.

Sodium Borate — see Borax**Sodium Fluosilicate or Sodium Silico-Fluoride (Na₂SiF₆)**

Definition: The gases from the superphosphate mixers and dens are sprayed with water when the fluorine compounds are largely recovered. The solution thus obtained is mixed with salt (sodium chloride), when sodium-fluosilicate is precipitated, filtered, and dried. It is used in enameling, and in laundering, also as an insecticide.

See Also: Fluosilicic Acid.

Sodium Molybdate (Na₂MoO₄)

Definition: The anhydrous salt is highly soluble and contains 47% molybdenum.

Sodium Nitrate (NaNO₃, Nitrate of Soda, Chile Salt-peter)

Definition: A salt recovered from natural deposits in Chile or produced commercially by reacting nitric acid with sodium carbonate. "Nitrate of

soda (sodium nitrate) is chiefly the sodium salt of nitric acid. It shall contain not less than 16% nitrate nitrogen and 26% sodium." (AAPFCO).

Description: Pure sodium nitrate contains 16% N and 27% sodium (Na).

Sodium Silico-Fluoride — see Sodium Fluosilicate**Soft Phosphate**

Definition: "Soft phosphate with colloidal clay is a very finely divided low-analysis by-product from mining Florida rock phosphate by a hydraulic process in which the colloidal materials settle at points in artificial ponds and basins farthest from the washer, and are later removed after the natural evaporation of the water." (AAPFCO).

Description: Soft phosphate is ground and sold as low grade phosphatic filler in mixed fertilizers.

Agronomics: Sometimes used for direct application to the soil.

See Also: Colloidal Phosphate.

Soil Acidifier

Definition: A material or mixture used, especially in semi-arid Western areas, to neutralize soil alkalinity.

Description: Sulfuric acid, phosphoric acid, liquid sulfur dioxide, aluminum sulfate, elemental sulfur, and ammonium polysulfide are soil acidifiers.

Soil Amendment

Definition: "The term soil amendment means any substance which is intended to improve the physical characteristics of the soil, except commercial fertilizers, agricultural liming materials, unmanipulated animal manures, unmanipulated vegetable manures, pesticides, and other materials exempted by regulation." (AAPFCO).

Description: Amendments may contain important fertilizer elements but the term commonly refers to added materials other than those used primarily as fertilizer.

Soil Conditioners

Definition: Polyelectrolytes, such as complex vinyl and acrylic compounds and certain cellulose and lignin derivatives, tend to agglomerate soil colloids and produce a crumb structure in the soil. Soil conditioners increase the permeability of the soil to air and water and reduce crusting of dry soil.

Solid Solutions

Definition: Occur as crystals in which one kind of atom, ion, or molecule is substituted for another that is chemically different but of similar size and shape. For example, ammonium nitrate and potassium chloride do not necessarily crystallize as the stable salt pair, potassium nitrate and ammonium chloride, but rather in the form of K(NH₄)NO₃ or NH₄(K)Cl. An excess of ammonium nitrate gives the low value for critical relative humidity, whereas an excess of potassium chloride gives the higher value.

See Also: Hygroscopicity.

Solubility

Definition: The amount of substance that will dissolve at a given temperature in 100 parts of water is known as its solubility.

Description: The solubility of some fertilizer chemicals in pure water at 32°F is found in Table 1-12, on page B33. Solubility of most chemicals is slightly higher at higher temperatures; that of others, especially ammonium and potassium nitrates, increases rapidly with temperature. The presence of other substances in the solution may either increase or decrease the solubility.

Agronomics: To be available to plants a nutrient must be at least slightly soluble in the soil solution.

Solubility of a Fertilizer

Definition: The mass of a fertilizer that will dissolve in a specific volume of water or other solution at a given temperature. (See Table 1-12.)

Soluble Potash — see Potash**Solution Fertilizer**

Definition: A clear, liquid fertilizer in which all nutrients have been completely dissolved in water.

Sorption — see Adsorption**Sour Gas**

Definition: Natural gas and refinery gases containing undesirable proportions of hydrogen sulfide.

Soybean Meal

Definition: The ground residues of soybeans, from which oil has been extracted. Most of the domestic supply is used as feed. Small quantities unfit for feed are used as conditioners in nongranular fertilizers.

Description: May contain up to 6% N, 1% P₂O₅, and 2% K₂O.

Materials and Processes

Table 1-12
Solubility of Fertilizer Materials

Material	Parts in 100 parts of water	
	Cold water (0°C)	Hot water (100°C)
Ammonia, NH ₃	89.9*	7.4
Ammonium nitrate, NH ₄ NO ₃	118.3	871.0
Ammonium sulfate, (NH ₄) ₂ SO ₄	70.6	103.8
Borax, Na ₂ B ₄ O ₇ ·10H ₂ O	2.0	170.0
Calcium carbonate (Limestone), CaCO ₃	0.00153(25°C)	0.0019(75°C)
Calcium nitrate, Ca(NO ₃) ₂ ·4H ₂ O	121.2(18°C)	376.0
Calcium sulfate, CaSO ₄ ·2H ₂ O	0.241	0.222
Copper sulfate, CuSO ₄ ·5H ₂ O	31.6	203.3
Diammonium phosphate, (NH ₄) ₂ HPO ₄	57.5(10°C)	106.0(70°C)
Magnesium sulfate, MgSO ₄ ·7H ₂ O	71.0(20°C)	91.0(40°C)
Manganese sulfate, MnSO ₄ ·4H ₂ O	105.3	111.2(54°C)
Monoammonium phosphate, NH ₄ H ₂ PO ₄	22.7	173.2
Monocalcium phosphate, Ca(H ₂ PO ₄) ₂ ·2H ₂ O	1.8(30°C)	decomposes
Potassium chloride, KCl	34.7(20°C)	56.7
Potassium nitrate, KNO ₃	13.3	247.0
Potassium sulfate, K ₂ SO ₄	12.0(25°C)	24.1
Sodium nitrate, NaNO ₃	92.1(25°C)	180.0
Urea, CO(NH ₂) ₂	78.0(5°C)	753.0
Zinc sulfate, ZnSO ₄ ·6H ₂ O	96.5(20°C)	663.6

* All temperatures are 0° or 100° Celsius unless indicated otherwise.

Specialty Fertilizers

Definition: "A fertilizer distributed for non-farm use." (AAPFCO).
See Also: Lawn and Garden Products.

Spent Alkylation Acid (Sulfuric Acid)

Definition: In one alkylation process for making high octane gasoline, strong sulfuric acid is used. After a time, this acid becomes so contaminated with petroleum products and reduced in strength that it is discarded. This is usually referred to as "spent alkylation acid."

Spent Bone Black — see Bone Products; Superphosphate

Spent Phosphate Catalysts

Definition: Two types discarded by petroleum refiners are used as fertilizers. Several thousand tons are used annually.
Description: The catalysts are silicophosphoric acid (50% P₂O₅) and copper pyrophosphate (22% P₂O₅). The availability of the phosphorus and copper is high.

Spent Phosphoric Acid

Definition: Orthophosphoric acid obtained from the bright dipping process of aluminum alloys.
Description: Typically 22% to 25% P₂O₅ (31%-35% H₃PO₄) containing 2%-3% aluminum and 1% nitric acid.

Spent Sulfuric Acid

Definition: Sulfuric acid which has been used in various industrial processes such as galvanizing operations.
Description: May contain metals such as iron and zinc, and possibly some heavy metal contaminants, depending on the type of industrial process.

Spherodizer — see Granulation

Spherodizing — see Urea

SPM — see Sulfate of Potash-Magnesia

Spray Drum Granulation — see Urea

Standard Ground Limestone

Definition: Material that meets the chemical and mechanical analysis requirements for a particular state under the Agricultural Conservation Program. These requirements vary from state to state.
See Also: Liming Materials.

Standard Superphosphate — see Superphosphate

Steamed Bone Meal

Definition: "Ground sterilized bone is ground animal bones or bone meal that have been previously steamed under pressure, heated, or rendered sterile in some other acceptable manner." (AAPFCO).
See Also: Bone Products.

STP — see Fluid Lime

Suint

Definition: The dried perspiration of sheep adheres to the wool fibers and consists largely of potash salts (mostly carbonate) combined with fatty acids. This "suint" or "yolk" amounts to one-third or more of the weight of the raw wool and is removed by solvents.
Description: The dried product contains 2% to 4% N, 4% to 7% P₂O₅, and 7% to 12% K₂O.
See Also: Wool Waste.

Sulfate of Ammonia — see Ammonium Sulfate

Sulfate of Potash — see Potassium Sulfate

Sulfate of Potash Magnesia (SPM) (K₂SO₄·2MgSO₄·Imported, MgSO₄·K₂SO₄·6H₂O)

Definition: Either of two double sulfates of potassium and magnesium. The material imported from Germany was formerly called double manure salts. The domestic salt is produced from langbeinite and is marketed as 95% langbeinite.
"Double sulfate of potash and magnesia (langbeinite) is a commercial product containing not less than 21% soluble potash (K₂O), nor less than 53% sulfate magnesia and not more than 2.5% chlorine."
"Sulfate of potash-magnesia is a potash salt containing not less than 25% soluble potash (K₂O) nor less than 25% sulfate magnesia and not more than 2.5% chlorine." (AAPFCO)

Sulfur (S, Brimstone)

Definition: An acid-forming element, essential to the growth of plants and animals. It occurs naturally in elemental deposits (as in Louisiana and Texas) and as sulfates and sulfide ore. Iron pyrites (FeS₂), anhydrite (CaSO₄), and gypsum (CaSO₄·2H₂O) are sources of sulfur and sulfuric acid in other parts of the world.
Process: The chief source has been from the Frasch process—hot sulfur emulsion pumped to the surface from wells reaching into the deposit which is melted by the injection of superheated water and hot compressed air. Other sources in North America are from the desulfurization of sour natural gas, oil refining gases, smelter gases, and coal.
Description: Yellow crystals melting at about 237°F. About 1 ton of sulfur (as sulfuric acid) is required to produce a ton of P₂O₅ (as wet-process P₂O₅).
Agronomics: Used for correction of alkali soils and sulfur deficiencies in soil. It is one of the secondary nutrients.

Sulfur Dioxide (SO₂)

Definition: Oxide formed by either combustion of sulfur or pyrites (as in the production of sulfuric acid) or recovered from stack gases and smelter fumes and used to produce sulfuric acid. The most widely used method for SO₂ recovery from stack gases is the limestone slurry method.

Sulfur-Coated Urea (SCU)

Definition: A controlled-release nitrogen fertilizer. "A coated slow-release fertilizer consisting of urea particles coated with sulfur. The product is usually further coated with a sealant (2%-3% of total weight) and a conditioner (2%-3% of total weight). It typically contains about 30% to 40% nitrogen and 10% to 30% sulfur." (AAPFCO)

Sulfuric Acid (H₂SO₄) (Oil of Vitriol)

Definition: Acid produced by the oxidation of sulfur and SO₂ according to the route S → SO₂ + H₂O → H₂SO₄, formerly by the lead chamber process, now largely by the contact process.
Description: Virgin acid, made from elemental sulfur or pyrites, or from the recoverable sulfur dioxide in smelter gas, is the preferred type of sulfuric acid for wet-process phosphoric acid manufacture. Some alkylation acid and spent or waste sulfuric acid from other industries is used in making normal superphosphate.
Agronomics: A few thousand tons of sulfuric acid are used annually in reclamation of alkali soils.
See Also: Virgin Acid.

Superphosphate

Definition: "Superphosphate is a product obtained when rock phosphate

Superphosphate (cont.)

is treated with either sulfuric acid or phosphoric acid or a mixture of these acids. The guaranteed percentage of available phosphoric acid shall be stated as a part of the name." (AAPFCO)

Description: Present-day terminology is by no means uniform. A given type of superphosphate may vary in analysis as well as in name. Normal superphosphate, frequently called "regular," "ordinary," "single," "standard," "simple," or "20% superphosphate" refers to all grades containing up to 22% available P_2O_5 , which are commonly made by the acidulation of natural phosphatic material with sulfuric acid. The usual phosphorus content is in the neighborhood of 20% P_2O_5 .

Enriched superphosphate refers to all grades containing more than 22% and less than 40% available P_2O_5 that are commonly made by the acidulation of natural phosphatic material with a mixture of sulfuric and phosphoric acids. The usual P_2O_5 content is in the neighborhood of 27%.

Concentrated superphosphate, also called "double," "treble," "triple," or "multiple," usually refers to all grades containing 40% or more available P_2O_5 , which are commonly made by acidulation of natural phosphatic material primarily with phosphoric acid. The product usually contains 45% to 48% available P_2O_5 and chiefly consists of monocalcium phosphate monohydrate. The usual product made with wet-process acid has a P_2O_5 content of 45% to 46%. (See Figure 1-10.)

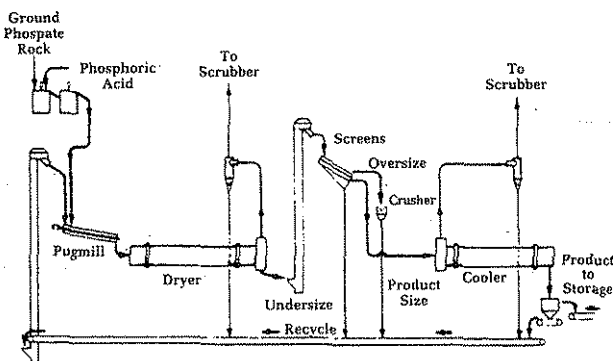


Figure 1-10
Continuous process for the manufacture of granular triple superphosphate. (Courtesy TVA)

Superphosphoric Acid

Definition: "The acid form of polyphosphates, consisting of a mixture of orthophosphoric and polyphosphoric acids. Species distribution varies with concentration, typically 68% to 83% P_2O_5 ." (AAPFCO)

Process: Can be made by thermal dehydration of orthophosphoric acid or by absorption of P_2O_5 in water.

Description: A phosphoric acid mixture containing a substantial proportion of one or more polyphosphoric acids. The most common use in fertilizer manufacture is for production of ammonium polyphosphate solution. Superphosphoric acid made by dehydration of wet-process phosphoric acid usually contains 68% to 72% P_2O_5 .

See Also: Phosphoric Acid.

Surfactants

Definition: Substances that have the property of lowering surface tension of liquids when dissolved in them. They are of three types: nonionic, anionic, and cationic, but only the first two are used in fertilizer manufacture.

Description: Anionic surfactants include many different types of complex alkyl aryl sodium sulfonates and sulfates. The nonionic include numerous complex ethers and alcohols. Hundreds of different surfactants are available.

See Also: Conditioners.

Suspending Agent

Definition: In the production of suspension fertilizers, a suspending agent is added to prevent settling of crystals or other solid materials during storage or shipment.

Description: The suspending agent must form a gel of sufficient strength to prevent floating or settling of crystals or other solids during low-shear pumping or gravity flow. It also must have a yield point low enough so that the gel can be easily broken allowing the suspension to be transferred from one container to another. It also must have the ability to recover its viscosity and gel strength immediately after stress beyond the yield point so there will be no settling of solids.

At present, the major material used as the suspending agent for suspension fertilizers is colloidal attapulgite clay. However, sodium bentonite and

sepiolite clays are being used in increased amounts. Most other gel-forming materials have been ruled out because of unfavorable economics.

See Also: Attapulgite Clay; Fluid Clay.

Suspension Fertilizers

Definition: Liquid fertilizer in which the solids are held in suspension (prevented from settling) by use of a suspension agent, usually a swelling type clay. "A fluid containing dissolved and undissolved plant nutrients. The suspension of the undissolved plant nutrients may be inherent with the materials or produced with the aid of a suspension agent of nonfertilizer properties. Mechanical agitation may be necessary in some cases to facilitate uniform suspension of undissolved plant nutrients." (AAPFCO)

Description: Must be fluid enough to be mixed, pumped, and applied to the soil without major alterations in the application equipment — and yet remain homogenous during application.

See Also: Liquid (Fluid) Fertilizers.

Sylvinite

Definition: A crystalline mixture of sylvite (potassium chloride — KCl) and halite (common salt — NaCl). It is the most common mineral from which potassium chloride is produced in North America.

Description: Sylvinite mined in New Mexico contains from 22% to 27% K_2O . Analysis of Saskatchewan ores indicates an average content of 26% K_2O . New Brunswick deposits contain 24% to 30% K_2O . Salt mixture found in Germany, France, Spain, and Russia contains from 16% to 30% K_2O .

Sylvite

Definition: The mineral, potassium chloride, occurring in colorless cubes or crystalline masses.

Synthetic

Definition: "A term which may be applied to any substance generated from another material or materials by means of a chemical reaction." (AAPFCO)

Synthetic Materials

Definition: Materials that are manufactured chemically (by synthesis) from their elements or other chemicals as contrasted to those found ready made in nature.

Description: Synthetic ammonia (NH_3) is now made on a large scale from its elements, nitrogen (from the air) and hydrogen, and synthetic urea is made from ammonia and carbon dioxide.

Synthetic Organic Chemicals

Definition: Calcium cyanamide and urea are produced synthetically for use as fertilizers.

Description: They contain organic combinations of elements, but behave in the soil like inorganic fertilizers.

See Also: Nitrogen.

Tailings

Definition: Off-grade material obtained in equipment clean-up, or the residue from ore treatment.

Tankage

Definition: Animal tankage is derived from rendered, dried, and ground by-products of the slaughter of animals. Some is used as fertilizer but the principal use is in animal feeds. "Tankage (without qualification) is the rendered, dried, and ground by-product, largely meat and bone from animals (slaughtered or that have died otherwise)." (AAPFCO)

Description: Averages 7% N and about 10% P_2O_5 .

See Also: Fish Tankage; Garbage Tankage; Leather Tankage.

Temperature — see Ammoniation**Tetrapolyphosphoric Acid — see Phosphoric Acid****Tetrasodium Pyrophosphate (TSPP)**

Definition: A water-soluble compound highly effective as a chemical dispersant for clay particles in nonelectrolyte solutions (urea) or water. A common use in the fluid fertilizer industry is in preparation of fluid clay for subsequent addition as a suspending agent in suspension-type fluid fertilizers.

See Also: Fluid Clay.

Thixotropic

Definition: Thixotropic gels will liquify readily when shaken, stirred, or otherwise agitated and then will return to the gel-like state when allowed to stand undisturbed. Thixotropic gels are the type desired in suspension-type fertilizers.

Materials and Processes

Thomas Phosphate — see Basic Slag

Thomas Slag — see Basic Slag

Tobacco Stems

Definition: Ground waste tobacco products, principally stems. Sometimes the stems are previously treated for the removal of nicotine.
Description: Fertilizer use is for the potash content and conditioning effect. They contain about 2% N, 6% K₂O, 3% Ca, 1% Cl, and 68% organic matter.

Total Phosphorus Content of Fertilizer

Definition: The sum of water-soluble, citrate-soluble, and citrate-insoluble phosphorus content of fertilizer.

TPA (Total phosphoric anhydride, P₂O₅) — see Phosphoric Acid

Trace Element Fertilizers — see Micronutrients

Trace Elements — see Micronutrients

T-Reactor — see Reactors

Treated Manure — see Manure

Treble Superphosphate — see Superphosphate

Triazone

Definition: "A water soluble organic compound of formula C₃H₇N₃O which contains at least 41% total N." (AAPFCO)

Tricalcium Phosphate — see Calcium Phosphate

Triple Superphosphate — see Superphosphate

Tripolyphosphoric Acid — see Phosphoric Acid

Tripotassium Phosphate — see Potassium Phosphates

TSPP — see Fluid Lime; Tetrasodium Pyrophosphate

Tung Hulls

Definition: Ground hulls removed from the nuts of *Aluertes fordii* are used as fertilizer filler or conditioner.

Description: Dried, ground hulls are reasonably safe from spontaneous heating and ignition provided that the moisture content does not exceed 15% to 17%. They contain only small amounts of plant nutrients.

Tung Pomace — see Tung-Nut Meal

Tung-Nut Meal

Definition: Derived from seeds of the tung oil tree, *Aluertes fordii*. The plant is grown in southern states, within 100 miles of the Gulf of Mexico. Oil is extracted from the kernel and the compressed cake is dried and used locally as a fertilizer conditioner.

Description: Tung kernels free of oil and shell on the dry basis contain about 8% N, 2% P₂O₅, and 2% K₂O. Tung-nut meal ignites spontaneously under certain circumstances, when it contains 5% or more of oil. Meal with more than 10% of moisture may ferment and heat up dangerously.

Turbidity of a Solution — see Clarity of Solution Fertilizer

Tyler Screen Series — see Sieve Numbers

UAN — see Nitrogen Solutions

UAP — see Urea-Ammonium Phosphate

UAPP — see Ammonium Polyphosphate

Unavailable Nutrients

Definition: Nutrients in forms which plant roots cannot absorb.

Unit

Definition: "Twenty pounds of plant food or 1% of a ton." (AAPFCO)

Description: Represents 1% or 20 pounds of a nutrient in a 2000-pound ton of fertilizer. Thus, a 5-20-10 fertilizer contains 5 units of N, 20 units of P₂O₅, and 10 units of K₂O per ton.

Unslaked Lime — see Liming Materials

Urea (CO(NH₂)₂)

Definition: A white crystalline, or granular, solid synthesized from ammonia and carbon dioxide under high temperature and pressure by a number of processes. "The commercial synthetic acid anhydride of carbonic acid and it shall contain not less than 45% nitrogen." (AAPFCO)

Description: Urea has a high analysis (45% to 46% N), low salt index and chemical stability. Urea for some crops, such as in foliage sprays, should not contain more than 0.25% biuret; such a product is called "low-biuret" urea.

Agronomics: Widely used in solid and liquid complex fertilizers and for direct application. It is used in foliar sprays, with or without the addition of pesticides and micronutrients. About 10 pounds of urea per 100 gallons of spray solution is readily absorbed through the leaves of many plants and efficiently utilized as a nitrogen source.
See Also: "LB" Urea.

Urea Phosphate (CO(NH₂)₂·H₃PO₄; UP)

Definition: A crystalline compound formed in processing mixtures containing urea and phosphoric acid or other phosphatic materials.

Agronomics: Urea phosphate has shown good promise in suppressing the volatilization loss of ammonia from surface-applied urea. Mixtures of urea and UP with a N:P₂O₅ ratio of about 3:1 are used. UP can be used in irrigation water through sprinkler irrigation systems to avoid scaling and plugging difficulties.

Urea Solution

Definition: A urea and water combination usually containing about 19% nitrogen.

Urea-Ammonia Liquors

Definition: Solutions containing usually 28-32% nitrogen.

Urea-Ammonium Phosphate (UAP)

Definition: Intimate mixtures containing ammonium orthophosphates and urea.

Process: Grades produced include 28-28-0, 36-18-0, and a variety of other grades with plant food contents up to 60%. Potash can be included in these products. Modified treatment produces urea ammonium polyphosphate (UAPP) for use as solid or in liquid fertilizers.

Description: Grades containing potash, such as 18-18-18, require control of humidity in the bagging system and immediate bagging of products to avoid serious moisture absorption and wetting problems.

See Also: Ammonium Polyphosphate.

Urea-Ammonium Sulfate (UAS)

Definition: Granulated homogeneous mixtures of urea and ammonium sulfate.

Description: Contains 30% to 40% N and 4% to 13% S. The products have greater granule strength than urea alone.

Urea-Feed Grade

Definition: Smaller prill size (42% N) for better blending into animal feeds as a protein source.

Urea-Form

Definition: "Urea-form fertilizer materials (sparingly soluble) are reaction products of urea and formaldehyde containing at least 35% nitrogen largely in insoluble but slowly available form. The water-insoluble content shall be at least 60% of the total nitrogen. Water-insoluble nitrogen in these products shall have an activity of not less than 40% when determined by the appropriate AOAC method." (AAPFCO)

See Also: Urea-Formaldehyde Reaction Products.

Urea-Form Fertilizer Materials — see Urea-Formaldehyde Reaction Products

Urea-Formaldehyde Products

Definition: Urea-formaldehyde products (water soluble) are reaction products of urea and formaldehyde which contain at least 30% nitrogen, largely in water soluble form. Some slowly available nitrogen products are present. Stable aqueous solutions may be prepared from these materials. The reaction products shall contain a maximum of 55% free urea with the remainder of the urea being chemically combined as methylolureas, methylolurea ethers, and/or methylenediurea (MDU) and dimethylenetriurea (DMTU)." (AAPFCO)
See Also: Dimethylenetriurea; Methylenediurea; Urea-Formaldehyde Reaction Products.

Urea-Formaldehyde Reaction Products (Urea-Form)

Definition: A class of synthetic insoluble nitrogenous materials, methylene ureas, made by reaction of urea and formaldehyde in a form slowly available to plants. Urea-formaldehyde plastic scrap contains considerably less than 38% N and is worthless as a fertilizer.

Agronomics: Because of its low solubility, urea-form cannot burn vegetation or interfere with germination. The nitrogen becomes slowly available over a controlled period of time. It cannot leach out until it has been nitrified.

See Also: Controlled-Release Fertilizers; Dimethylenetriurea; Methylenediurea; Urea-Formaldehyde Products.

Urea-Formaldehyde Solutions (UF)

Definition: Specially stabilized solutions containing urea and formaldehyde. When mixed with fertilizer materials to make ordinary mixtures urea-form is produced in the mixture, up to about 20% of the total N of the solution.

Process: When additional urea is added to any of these solutions and the solution is acidified it polymerizes to form a methylene urea. Under proper conditions it produces urea-form, a slowly available fertilizer, but under others it forms a plastic that is unavailable as a plant nutrient.

See Also: Methylenediurea; Nitrogen Solutions; Urea-Form; Urea-Formaldehyde Reaction Products.

Urea-Nitric Phosphate (UNP)

Definition: A nitric phosphate fertilizer produced with urea as a major ingredient in the production process.

Description: Urea-nitrogen phosphates have unique chemical compositions and unique properties. For example, when produced with only phosphate rock, nitric acid, and urea as the raw materials, product of 27-9-0 grade can be made in which the P_2O_5 is essentially 100% water soluble. Urea in the urea-nitric phosphate serves both as a nitrogen source and as an adducting agent to form such adduct-type compounds as $Ca(NO_3)_2 \cdot 4CO(NH_2)_2$, $CO(NH_2)_2 \cdot HNO_3$, and $CO(NH_2)_2 \cdot H_3PO_4$. Dicalcium phosphate, a water-insoluble content of most nitric phosphates, is not present to a significant extent in the urea-nitric phosphates. Nitrate nitrogen and urea nitrogen are the principal forms of nitrogen present. The urea-nitric phosphates are highly acidic with a pH of about 2.

See Also: Nitric Phosphate.

Urease

Definition: An enzyme that promotes hydrolysis of urea which results in the formation of ammonium carbonate that easily changes chemically into ammonium hydroxide.

Description: The enzyme, a crystalline substance, is present in all soils, and occurs on living and dead plant tissues. It is the product of many different organisms and living cells, and can be isolated and studied.

Agronomics: Hydrolysis of urea is indirectly responsible for nitrogen losses from urea fertilizer. After hydrolysis, the ammonium hydroxide further breaks down to release free ammonia, which, when the urea has not been incorporated into the soil, can volatilize into the atmosphere. Urease activity is greatest in soils high in organic matter, but it also can be high on crop residues and growing plants. High temperatures speed hydrolysis.

Urease Inhibitor

Definition: An additive to urea fertilizers which slows the rate at which urea hydrolyzes in soil.

Uric Acid ($C_5H_4N_4O_3$)

Definition: A white crystalline compound almost insoluble in water. Occurs in dried poultry manure and bird guano. It becomes readily available in the soil.

Description: Pure uric acid contains 33% N.

U.S. Standard Sieve Series — see Sieve Numbers**Value**

Definition: "Overall index value — the value obtained from the calculation: (Commercial Value Found) \times 100 / (Commercial Value Guaranteed) using assigned values for N, AP, and soluble K_2O , such as \$3, \$2, and \$1 per unit." (AAPFCO)

Verdete

Definition: Illite-glaucinite siltstone, associated with phosphorite in Brazil.

Description: Contains phosphorus and potassium in sufficient amounts to make it of possible agronomic use when finely ground.

Vermiculite ($3MgO \cdot Fe_2Al_2O_3 \cdot 3SiO_2$)

Definition: When vermiculite ore (a magnesium mica) is heated, the material expands to many times its original volume. Exfoliated vermiculite is used as a fertilizer conditioner in mixed fertilizers, as a rooting medium in greenhouses, and as a soil conditioner.

Description: Exfoliated vermiculite weighs from 8 to 25 pounds per cubic foot. Contains an average of less than 1% N, about 0.25% P_2O_5 , about 2.5% K_2O , and 20% to 24% MgO .

Agronomics: Vermiculite absorbs large quantities of moisture and acts as a base exchange medium in the soil.

Virgin Acid (Sulfuric)

Definition: Relatively pure manufactured acid as opposed to spent or waste acids.

See Also: Spent Sulfuric Acid; Sulfuric Acid.

Viscosity

Definition: That property, usually of a liquid, referring to the effect of forces which oppose the flow. The converse of "viscosity" is "fluidity."

Description: Viscosity measurements are valuable in estimating the handling characteristics of liquids such as superphosphoric acid. The unit is the centipoise. The viscosity of water at 68°F is very nearly one centipoise. For practical purposes, the "relative viscosity" of a fluid is identical with its viscosity in centipoises.

Waste Lime — see Liming Materials and Lime, Waste**Water-Insoluble Nitrogen (WIN) — see Activity of Water-Insoluble N in Mixed Fertilizers****Water-Soluble Phosphate**

Definition: That part of the phosphate in a fertilizer that is soluble in water as determined by prescribed chemical tests.

Water-Soluble Phosphorus Content of Fertilizer

Definition: The content of total phosphorus which is water-soluble, all of which is considered to be plant available.

Weights — see Net Weights**Wet Scrubbers — see Scrubbers, Wet****Wet-Process Phosphoric Acid — see Phosphoric Acid****WIN — see Activity of Water-Insoluble N in Mixed Fertilizer****Wood Ashes**

Definition: Hardwood ashes are frequently used as fertilizer for tobacco. The amount used commercially is insignificant as compared with the total used.

Description: Hardwood ashes contain about 5% K_2O and 23% Ca.

Wool Waste

Definition: In cleaning raw wool by mechanical processes a good deal of short hair, manure, suint, grease, and dirt are taken out. This material was formerly used for making base goods. "Sheep manure-wool waste is the by-product from wool-carding establishments, consisting chiefly of sheep manure, seeds, and wool fiber." (AAPFCO)

Description: Pure wool contains 15% N.

See Also: Suint.

Xanthan Gum

Definition: A swelling material used in suspension fertilizers which acts as a suspending agent.

X-O-X Grades

Definition: Nonphosphate grades (mainly granular) have been increasing moderately in popularity since the mid-1970s. Usual commercial grades include 14-0-14 and 16-0-16, formulated with nitrogen solution, ammonium sulfate (sometimes ammonia and sulfuric acid) and potash. Higher analysis grades, such as 26-0-26, have been produced experimentally by granulating urea melt and potassium chloride.

Agronomics: Increased popularity of X-O-X grades in recent years has been attributed mainly to "skip-year" fertilization practices where the level of phosphate in the soil is considered adequate, and addition of phosphate for maintenance is omitted in alternate years.

Yolk — see Suint**Zinc (Zn)**

Definition: Bluish-white metallic element, which forms salts with acids. It is essential to plant growth, and recognized as one of the micronutrients.

See Also: Micronutrients.

Materials and Processes

Zinc Ammonium Nitrate

Definition: A liquid mixture of zinc and ammonium nitrates containing 15% Zn and 20% N.

See Also: Micronutrient Fertilizers.

Zinc Nitrate ($Zn(NO_3)_2 \cdot 6H_2O$)

Definition: A highly soluble compound, used in solution form as a source of zinc in liquid fertilizers.

See Also: Micronutrient Fertilizers.

Zinc Oxide (ZnO)

Definition: Used in some mixed fertilizers to supply zinc.

Description: Pure zinc oxide contains 80% zinc.

Agronomics: Although not water soluble, it is somewhat available to plants, especially in powdered form. Powdered zinc oxide is also used as slurry or dust directly on plant foliage or on dormant tree crops.

See Also: Micronutrient Fertilizers.

Zinc Oxysulfate

Definition: A fertilizer, sometimes known as Basic Zinc Sulfate, containing zinc oxide which has been partially acidulated with sulfuric acid.

Description: The percentage of the total zinc in water-soluble form is directly related to the degree of acidulation. Products are sold in powdered or granular form.

Agronomics: Availability to plants of zinc in granular zinc oxysulfates is related to the percentage of total zinc in water-soluble form.

Zinc Sulfate

Definition: The zinc salt of sulfuric acid - $ZnSO_4 \cdot H_2O$, $ZnSO_4 \cdot 6H_2O$, and $ZnSO_4 \cdot 7H_2O$. The anhydrous salt is not used as a fertilizer, but all of the three hydrates, whose formulas are shown above, are used.

Description: The anhydrous salt is very hygroscopic. The monohydrate is the most stable variety in warm climates. Zinc contents of the three hydrates, respectively, are about 36%, 24%, and 22%.

See Also: Micronutrient Fertilizers.

Notes

Section 2

FERTILIZER DICTIONARY

Agronomics / Application

Edited by Dr. Larry S. Murphy and Charlotte Sine

Section 2 of the Fertilizer Dictionary provides "how-to-use" information on fertilizers, with an emphasis on proper application and environmental considerations. Included are descriptions of use of macro, secondary, and micronutrients, and organic materials, as well as information on how fertilizers impact the environment. Such terms as

Nitrification, Denitrification, Crop Nutrient Recycling, Nitrogen Cycle—which every ag professional must be comfortable with—are explained in this section of the Fertilizer Dictionary. Definitions of agronomic terms are found at the beginning of this section. Application terms are grouped for easy reference beginning on page B 50.

Agronomics

Acid Soil

Definition: A soil containing a prevalence of hydrogen ions (H⁺) in the soil solution (active acidity) and held to the surface of soil particles (reserve or potential acidity).

Soil pH values are below 7, depending on the concentration of hydrogen ions in the soil solution.

Agronomics: Soils become more acid as a result of leaching of calcium

(Ca⁺²), magnesium (Mg⁺²), and potassium (K⁺) cations from the topsoil into the subsoil, through the removal of cations by growing crops, and by nitrification of ammonium (NH₄⁺) nitrogen. As cations are removed from the soil particles, they are replaced with hydrogen and acid-forming aluminum ions. Soil acidity affects availability of the essential plant nutrients. (See Figure 2-1.)
See Also: Cation Exchange; Liming Materials (Section 1).

Acidity and Basicity of Fertilizers

Definition: Fertilizers have either neutral, acidic (lower soil pH), or basic (increased soil pH) effects when added to the soil. This effect is commonly expressed in terms of the amount of pure calcium carbonate that would be required to either offset the acid-forming reactions of 100 pounds of fertilizer materials or the amount of calcium carbonate required to equal the acid-neutralizing effects of 100 pounds of fertilizer.

Agronomics: Most of the acid-forming effects of fertilizers are due to the activities of soil bacteria which convert ammonium-nitrogen to nitrite and nitrate in the process of nitrification. The theoretical values shown in Table 2-1 are based on acidity produced during nitrification. These values, however, have been substantiated by research. Ammonium nitrogen from legumes, animal wastes, and sewage sludge produces exactly the same effect as commercial fertilizers. Oxidizable forms of sulfur (elemental S or thiosulfate S) also contribute to soil acidification.

Properties: The acid- and base-forming nutrients and their equivalent acidities or basicities, in terms of calcium carbonate (CaCO₃) per 100 pounds of product are shown in Table 2-1 on page B40.

Availability of Plant Nutrients

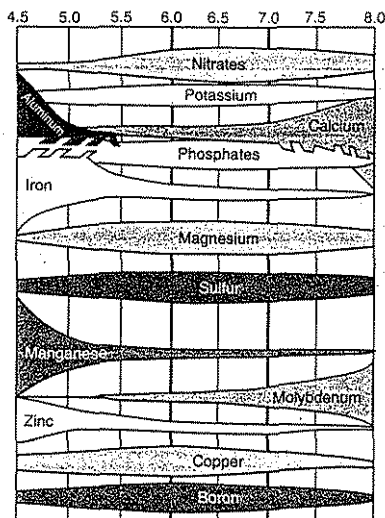


Figure 2-1

The relative availability of 12 essential plant nutrients in well-drained mineral soils in temperate regions in relation to soil pH. A pH range between 6.0 and 7.0 (between heavy lines) is considered ideal for most plants. The thirteenth essential plant nutrient from the soil, chlorine, is not shown because its availability is not pH-dependent. Aluminum is not an essential nutrient for plants but it is shown because it may be toxic below a soil pH of 5.2. (Source: "Liming Acid Soils," Leaflet AGR-19, 1978, University of Kentucky.)

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Actinomycetes

Definition: A category of soil bacteria that includes thread-like microorganisms forming elongated cells with a tendency towards branching.

Other Names: Frequently called "ray fungi."

Agronomics: Actinomycetes are heterotrophic bacteria utilizing fixed carbon sources and their presence is therefore conditioned by the availability of organic substrates (organic matter). Their activities aid the decomposition of certain disease resistant components of plant and animal tissue, formation of humus, and organic transformations at high temperatures, particularly in the rotting of green manures, hay, compost piles, and animal manures.

Active Acidity

Definition: The hydrogen ion concentration of the soil solution is designated as active acidity.

Agronomics: Active acidity is measured by soil pH but does not indicate the actual magnitude of lime that is required to correct soil acidity. Lime requirements are based on the amount of reserve or potential acidity held on the soil's exchange complex.

See Also: Acid Soil; Reserve Acidity.

Alkali Soil

Definition: A soil having a high degree of alkalinity (pH 8.5 or higher) or high in exchangeable sodium (15% or higher) — or both, so that growth of most crops is reduced.

Alkaline Soil

Definition: A soil having a pH greater than 7.0; practically, one having a pH above 7.3.

Table 2-1: Acidity and Basicity of Principal Fertilizer Materials

Material Supplying	Nitrogen (N) %	Phosphate (P ₂ O ₅) %	Potash (K ₂ O) %	Sulfur (S) %	Equivalent Acidity (A) or Basicity (B) (lb. CaCO ₃ /100 lb. of product)	
					(Theoretical)	(Commonly Used)
NITROGEN						
Ammonium nitrate	33 to 34	0	0	0	119 to 122 A	61A
Anhydrous ammonia	82	0	0	0	295A	148A
Calcium nitrate	15.5	0	0	0	20B	20B
Sodium nitrate	16	0	0	0	29B	29B
Urea-ammonium nitrate solution	28 to 32	0	0	0	101 to 115A	50-58A
Ammonium sulfate	21	0	0	24	151A	110A
Urea	46	0	0	0	166A	84A
Ammonium thiosulfate	12	0	0	26	80A	—
PHOSPHORUS						
Ammonium polyphosphate (APP)	10	34	0	0	73A	—
Diammonium phosphate (DAP)	18	46	0	0	102A	70A
Monoammonium phosphate (MAP)	10 to 12	50 to 55	0	0	90 to 99A	54-58A
Normal superphosphate	0	18 to 20	0	12	Neutral	Neutral
Triple superphosphate	0	44 to 46	0	1	Neutral	Neutral
Ground rock phosphate	0	26 to 35	0	0	10B	10B
		(Approx. 3% Available)				
POTASSIUM						
Potassium chloride	0	0	60 to 62	0	Neutral	Neutral
Potassium nitrate	13	0	44	0	26B	26B
Potassium sulfate	0	0	48 to 52	18	Neutral	Neutral
Sulfate of potash magnesia	0	0	22	22	Neutral	Neutral

Source: Potash & Phosphate Institute; adapted from various sources.

Ammonification

Definition: The conversion of organic nitrogen to ammonium-nitrogen by microorganisms in the soil.

Animal Manures

Definition: The excreta of animals — dung and urine with the straw or other materials that may have been used in the confinement areas.

Properties: The plant nutrients in animal waste solids must usually be mineralized before those nutrients are available to plants. Nutrients in urine, on the other hand, are immediately available. Most of the urinary nitrogen is present as urea. Potassium in both solids and urine is readily available.

Environment: It is difficult if not impossible to control the amount or the timing of N release from animal manures. This difficulty with manures actually increases the environmental risk, compared to that of commercial fertilizer, when they are used as the primary source of plant nutrients.

Autotrophic Bacteria

Definition: A category of soil bacteria that obtain their energy from the oxidation of mineral constituents, such as ammonium, sulfur, and iron and obtain most of their carbon from carbon dioxide.

Agronomics: The numbers of these bacteria are much smaller than those classified as heterotrophic but their involvement in nitrification and sulfur oxidation reactions makes them tremendously important in higher plant nutrition.

Available

Definition: As applied to nitrogen, phosphorus, and potassium, this term has somewhat different meanings. In each case all that is soluble in water is available. In addition, however, some of each that is not soluble in water is available to plants. In general, a form of nutrient capable of being assimilated by a growing plant.

Agronomics: Available nitrogen is defined as nitrogen that is water-soluble plus that which is readily solubilized or converted to free ammonia.

Available phosphorus (expressed as P₂O₅) is that portion which is water-soluble plus that which is soluble in ammonium citrate.

Available potassium (expressed as K₂O) is defined as that portion soluble in water or a solution of ammonium oxalate.

BMPs

Definition: Best management practices (BMPs) are those practices which have been proven in research and tested through farmer implementation to give optimum production potential, input efficiency, and environmental protection.

Boron (B)

Definition: Boron (B) is an essential non-metallic micronutrient and exists in the soil in a number of primary and secondary nutrients. It is absorbed by plants as boric acid (H₂BO₃) or one of the borate anions.

Agronomics: Boron is essential for germination of pollen grains and growth of pollen tubes and is essential for seed and cell wall formation. Boron forms sugar/borate complexes associated with sugar translocation and affects protein formation. Boron deficiency generally results in stunted plant growth — the growing point and the younger leaves first because of lack of mobility in the plant. In many crops the symptoms of boron deficiency are well defined and quite specific such as crooked and cracked stem in celery, corky core in apples, black heart in beets, hollow heart in peanuts, and ringed or banded leaf petioles in cotton. Alfalfa, especially susceptible to boron deficiency, shows a rosetting (yellow top), then death of the terminal bud. Coarse-textured sandy soils low in organic matter are typically low in minerals that contain boron and boron availability. Organic matter is an important source of soil boron. High soil pH also limits boron availability. Deficiencies of this element can be determined by soil and plant analysis.

Buffer

Definition: A system of substances, usually a mixture of weak acids and their salts, which tends to resist changes in pH. In soils, organic matter, clays, and free calcium carbonate tend to buffer the system against pH changes.

Buffer Capacity of Soils

Definition: The ability of a soil to resist a change in soil solution hydrogen-ion concentration (soil pH) . . . resisting the tendency to become more acid upon the addition of an acid or an acid-forming material or more alkaline upon addition of basic materials such as lime.

Agronomics

Calcareous Soil

Definition: A soil containing calcium carbonate . . . a soil alkaline in reaction because of the presence of free calcium carbonate.

Properties: Treatment with dilute hydrochloric acid causes such soils to effervesce (fizz), giving off carbon dioxide gas.

Calcium (Ca)

Definition: Calcium (Ca) is an essential secondary nutrient grouped with sulfur (S) and magnesium (Mg). It exists in the soil and is absorbed as the Ca⁺² ion.

Agronomics: Calcium stimulates root and leaf development and forms compounds which are part of the cell walls. Physiological roles include the activation of several enzyme systems, reduction of nitrate, and neutralization of organic acids. Calcium deficiency symptoms are not often seen in the field because secondary effects, associated with high soil acidity, limit growth first. Leaves may be cupped-shaped and crinkled, and the terminal buds deteriorate with some breakdown of petioles. Fruits may break down at the blossom end. Calcium deficiency is associated with "blossom-end rot" in tomatoes and other crops. Deficiencies can be determined by soil and plant analysis.

Carbon Cycle

Definition: The cycling of carbon (C) in the environment including the fixation of atmospheric carbon dioxide (CO₂) by plants in the presence of sunlight and water to form sugar (photosynthesis), conversion of sugars to plant structural components, consumption of plants by man and animals, and the return of carbon dioxide to the atmosphere by decay of plant and animal residues.

Cation

Definition: A charged form of an atom or molecule carrying one or more positive charges of electricity (valence).

Agronomics: The most common soil cations are calcium (Ca⁺²), magnesium (Mg⁺²), sodium (Na⁺), potassium (K⁺), ammonium (NH₄⁺), and hydrogen (H⁺).

Cation Exchange

Definition: The exchange of cations held (adsorbed) at the surface of soil clay and organic matter particles for other cations in the soil solution. Cation exchange is an important reaction in soil fertility, in correcting soil acidity and alkalinity, in changes altering soil physical properties and as a mechanism in purifying or altering percolating waters. For example, when an acid soil high in exchangeable hydrogen ions is treated with a liming material such as calcium hydroxide (Ca(OH)₂), calcium ions from the lime replace hydrogen ions at the surface of the soil particles. The hydrogen ions are neutralized by hydroxyl ions and soil pH increases. (See Figure 2-2.)

Agronomics: The plant nutrients calcium (Ca), magnesium (Mg), and potassium (K) are supplied to plants in large measure from exchangeable forms. The usual soil test to predict a soil's ability to furnish potassium to the plant is a measure of the soil's exchangeable potassium content. The amounts of cations in the soil solution are intimately related to the exchangeable ions. Any change in the concentration of cation in the soil solution forces a change in the proportions of exchangeable ions on soil colloids. Cation exchange capacity (CEC) is the amount of exchangeable cations per unit weight of soil (dry basis).

See Also: Liming Materials (Section 1).

Cation Exchange Sites

Definition: Locations of the surface of soil colloids (clay, organic matter) with negative charges capable of attracting and holding positively charged cations.

Agronomics: Cation exchange sites are more abundant in fine soils having high contents of clay and organic matter than in sandy soils that are low in clay and organic matter. Divalent cations such as calcium (Ca⁺²) are held more firmly at the surface of soil colloids than monovalent cations such as potassium (K⁺).

Chemoautotrophic Bacteria

Definition: Microorganisms are divided into two broad classes with respect to their energy and carbon sources: heterotrophic forms which require preformed organic nutrients to serve as sources of energy and carbon, and autotrophic microorganisms, which obtain their energy from sunlight or by the oxidation of inorganic compounds and their carbon by the assimilation of carbon dioxide. Autotrophic bacteria are of two general types: photoautotrophs, whose energy is derived from sunlight, and chemoautotrophs, which obtain the energy needed for growth and biosynthetic reactions from the oxidation of inorganic materials.

Agronomics: Some species of bacteria are limited exclusively to inorganic oxidations and are considered to be obligate chemoautotrophs. Significant obligate chemoautotrophs include the genus *Nitrosomonas*, which oxidizes ammonium nitrate to nitrite; *Nitrobacter*, which oxidizes

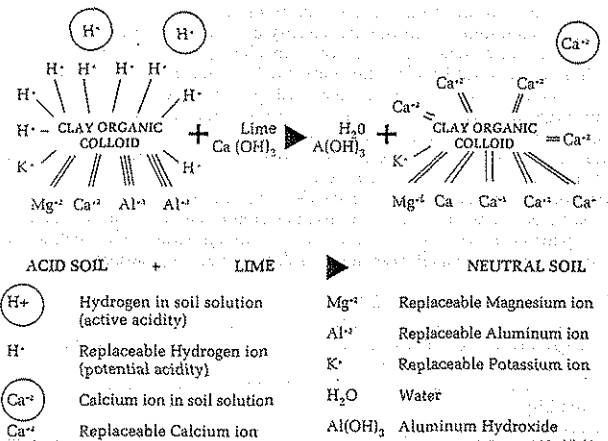


Figure 2-2

Shown is the cation exchange reaction when an acid soil is limed. The small numbers by the symbols for the cations indicate the number of charges carried by that cation. When no number appears, one positive charge is present. The numbers of different kinds of ions involved in the exchange reaction depend on the number of charges carried by each ion. One calcium ion with two positive charges (Ca⁺²) replaces two hydrogen ions, each having one positive charge (H⁺). Three doubly charged calcium ions are required to replace two triple charged aluminum (Al⁺³) ions.

nitrite-nitrogen to nitrate; and *Thiobacillus*, which oxidizes certain inorganic sulfur compounds.

Chlorine (Cl)

Definition: Plants utilize this non-metallic micronutrient in the form of chloride (Cl⁻), the only form in which this element exists in the soil.

Agronomics: Chloride is involved in energy reactions in the plant, specifically involved in the chemical breakdown of water in the photosynthesis reaction. It also activates several enzyme systems. It is involved in transporting several cations — potassium, calcium, magnesium — within the plant, regulating the actions of stomatal guard cells, thus controlling water loss and moisture stress while maintaining plant turgor. Research has shown that chloride diminishes the effects of fungal root and leaf diseases in small grains. Lowered incidence of stalk rot in corn has been related to adequate chloride. Chloride is very mobile in the soil and leaches readily. Deficiencies are most likely on sandy soils but can occur on any soil texture. Deficiencies can be determined by soil and plant analysis.

Chlorosis

Definition: Loss of the green color in plants indicated by yellowing of the leaves.

Agronomics: A sign of nutrient deficiency. Specific patterns of chlorosis are characteristic of individual nutrients.

Clay

Definition: Naturally occurring inorganic crystalline particles in soils and other parts of the earth's crust. Clay particles are less than 0.002 millimeters in diameter.

Properties: Contains compounds of silicon, aluminum, hydrogen, and oxygen.

Colloid

Definition: Soil particles (organic or inorganic) having small diameters ranging from 0.10 to 0.005 micron.

Properties: Characterized by high cation exchange capacity. Colloids have a vast surface area per unit mass, which accounts for their high adsorptive capacity and their high cation exchange capacity in soils.

Compost

Definition: A mixture that consists largely of decayed, relatively stable plant and animal wastes.

Agronomics: Used for fertilizing and conditioning the soil.

Controlled-Release Fertilizer

Definition: "Slow or Controlled Release Fertilizers. A fertilizer containing a plant nutrient in a form which delays its availability for plant uptake and use after application, or which delays its availability to the plant

Controlled-Release Fertilizer (cont.)

significantly longer than a reference 'rapidly available nutrient' fertilizer such as ammonium nitrate or urea, ammonium phosphate, or potassium chloride. Such delay of initial availability or extended time of continued availability may occur by a variety of mechanisms. These include controlled water solubility of the material (by semipermeable coatings, occlusion, or by inherent water insolubility of polymers, natural nitrogenous organics, protein materials, or other chemical forms), by slow hydrolysis of water-soluble low molecular weight compounds, or by other unknown means." (AAPFCO). Also called controlled-availability fertilizers and slow-release fertilizers.

Description: Limited solubility may be an inherent characteristic of the fertilizer such as in urea-formaldehyde reaction products and magnesium ammonium phosphate; or it may be imparted to a soluble fertilizer by coating the particles with such materials as molten sulfur, waxes, and plastics.

Conventional Agriculture

Definition: Conventional agriculture is composed of modern, site-specific, progressive, science-based production systems in which available and applicable technologies and inputs are used effectively and efficiently. Conventional agriculture shows concern for the environment as well as profitability.

Agronomics: Production systems have developed over time because they are more efficient and profitable. Today's conventional systems are the results of extensive research and education programs on the development, adaptation, and implementation of technology in production practices in a competitive system. Any inefficient, resource-wasting practices are constantly being eliminated and replaced with more efficient, best management practices (BMPs).
See Also: BMPs.

Copper (Cu)

Definition: Copper (Cu) is an essential metallic micronutrient and is absorbed by plants from the soil in the form of the Cu⁺² ion.

Agronomics: Copper is necessary for chlorophyll formation in plants and catalyzes several other plant reactions although it is not usually a part of the products formed by those reactions. Organic soils are most likely to be copper deficient, since copper is fixed in unavailable forms in these soils. High soil pH also decreases copper availability. Mobility in the plant is low. Common symptoms of copper deficiency include dieback in citrus and blasting of onions. Leaves of copper-deficient vegetable crops lose turgor and develop a bluish-green shade before becoming chlorotic and curling. Plants may fail to flower. Small grains fail to develop heads when copper is deficient. Deficiencies of this element can be determined by soil and plant analysis.

Crop Nutrient Budget

Definition: A balance sheet showing the nutrients applied to the crop and the nutrients removed by the crop.

Agronomics: Only a portion of the nutrients needed by a crop is removed from the field at harvest. Grain crops remove less nutrients per unit of harvest than forage crops.

Crop Nutrient Recycling

Definition: Returning to the soil the nutrients contained in plant residues.

Crop Nutrient Removal

Definition: Nutrients removed in harvested crops.

Agronomics: Perhaps the most critical factor when evaluating the sustainability of a farming system. Simply put, if the nutrients removed from a field are not replaced, the system is not sustainable. When nutrients removed in harvested crops are not returned, the result is a decline in soil productivity.

The two nutrients most susceptible to depletion through crop removal are phosphorus (P) and potassium (K). Unlike nitrogen (N), which can be partially replenished by rotation with legume crops, there is no biological method of replacing P and K. Once soil supplies are depleted through crop removal, the only method of replacement is through importation of outside sources. The source can be organic residues, manures, or commercial fertilizers.

Crop Nutrient Sources

Definition: Plants obtain essential nutrients from a number of sources including soil minerals, organic matter, commercial fertilizers, legumes (N), animal wastes, sewage sludge, and other wastes.

Agronomics: Plants do not distinguish between these sources. All nutrients are taken up in identical inorganic forms regardless of source.

Crop Nutrient Uptake

Definition: Large quantities of nutrients are contained in the above-ground portion of crops. Total nutrient demand is often referred to as crop nutrient uptake.

Agronomics: Today's high-yielding crops put tremendous pressure on the soil for nutrients. There is no effective way to reduce this demand because the nutrient requirement at a given yield level is quite stable.

Denitrification

Definition: The reduction of nitrates and nitrites by soil bacteria under anaerobic conditions resulting in the loss of nitrogen oxides (N₂O and NO) and nitrogen (N₂) into the air.

Agronomics: Losses are greatest from water-logged, poorly aerated soils with large amounts of oxidizable carbon sources (plant residues).

Distribution Pattern

Definition: The pattern of distribution of fertilizer on the soil from a mechanical applicator.

Ecology

Definition: The branch of biology that deals with the mutual relations among organisms, and between organisms and their environment.

Elemental Composition

Definition: Plants are composed of various elements in roughly the proportions shown in Table 2-2 on a dry matter basis. These percentages vary for different species as well as for the same species grown under different conditions. The data shown in the table gives the order of magnitude for concentrations of each element under average conditions.

Agronomics: Knowledge of the average elemental composition of plant tissues can be used in diagnoses of nutrient deficiencies by tissue analysis.
See Also: Tissue Analysis.

Table 2-2 Elemental Composition

Element		Amount in Whole Plant (%)
Oxygen	O	45
Carbon	C	44
Hydrogen	H	6
Nitrogen	N	2
Phosphorus	P	0.5
Potassium	K	1.0
Calcium	Ca	0.6
Sulfur	S	0.4
Magnesium	Mg	0.3
Boron	B	0.005
Chlorine	Cl	0.015
Copper	Cu	0.001
Iron	Fe	0.020
Manganese	Mn	0.050
Molybdenum	Mo	0.0001
Zinc	Zn	0.0100
TOTAL		99.9011

Environment

Definition: All external conditions that may act upon an organism or soil to influence its development, including sunlight, temperature, moisture, and other organisms.

Enzymes

Definition: Protein substances produced by living cells which modify the rate of chemical reactions. They are organic catalysts.

ESP — see Exchangeable Sodium Percentage

Eutrophication

Definition: A condition in stagnant pools and lakes usually characterized by an abundant accumulation of nutrients that supports a dense growth of plant and animal life, the decay of which depletes the shallow waters of oxygen in summer.

Exchangeable Base

Definition: A basic cation (Ca⁺², Mg⁺², K⁺, NH₄⁺) adsorbed on a soil colloid, but which can be replaced by hydrogen (H⁺) or some other cation.
See Also: Cation Exchange.

Agronomics

Exchangeable Ions

Definition: Ions held on the soil complex that may be replaced by other ions of like charge.

Exchangeable Sodium Percentage (ESP)

Definition: The degree of saturation of the soil exchange complex with sodium (Na).

Agronomics: May be calculated by the following formula: Soil cation exchange capacity (CEC) = 12 milliequivalents (meq) / 100 grams

Calcium (Ca²⁺) = 7 meq / 100 grams

Potassium (K⁺) = 2 meq / 100 grams

Magnesium (Mg²⁺) = 2 meq / 100 grams

Sodium (Na⁺) = 1 meq / 100 grams

ESP = 1 meq Na / 12 meq / 100 g soil x 100 = 8.33 %

Reducing exchangeable Na to 5% of the soil's CEC (cation exchange capacity) is a target of many reclamation plans.

Fallow

Definition: The practice of allowing cropland to be left idle in order to enhance productivity, mainly through accumulation of water, release of nutrients from organic matter, or both.

Agronomics: Summer fallow is a common practice in cereal grain production systems in regions of limited rainfall. The soil is kept weed-free for one growing season by tillage or herbicides in order to store moisture and nutrients for the following grain crop. However, moisture storage is relatively inefficient.

Fertilizer

Definition: Any natural or manufactured material added to the soil in order to supply one or more plant nutrients. The term is generally applied to manufactured materials other than lime or gypsum.

AAPFCO official definition is: "Any substance containing one or more recognized plant nutrient(s) which is used for its plant nutrient content and which is designed for use or claimed to have value in promoting plant growth, except unmanipulated animal and vegetable manures, marl, lime, limestone, wood ashes, and other products exempted by regulation by the _____."

Agronomics: Fertilizer is food for plants. It contains nutrients needed to supplement the soil's supply, which is often less than that required to satisfy demands for optimum crop production.

The most common fertilizer nutrients are nitrogen (N), phosphorus (P), and potassium (K). These three nutrients are needed in largest amounts by crops and are most often the ones first limiting in soils. The composition of fertilizer varies depending on the crop for which it will be used and the nutrient status of the soil.

Fertilizer Soil Reaction Zone

Definition: That volume of soil containing fertilizer components and/or their reaction products before they are dispersed by soil water or tillage. The size of the fertilizer-soil reaction zone is determined by fertilizer physical form (solid or fluid), rate of application, particle size, and method of application as well as soil physical and chemical properties.

Fertilizer Use Efficiency

Definition: An expression of the units of yield per unit of nutrient provided for the crop. Common expressions include bushels of grain per pound of applied nutrient or pounds of yield per pound of applied nutrient.

Agronomics: Any production practice which improves the final crop yield directly affects fertilizer use efficiency. When a superior variety or hybrid increases grain yields by 5%, for example, this translates directly to a similar increase in fertilizer use efficiency. Rotation, planting date, seeding rate, and method of fertilizer application can have similar effects.

Fixation

Definition: Processes by which available plant nutrients are rendered unavailable by reaction with soil components. Generally, refers to reactions of phosphorus, ammonium, and potassium leading to decreased availability.

Agronomics: The more acid the soil and the higher its clay content, the greater its capacity to fix phosphorus. On such soils, liming and applying the phosphate in bands to lessen its contact with the soil have been the conventional remedies to lessen fixation and improve nutrient use efficiency.

Soils differ in their capacity to fix potassium, depending on the kinds and amounts of clay minerals they contain. Fixed potassium ions are trapped between the silica sheets of certain soil clay minerals, including especially vermiculite and illite. These trapped ions may be slowly released over time.

Ammonium ions from ammonia-based fertilizers, legumes, and wastes also can be fixed by the same clay minerals that fix potassium, and in the same manner.

Foliar Diagnosis

Definition: Estimation of the nutrient status of a plant or the nutrient require-

ments of the soil for producing a crop through chemical analyses or color manifestations of plant leaves, or by both methods.

Forage

Definition: Plant material which can be used as feed by domestic animals. Forage may be grazed or cut for hay or silage.

Green Manure

Definition: Crops grown especially to be plowed under for the benefit of succeeding crops.

Agronomics: Common green manures are alfalfa, clovers, buckwheat, cowpeas, small grains, and other crops.

Hardpan

Definition: A hardened or cemented soil horizon or layer. The soil material may be sandy or clayey and may be cemented by iron oxide, silica, calcium carbonate, or other substances.

Heterotrophic Bacteria

Definition: A category of soil bacteria that obtain their energy and carbon directly from soil organic matter. Most soil bacteria fit in this category.

Agronomics: The general-purpose decay and ammonifying bacteria are heterotrophic. Fungi and actinomycetes are also heterotrophic in character.

See Also: Actinomycetes.

Humification

Definition: The process of forming humus, well-decomposed organic matter, in soils.

Agronomics: Humification in soils is controlled mainly by factors which are favorable for microbial activity. Among these are optimum soil moisture, temperature and aeration, as well as a source of energy. Incorporation of crop residues and appropriate tillage also promote soil organic matter formation. Humification is needed to maintain soil organic matter levels since decomposition of soil humus occurs during much of the year. Loss of soil organic matter leads to low water-holding capacity, soil compaction, increased erosion, and decreased productive capacity.

Humus

Definition: Dark brown or black substances consisting of well-decomposed organic matter that provides nutrients for plants and increases the water retention of soil. Humus constitutes from one-fifth to one-half of the organic matter in peat, compost, leaf mold, and rotted animal manures.

Agronomics: The importance of humus to the growth of crops is due principally to its high buffer capacity over a considerable range of pH values. It tends to stabilize soil structure and has a high cation exchange capacity.

Hydroponics

Definition: The production of plants in a liquid solution or gravel medium supplemented with all required nutrients for proper growth.

AAPFCO official definition is "... a system in which water-soluble nutrients are placed in intimate contact with the plant's root system, being grown in an inert supportive medium which supplies physical support for the roots but which does not add or subtract plant nutrients."

Iron (Fe)

Definition: Iron (Fe) is an essential metallic micronutrient and is absorbed by plants as the ferrous (Fe²⁺) ion.

Agronomics: Iron is a catalyst in chlorophyll formation and acts as an oxygen carrier. It also helps form certain respiratory enzyme systems in the plant. The nutrient is immobile in plants. Iron deficiency shows up as a very light pale leaf color with veins remaining green, usually first appearing on younger leaves; but severe deficiency may result in the entire plant showing such symptoms. Iron deficiency may be caused by an imbalance with other metals such as molybdenum (Mo), copper (Cu), or manganese (Mn). Other factors contributing to iron deficiency include high availability of soil P, high soil pH, wet and cold soil conditions, low soil organic matter, and plant genetic differences. Deficiencies of this element can be determined by soil analysis.

Leaching

Definition: The removal of materials in solution by the passage of water through soil. In agriculture, leaching refers to the downward movement of free water (percolation) out of the plant root zone. It occurs when the amount of rainfall or irrigation water entering the soil becomes greater than its water-holding capacity. Most likely to occur on coarse-textured soils.

Agronomics: Leaching of nutrients, particularly nitrate-nitrogen (NO₃-), can cause decreased nutrient use efficiency, lower yields, and environmental problems including nitrate accumulation in groundwater. Best management practices minimize this type of nutrient loss, usually through multiple nutrient applications close to the time of nutrient need and through the use of nitrification inhibitors. In some cases, leaching is intentionally practiced to remove accumulations of soluble salts from soils.

Legumes

Definition: Plants of the family *Leguminosae* characterized botanically by a fruit called a legume or pod that opens along two sutures when ripe. Some samples of legumes are alfalfa, soybeans, peas, clovers, and vetches.

Agronomics: Legumes in symbiotic relationship with *Rhizobium* bacteria fix atmospheric nitrogen in the nodules on the plant's roots. It has been estimated that from 100 to 300 pounds of nitrogen per acre may be fixed annually by a leguminous crop.

Lime Requirement

Definition: Lime requirement is the amount of good quality agricultural limestone required to establish the desired soil pH range for the cropping system being used. (See Table 2-3.)

Agronomics: Lime requirements are determined in the laboratory using a buffer pH in equilibrium with the soil. Lime requirement is NOT determined by the soil pH alone but is primarily affected by the soil's cation exchange capacity. The specific requirement is usually expressed in terms of effective calcium carbonate equivalent (ECCE) which is based on the calcium carbonate equivalent content of the liming agent and its fineness of grind. Smaller particles react faster in the soil. Different liming materials have different neutralizing values depending upon their chemical composition, as shown in Table 2-4.

Table 2-3: Approximate Amounts of Finely Ground Limestone Needed to Increase the pH of 7-Inch Layer of Soil as Indicated.^{1, 5}

Soil regions and textural classes	Limestone requirement		
	From pH 3-5 to pH 4-5 Tons per acre	From pH 4-5 to pH 5-5 Tons per acre	From pH 5-5 to pH 6-5 Tons per acre
Soils of warm-temperate and tropical regions:²			
Sand and loamy sand.....	0.3	0.3	0.4
Sandy loam .....	...	0.5	0.7
Loam .....	...	0.8	1.0
Silt loam .....	...	1.2	1.4
Clay loam .....	...	1.5	2.0
Muck ³	2.5	3.5	3.6
Soils of cool-temperate and temperate regions:⁴			
Sand and loamy sand.....	0.4	0.5	0.6
Sandy loam .....	...	0.8	1.3
Loam .....	...	1.2	1.7
Silt loam .....	...	1.5	2.0
Clay loam .....	...	1.9	2.3
Muck ³	2.9	3.6	4.3

¹ All limestone goes through a 2-mm mesh screen and at least one-half through a 0.15-mm mesh screen. With coarser materials, applications need to be greater. For burned lime about one-half the amounts given are used; for hydrated lime about three-fourths.

² Oxisol, ultisol, etc.

³ The suggestions for muck soils are for those essentially free of sand and clay. For those containing much sand or clay the amounts should be reduced to values midway between those given for muck and the corresponding class of mineral soil. If the mineral soils are unusually low in organic matter, the recommendations should be reduced about 25%; if unusually high, increased by about 25% or even more.

⁴ Alfisol, mollisol, spodosol, etc.

⁵ From USDA Handbook No. 18, p.237.

LISA

Definition: Acronym for Low Input Sustainable Agriculture.

Agronomics: Farming systems that economize on the use of manufactured inputs, notably fertilizers and pesticides, but also chemicals used to prevent livestock diseases or promote growth. The emphasis is on minimizing the use of agricultural chemicals without drastically reducing crop yields or livestock production.

Loam

Definition: The textural class name for soil having a moderate amount of sand, silt, and clay. Loam soils contain 7% to 27% clay, 28% to 50% silt, and less than 52% sand.

See Also: Soil Texture.

Luxury Consumption

Definition: A phenomenon brought about by the availability to plants of nutrients from any source which causes uptake of nutrients beyond those amounts required for normal growth and function.

Agronomics: The normal physiological function of plants may be upset by excessive accumulation of some nutrients, e.g., excessive nitrogen (N) may prolong the vegetative cycle and delay maturing or it may even prevent flowering, excessive phosphorus (P) may decrease plant uptake of zinc (Zn) and other micronutrients, and excessive potassium (K) may decrease plant uptake of magnesium (Mg).

Macronutrients

Definition: Nutrients that plants require in relatively large amounts: nitrogen (N), phosphorus (P), and potassium (K).

Magnesium (Mg)

Definition: Magnesium (Mg) is an essential secondary nutrient classed with calcium and sulfur. It exists in the soils and is absorbed by the plant as the Mg⁺² ion. Its oxidation state in the plant does not change.

Agronomics: Magnesium is a constituent of chlorophyll and is actively involved in photosynthesis. Much of the magnesium in plants is found in the chlorophyll. Seeds are also relatively high in magnesium, though grain crops such as corn have low magnesium levels in the seed. Magnesium aids in phosphate metabolism, plant utilization of sugars, and the activation of several enzyme systems. Magnesium is mobile in the plant and deficiency symptoms first appear on the lower (older) leaves. It appears first as a light, yellowish, faded discoloration with the veins remaining green. In crops such as corn, the leaves are yellowish or very light green striped while veins remain green. In some crops, as the deficiency progresses, a reddish-purple color develops with green veins. Deficiencies can be determined by soil and plant analysis.

Manganese (Mn)

Definition: Manganese (Mn) is a metallic micronutrient existing in the soil in several oxidation states of which the Mn⁺² ion is the form most commonly absorbed by plants.

Agronomics: Manganese functions primarily as a part of enzyme systems in plants. It activates several important metabolic reactions and plays a direct role in photosynthesis by aiding chlorophyll synthesis. Manganese accelerates germination and maturity, while increasing the availability of phosphorus and calcium. Because manganese is not translocated (mobile) in the plant, deficiency symptoms appear first on the younger leaves with yellowing between the veins — and sometimes brownish-black specks. In small grains, grayish areas appear near the base of younger leaves. Manganese deficiencies occur most often on high organic matter soils, and on those soils with neutral-to-alkaline pH and naturally low in manganese content. Deficiency symptoms are most severe during cool spring months when soils are sometimes waterlogged. On some soils, an extremely acid pH (5.0 or lower) may cause manganese toxicity to crops. Deficiencies of this element can be determined by soil and plant analysis.

Table 2-4 Relative neutralizing values of some liming materials.

Liming material	Relative neutralizing value, %
Calcium carbonate	100
Dolomitic lime	95-108
Calcitic lime	85-100
Baked oyster shells	80-90
Marl	50-90
Burned lime	150-175
Burned oyster shells	90-110
Hydrated lime	120-135
Basic slag	50-70
Wood ashes	40-80
Gypsum	None
By-products	Variable

Micronutrients

Definition: Nutrients that plants need in only small or trace amounts. Essential micronutrients are boron (B), chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo), and zinc (Zn).

Moisture Retention

Definition: The ability of a soil or growth medium to retain moisture. Moisture retention is dependent upon soil composition of sand, silt and clay, organic matter content, and soil structure.

Agronomics

Molybdenum (Mo)

Definition: Molybdenum (Mo) is a metallic micronutrient that is absorbed as a molybdate anion (MoO₄⁻²). Plants require molybdenum in the smallest quantities of all the essential elements.

Agronomics: Molybdenum is required for the synthesis and activity of the enzyme nitrate reductase. This enzyme system reduces nitrate-nitrogen to ammonium-nitrogen in the plant. Molybdenum is also vital for the process of symbiotic nitrogen fixation by *Rhizobia* bacteria in legume root nodules. Molybdenum deficiency symptoms show up as a general yellowing and stunting of the plant. A deficiency can cause nitrogen deficiency symptoms in legume crops because symbiotic soil bacteria must have molybdenum to fix nitrogen from the atmosphere. Molybdenum availability goes up as soil pH rises, the opposite of most other micronutrients. Deficiencies are more likely to occur on acid soils.

Mulch

Definition: A material applied to or left on the soil surface to slow water loss by evaporation, to prevent rapid changes in soil temperature, to prevent erosion, to suppress weed growth, to add organic matter to the soil, and for decorative purposes.

Agronomics: The main value of mulches is to reduce loss of water through evaporation, help control weeds, and reduce soil erosion. Mulches also help moisture penetration into the soil and help maintain a more even temperature in the soil.

Application: Mulching materials, besides crop residues, include sawdust, leaves, grass clippings, compost, etc., as well as paper and plastic specially prepared for mulching purposes.

Neutral Soil

Definition: A soil with a high percentage (80% to 90%) of the exchange capacity occupied by calcium and magnesium ions and a soil pH near 7.0.

Agronomics: There are 5 to 10 times as many calcium ions as magnesium ions on the exchange sites. Potassium ions occupy about 2% to 5% of the capacity, and hydrogen ions the remainder. These ranges are well established but critical values are not firm for all soils. The theoretical pH is 7; practically it is 6.8 to 7.3.

Nitrification

Definition: The formation in soils of nitrites and nitrates from ammonium ions through the activities of certain soil bacteria.

Agronomics: Nitrification is a two-step biological process in which the ammonium ion (NH₄⁺) is first converted to nitrite (NO₂⁻) by bacteria of the genus *Nitrosomonas*, and then the nitrite is converted to nitrate (NO₃⁻) by bacteria of the genus *Nitrobacter*. The process is the same regardless of where the ammonium ion originates, whether from soil organic matter, legumes, wastes, or ammonium-containing fertilizers.

Nitrification is most rapid in warm, moist, and approximately neutral pH soils. The process halts entirely when the temperature drops to about 37° F.

Environment: In an effort to reduce nitrification of fall-applied ammonium-producing fertilizers and thus reduce the possibilities of nitrate losses by leaching, many state, provincial, and commercial laboratories recommend delaying N application until the soil temperature reaches 45° F or 50° F. Nitrification inhibitors are now available to slow the rate of nitrification. These inhibit the growth or the activity of the nitrification bacteria but are eventually decomposed and nitrification continues.

See Also: Nitrification Inhibitor, *Nitrobacter*, Nitrogen Cycle, *Nitrosomonas*.

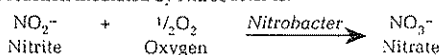
Nitrification Inhibitor

Definition: Compounds such as 2-chloro-6-(trichloromethyl) pyridine (nitrapyrin) and dicyandiamide that delay bacterial oxidation of the ammonium ion (NH₄⁺) to nitrite (NO₂⁻) and thus slow production of nitrate (NO₃⁻). The objective of use of these compounds is to control leaching of nitrate by keeping nitrogen in the ammonium form longer to prevent denitrification of nitrate-nitrogen and to provide ammonium-N to plants over a longer period of time.

Nitrobacter

Definition: A genus of obligate aerobic chemoautotrophic soil bacteria which oxidizes nitrite ions to nitrate in the final stage of the nitrification process.

Agronomics: *Nitrobacter* and *Nitrosomonas* are the major soil nitrifying chemoautotrophic bacteria and are essential for the production of the main form of nitrogen absorbed by plants — nitrate. Numbers of both organisms are stimulated by the addition of ammonium ions to the system. High concentrations of ammonium ions, however, can inhibit the activity of *Nitrobacter*. Oxidation of nitrite ions to nitrate by *Nitrobacter* yields energy for the organism. Rate of conversion of nitrite to nitrate is affected by soil temperature, soil pH, and the amount of molecular oxygen in the soil. The specific reaction mediated by *Nitrobacter* is:



See Also: Nitrification; *Nitrosomonas*.

Nitrogen (N)

Definition: Nitrogen (N) is an essential nutrient, a constituent of every living cell, plant or animal. In plants it is a part of the chlorophyll molecule, amino acids, proteins, and many other compounds.

Agronomics: Large amounts of nitrogen are needed by all growing crops. Nitrogen is necessary for chlorophyll synthesis and, as a part of the chlorophyll molecule, is involved in photosynthesis. Lack of adequate N and chlorophyll diminishes plant utilization of sunlight as an energy source, decreases production of carbohydrates, and limits essential functions such as nutrient uptake and protein synthesis. As a result, growth is stunted, yields are reduced, and crop quality is impaired.

Nitrogen deficiency produces a yellowing of leaves (chlorosis) beginning at the bottom of the plant. Nitrogen is mobile and is moved from older leaves to new growth areas under deficient conditions. As the deficiency becomes more severe, chlorosis can extend over the entire plant. As a result, plants are stunted, water use efficiency is diminished, and yields decline.

See Also: Ammonification; Denitrification; Nitrification.

Nitrogen Cycle

Definition: The routes taken by nitrogen from the atmosphere through soils, plants, animals, and man, back to the atmosphere (Figure 2-3). Nitrogen can take three routes from the atmosphere to the soil:

1. Nitrogen oxides and nitric acid produced by lightning plus ammonia and ammonium compounds in the air are carried to the soil by rainfall;
2. *Rhizobia* bacteria in the root nodules of legumes fix nitrogen from the atmosphere, and some forms of algae are also capable of fixing atmospheric nitrogen; and
3. Commercial fixation of atmospheric nitrogen and application of nitrogen fertilizers.

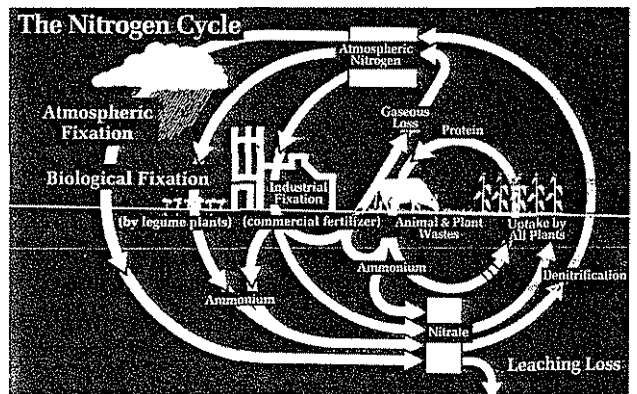
Bacterial fixation (*Rhizobia*) furnishes a direct route for nitrogen from the atmosphere to reach legume plants. Nitrogen reaching the soil by either of the other two routes first enters the soil solution in the form of ammonium or nitrate ions, which are then assimilated by plants through their root systems.

Agronomics: Organic matter in the soil usually contains 5% to 6% nitrogen, largely in the form of protein, that is unavailable to crops until it has undergone mineralization by the action of bacteria, actinomycetes, and fungi. Mineralization (or ammonification) produces ammonium ions which are either converted to nitrate by soil bacteria or directly absorbed by higher plants.

Fertile soils having adequate supplies of decaying organic matter, a carbon:nitrogen ratio of 30 or greater, and a high microbial population are capable of storing enormous quantities of nutrients for future plant use. This is possible because of microbial organisms that consume nitrogen in the ammonium form. In soils with a low organic matter content, a carbon:nitrogen ratio of less than 15, and a quantity of ammonium ions in excess of that which can be absorbed by either the plant or microbes, the excess ammonium nitrogen is oxidized by nitrification, first to nitrite by *Nitrosomonas* bacteria and then to nitrate by bacteria such as *Nitrobacter*. In soils containing oxidizable organic matter and inadequate oxygen, nitrate may be reduced to nitrogen gas by microbes that use the nitrogen of the nitrate ion in place of their need for oxygen. The nitrogen eventually finds its way back to the atmosphere.

On permeable soils having low organic matter content, nitrates may be moved into drainage water, especially under conditions of high rainfall.

Figure 2-3 Nitrogen Cycle



There is no net gain or loss of N in nature, as indicated in this illustration. Good management can help assure efficient use of N with minimum threat to the environment.

Agronomics

binning water and carbon dioxide to form carbohydrates. The pigment chlorophyll is required for the conversion of light energy into chemical energy.

Plant Sample

Definition: A representative sample of plant tissue utilized for chemical analysis to determine plant nutrient status. Specific instructions have been developed for collection of tissue samples from various crops.

Potassium (K)

Definition: Potassium (K) is one of the three macronutrients, nitrogen, phosphorus, and potassium. It is required by most plants in approximately the same amounts as nitrogen.

Agronomics: About 90% of potassium in soils is present in unavailable forms in primary silicate minerals. Another 2% to 10% is held in slowly available forms between the sheets of clay minerals. Available potassium, 1% to 2% of the total, is held on the surface of soil clay and organic matter colloids and in soil solution. Many soils are potassium deficient, which can be detected by soil analysis.

Movement of K⁺ ions to plant roots is primarily by diffusion through soil water. Anything which interferes with that movement such as moisture stress or cold soil temperatures affects plant uptake of potassium. Plant uptake and metabolism of potassium is in that same ionic form, K⁺.

Potassium has important roles in activation of many enzyme systems in the plant. It is vital to photosynthesis and to the formation and utilization of sugars (respiration). Potassium is also essential to protein synthesis and maintenance of protein structure. Potassium helps the plant use water more efficiently and helps control the loss of water from plant leaf surfaces. Adequate potassium helps plants resist diseases and develop strong stems. Potassium deficiency symptoms, like nitrogen deficiency symptoms, are usually noted first at the bottom of the plant because of its mobility. Chlorosis develops around leaf margins. High yielding cotton varieties frequently show characteristic potassium deficiency symptoms at the top of the plant brought on by late season demands of potassium during boll development.

Primary Nutrients

Definition: Nutrients required by plants in relatively large amounts and are frequently applied as fertilizers.

Description: Nitrogen, phosphorus, and potassium.

See Also: Macronutrients.

Quick Test

Definition: Simple and rapid chemical tests of soils and plant tissues designed to give an approximation of nutrients available to plants.

Ray Fungi — See Actinomycetes**Reciprocal**

Definition: Mathematical expression. Equal to the number 1 divided by a specific value. In relation to acidity, pH is expressed as the logarithm (base 10) of the reciprocal of the hydrogen ion concentration (1/[H⁺]).

Reserve Acidity

Definition: The exchangeable hydrogen ions held on the soil colloids are referred to as reserve or potential acidity of the soil.

Agronomics: In an acid soil, two groups of hydrogen ions are involved — those of the soil solution itself and those held as adsorbed cations by the colloidal complex. These groups are in dynamic equilibrium and consequently both must be considered in any attempt to alter the pH of the soil solution. For convenience of distinction, the hydrogen ion concentration of the soil solution is designated as active acidity while exchangeable hydrogen ions on colloids constitute reserve or potential acidity. The relative magnitude of the two types of acidity varies tremendously. Active acidity constitutes only a very small part of soil acidity. Conservative calculations suggest that reserve acidity may be 1000 to as much as 100,000 times greater (for a clay soil) than active acidity. Liming to correct soil acidity must then neutralize residual acidity (see Figure 2-2).
See Also: Acid Soil; Active Acidity; Residual Acidity.

Residual Acidity

Definition: The ultimate acidity that develops from fertilizer in a particular soil horizon after the residual salts are removed from that horizon by leaching. The level of residual acidity depends on the extent that any ammonium nitrogen in the fertilizer nitrifies, the extent that plants differentially absorb cations and anions, and the initial composition of the fertilizer.

Residual Basicity

Definition: The ultimate basicity that develops from fertilizer in a particular soil horizon after the residual salts are removed from that horizon by leaching.

Residual Fertility

Definition: Available nutrient content of a soil carried over to the next crop after fertilizing the previous crop.

Residual Value

Definition: The value of the fertilizer to succeeding crops after it has been in the soil for one or more cropping seasons.

Agronomics: Residual values of plant nutrients affect soil test levels for nutrients such as phosphorus and potassium. Residual values, then, affect requirements for additional nutrients in the future.

Rhizobium/Rhizobia

Definition: Genus of cylindrical, aerobic, mesophilic bacteria that infect the roots of leguminous plants causing the formation of nodules. When in a symbiotic relationship with a legume, the plant supplies the bacteria with energy, water, nutrients and the bacteria fixes atmospheric nitrogen proteins into amino acids for use by the plant.

Agronomics: Inoculation of legumes (seed) with specific *Rhizobia* is an essential practice for proper nitrogen nutrition of the crop. Amount of nitrogen fixed is affected by many factors including type of legume, soil nutrient levels, soil pH, availability of water, and soil aeration.

Saline Soil

Definition: A soil containing enough soluble salts to impair its productivity, but not containing an excess of exchangeable sodium. Its pH is less than 8.5.

Agronomics: High concentrations of soluble salts in soil can severely limit plant growth. Special treatment including leaching with good quality water may be necessary to remove the excess salts from the root zone.

Saline-Alkali Soil

Definition: A soil containing a high proportion of soluble salts and either a high degree of alkalinity or a high amount of exchangeable sodium (Na), or both, so that the growth of most crops is less than normal.

Agronomics: Soils high in exchangeable sodium often have poor structural characteristics and may require extensive treatment with gypsum or acid followed by leaching to remove the high sodium concentrations from the root zone.

Salt Index

Definition: An index used to compare solubilities of chemical compounds used as fertilizers. Most nitrogen and potassium compounds have high indexes, and phosphorus compounds have low indexes. When applied too close to seed or on foliage, the compounds with high indexes cause plants to wilt or die because of the compounds' high affinity for water.

Agronomics: The lower the salt index, the lesser the risk of crop injury with localized placement of fertilizers, specifically close to or in direct seed contact (pop-up fertilization). See Salt Index Table on page B29.

Sand

Definition: One classification of soil particles ranging in size from 0.05 to 2.0 millimeters. Sand grains may be round or quite irregular depending on the amount of abrasion they received in weathering. Composition of sand is not implied by its particle size; however, the main component is quartz.

Agronomics: Sand, when dominant in a soil, imparts properties known as sandy or light. Sand particles exhibit practically no plasticity and stickiness and as a consequence have little influence on changes in soil moisture content. Water holding capacity is low, and because of the large size of the spaces between the separate particles, passage of percolating water is rapid. Sandy soils are of open character, possess good drainage and aeration, and are usually in a loose, friable condition.

Secondary Nutrients

Definition: Calcium (Ca), magnesium (Mg), and sulfur (S) are called secondary nutrient elements because they are essential to plant growth but less frequently deficient than the macro- (primary) nutrients and in greater quantity than the micronutrient elements.

Agronomics: Sulfur has frequently been called the fourth major nutrient because of the frequency of sulfur deficiencies and the relatively large quantities used by plants.

Silt

Definition: Classification of soil particles ranging from 0.002 to 0.05 millimeter. Silt particles are irregularly fragmental, diverse in shape, and seldom smooth or flat. They are actually micro-sand particles, quartz being the dominant mineral. Silt particles possess some plasticity, cohesion, and adsorption due to an adhering film of clay.

Agronomics: The presence of silt and especially clay in a soil imparts to it a fine texture, and a slow water and air movement. Much of the wind-blown material called loess occurring over wide areas of the central U.S. is composed of a high percentage of silt-sized particles.

Site-Specific Management

Definition: Management of nutrient inputs, pesticide applications, crop population and other cropping system practices according to changes in

Site-Specific Management (cont.)

soil character and composition.

Agronomics: Site-specific management is a developing technology which has been predicated on intensive soil sampling and nutrient management by individual, small land blocks or soil types. Application and planting equipment has been developed with on-board computers, digitized soil maps, and the use of global positioning satellites to facilitate changes in application rates of plant nutrients as the equipment moves across the field.

See Also: Variable Rate Application.

Sodic Soil

Definition: The term sodic refers to a soil that has been affected by high concentrations of salt and sodium. Sodic soils are relatively low in soluble salts but are high in exchangeable sodium.

Agronomics: Saline, sodic and saline-sodic soils are terms used to define arbitrary limits of salt content and exchangeable sodium percentage in salt-affected soils. Sodic soils with low soluble salts but high exchangeable sodium tend to remain in dispersed condition, almost impermeable to both rain and irrigation water. They are of poor tilth — plastic and sticky when wet and prone to form hard clods and crust upon drying. When wet they have a characteristic smooth, slick look caused by the dispersed condition of clay and humus. Sodic soils are very poor for the growth of plants. Exchangeable sodium exceeds 15% of the cation exchange capacity.

Soil

Definition: The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of plants.

Agronomics: Unconsolidated mineral matter on the surface of the earth has been subjected to and influenced by original composition and environmental factors including climate, macro- and microorganisms, and topography acting over a period of time and producing a product — soil — that differs from the material from which it is derived in many physical, chemical, biological, and morphological properties and characteristics. Organic matter is an important part of soil and soil characteristics.

Soil Acidifier

Definition: A material or mixture used, especially in semi-arid areas, to neutralize soil alkalinity.

Agronomics: Sulfuric acid, elemental sulfur, phosphoric acid, liquid sulfur dioxide, and ammonium polysulfide are soil acidifiers. In several cases, the acidity produced from the addition of these compounds to the soil is through the oxidation of sulfur compounds. Ammoniacal nitrogen (N) fertilizers also have a strong acidifying effect on the soil through the process of nitrification.

Soil Acidity — see Acid Soil**Soil Aeration**

Definition: The process by which air in the soil is replaced by air from the atmosphere.

Agronomics: In a well-aerated soil, the soil air is similar in composition to the atmosphere above the soil. A well-aerated soil is one in which gases are available to growing organisms (particularly higher plants) in sufficient quantities and in the proper proportions to encourage optimum rates of the essential metabolic processes of these organisms. Poorly aerated soils contain a much higher percentage of carbon dioxide and a correspondingly lower percentage of oxygen than in the atmosphere above the soil.

Soil Amendment

Definition: Any material such as lime, gypsum, sawdust, or synthetic conditioner, that is worked into the soil to make it more amenable to plant growth. The AAPFCO official definition of soil amendment implies any substance which is intended to improve the physical characteristics of the soil, except commercial fertilizers, agricultural liming materials, unmanipulated animal manures, unmanipulated vegetable manures, pesticides, and other materials exempted by regulation.

Agronomics: Soil amendments may contain important fertilizer elements but the term commonly refers to added materials other than those used primarily as fertilizer. An important use of a soil amendment would be the incorporation of gypsum into sodic soils to displace sodium from the exchange complex and improve soil permeability.

Soil Conditioners

Definition: Any material added to a soil for the purpose of improving its physical condition.

Agronomics: Examples of soil conditioners include crop residues, animal manures, sewage sludge, polyelectrolytes such as complex vinyl and acrylic compounds and certain cellulose and lignin derivatives. Soil

conditioners tend to agglomerate soil colloids and produce a crumb structure in the soil increasing the permeability of the soil to air and water and reducing crusting of dry soil.

Soil Conservation

Definition: The practices of protecting soil from wind and water erosion and maintenance of its productive capability through protection of structure, water holding capacity, and ability to supply plant nutrients.

Agronomics: Soil conservation today implies the collective use of a number of practices intended to protect the soil and maintain its productive capabilities. Soil conservation practices include contour cropping, construction of terraces and waterways, utilization of various types of reduced tillage to maintain surface residues, and adequate utilization of supplemental plant nutrients from any source to maintain soil fertility levels. Soil conservation is saving the soil, making maximum use of it, and improving it while allowing only minimum waste.

Soil Erosion

Definition: The wearing away of the land surface (soil) by running water, wind or other geological agents including such processes as gravitational creep.

Agronomics: Erosion of the soil has always existed in nature and is called geologic erosion (natural erosion losses). Acceleration of this loss by cultivation, burning, overgrazing and other removal of protective surface cover results in severely diminished soil productive capability.

Soil Fertility

Definition: The quality of a soil that enables it to provide nutrients in adequate amounts and in proper balance for the growth of specified plants, when other growth factors such as light, moisture, temperature, and physical condition of the soil are favorable.

Agronomics: Understanding and preservation of soil fertility are key to mankind's survival. Adequate amounts of plant nutrients are one characteristic of a productive soil. But a fertile soil is not necessarily a productive soil unless other limiting factors are controlled. Soil fertility and the replenishment of needed nutrients removed in crop production have been recognized, written about, and discussed for thousands of years. Extensive research has helped us to a better understanding of plant nutrition and the importance of soil fertility, but much remains to be learned.

Soil Nutrient Status

Definition: The level or state of adequacy or inadequacy at which available plant nutrients are present in a soil.

Agronomics: The level of availability of soil nutrients is commonly determined by soil testing, complemented by plant tissue analysis. Soil testing and plant analysis are best management practices (BMPs) essential for efficient, profitable, and environmentally protective crop production.

Soil Permeability

Definition: The characteristic of a soil horizon that enables water or air to move through it. Permeability can be measured quantitatively in terms of rate of flow of water through a unit cross section per unit of time under specified temperature and hydraulic conditions. Values for saturated soils usually are called hydraulic conductivity. The permeability of a soil is controlled by the least permeable horizon even though the others are permeable.

Soil Profile

Definition: A vertical section of soil extended from the surface through all its horizons and into the parent material.

Soil Structure

Definition: The physical arrangement of the soil particles. Soil structure controls soil porosity and subsequently the ability of the soil to store water and exchange gases with the atmosphere.

Soil Test

Definition: A chemical analysis of soil composition, usually intended to estimate availability of plant nutrients but also including measurements of soil acidity or alkalinity and physical measurements of soil electrical conductivity.

Soil Texture

Definition: The relative proportion of various sized particles making up the soil. These particles are frequently referred to as soil separates and include sand, silt, and clay, all of which vary in size through a particular range.

Agronomics: Texture is an important soil characteristic because it will determine water intake rates, water storage in the soil, the ease of tilling the soil, and the amount of aeration, and will influence soil fertility. Textural names are given to soils based upon the relative proportions of each of the three soil separates—sand, silt, and clay. Soils that are predominantly clay are clay (textural class); those with high silt content are

Agronomics

silt (textural class); those with a high sand percentage are sand (textural class). The textural triangle (see Figure 2-4) can be used to determine the soil textural name after the percentage of sand, silt, and clay are determined from a laboratory analysis. See Also: Clay; Sand; Silt.

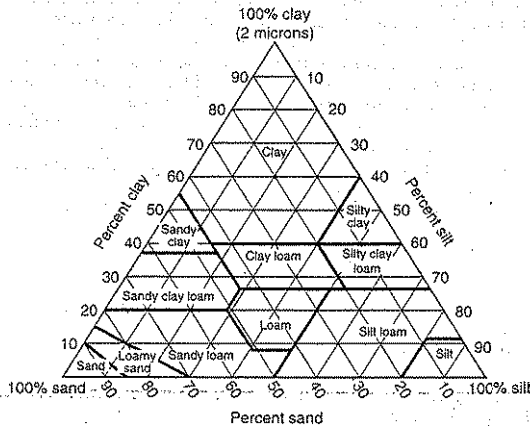


Figure 2-4

Graphic guide for textural classification. Because of the small scale of the chart, it is not possible to show all recognized soil textures in the sandy range. (Source: USDA—Soil Conservation Service)

Solubility

Definition: The amount of substance that will dissolve at a given temperature in a specified water is known as solubility.

Agronomics: To be available to plants a nutrient must be at least slightly soluble in the soil solution. Solubility of compounds such as urea, ammonium nitrate, potassium nitrate, and potassium chloride increases rapidly with temperature. The presence of other substances in the solution may either increase or decrease the solubility.

Solution Fertilizer

Definition: A clear, liquid fertilizer in which all nutrients have been completely dissolved in water.

Subsoil

Definition: The underlying layers of the soil beneath the topsoil which may contain less organic matter and more characteristics of the soil's parent material.

Agronomics: Subsoils tend to be lower in available nutrient supply, particularly nutrients such as phosphorus and micronutrients. The actual nutrient content of the subsoil and the usefulness of those nutrients in plant nutrition depend upon a number of factors including the degree of weathering of the subsoil and the climate of the region. Subsoil sampling for accumulated nitrate-nitrogen is an important part of nitrogen management practices in many areas, particularly those with lower rainfall.

Sulfur (S)

Definition: Sulfur (S) is an essential secondary plant nutrient classed with calcium and magnesium. It exists in the soil in a number of oxidation states and is absorbed by the plant in the sulfate ion (SO₄⁻²) form. Sulfate-sulfur is reduced in the plant before incorporation into plant components.

Agronomics: Sulfur is essential in forming plant protein because it is part of certain amino acids. As a part of plant protein it is essential for enzyme activity. Sulfur is also involved in nodule formation and nitrogen fixation in legumes. Sulfur is essential in chlorophyll formation although it is not a constituent of the chlorophyll molecule. Sulfur-deficient plants are pale green. Symptoms look very much like nitrogen deficiency. Sulfur is not mobile and symptoms generally appear first on the upper leaves, while nitrogen deficiency shows up first on the lower leaves. However, in sulfur deficiency the entire plant can take on a pale green appearance. Sulfur deficiencies occur most often in sandy soils low in organic matter. Deficiencies can be determined by soil and plant analysis. See Also: Sulfur Cycle.

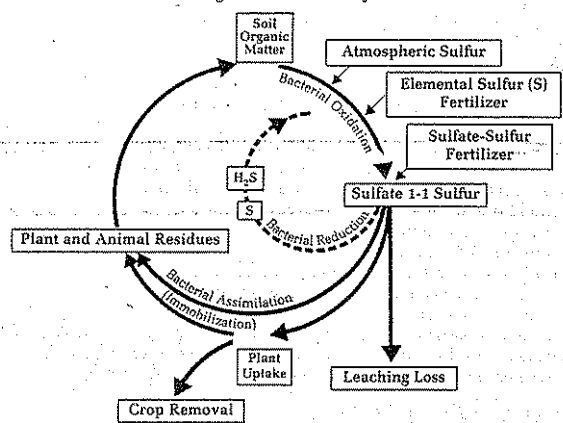
Sulfur Cycle

Definition: Sulfur transformations in the soil are similar to those of nitrogen. As shown in Figure 2-5, sulfur from crop residues is retained in the soil

organic matter and converted to the sulfate form upon organic matter decomposition. Sulfate-sulfur from the atmosphere is deposited in soils with rainfall. The sulfate-sulfur form is available to plants. All sulfate-sulfur also is subject to leaching. Under flooded conditions, sulfate-sulfur can be reduced to sulfides in the soil.

Agronomics: Most of the plant available sulfur is in the soil organic matter and therefore is concentrated in the surface soil. Sulfur in organic matter is not immediately available to plants. Upon organic matter decomposition, the organic forms of sulfur will be oxidized to the sulfate form, which is available to plants. Sulfur is removed from the sulfur cycle by crop removal and by leaching in the sulfate form. Crop removal varies from about 10 pounds per acre for grain crops to about 20 pounds per acre for legumes. Soil incorporation of residues low in sulfur can cause sulfur deficiencies in succeeding crops because the available sulfur supply may be consumed by the increased microbial population resulting from the addition of crop residues. This process is similar to the immobilization of available nitrogen when an energy source (plant residues) is added to soil.

Figure 2-5 Sulfur Cycle



Suspension Fertilizer

Definition: A fluid containing dissolved and undissolved plant nutrient compounds. Suspension of the undissolved materials is usually produced with the aid of a suspending agent of non-fertilizer properties (clay). Mechanical or air agitation may be necessary to facilitate uniform suspension of undissolved plant nutrients.

Sustainable Agriculture

Definition: Integration of soil and crop management technologies to produce quality food and fiber while maintaining or improving soil productivity, farm profitability and environmental quality.

Symbiosis

Definition: Two dissimilar organisms living together in intimate association resulting in mutual benefit, such as *Rhizobia* species and leguminous plants and the association of algae and fungi in lichens.

Agronomics: In symbiosis, the symbiotic organisms rely upon one another and both benefit by the relationship. In the symbiotic relationship of legumes and *Rhizobia* species, the host plants provide fixed carbon sources for the bacteria which in turn fix atmospheric nitrogen for the host plant. The mycorrhizal, fungus-plant root association is another instance of a symbiosis. Plant uptake of such nutrients as phosphorus and zinc can be benefited by this type of relationship. See Also: *Rhizobium/Rhizobia*.

Symbiotic

Definition: The relationship of two living organisms in which both benefit, such as nitrogen fixation by *Rhizobia* in nodules on legume roots.

Symbiotic Bacteria

Definition: In agriculture, the definition usually relates to bacteria in nodules growing on the roots of legumes which have the ability to fix free nitrogen from the atmosphere into forms which can be utilized by the host legume plant.

Agronomics: Agronomically, the *Rhizobium*-legume symbiosis is most important as it results in appreciable nitrogen gains for the system. This is a true symbiosis as neither plant nor bacterium utilizes atmospheric nitrogen (N₂) in the absence of the second organism.

Tissue Analysis

Definition: A diagnostic technique in which plants are sampled and

Tissue Analysis (cont.)

their tissues analyzed for nutrient concentrations to evaluate the soil-plant nutrient status during the growing season, and thereby confirm a sufficiency or insufficiency of these plant nutrients.

Agronomics: Concentrations of plant nutrients in plant tissues reflect the available nutrient status in the soil. When properly interpreted, such information along with soil test data can be effectively used in developing fertilizer recommendations for optimum crop production.
See Also: Elemental Composition; Petiole Analysis.

Topsoil

Definition: Topsoil refers to the surface layer of a soil including most of the organic matter content of the soil profile. Technically, this layer is considered as the dark-colored A horizon of the soil profile.

Agronomics: Much of the available nutrient supply for crops is associated with the topsoil. This portion of the soil horizon is usually sampled for determination of nutrient availability. This emphasis on topsoil as a nutrient source, however, tends to ignore the important contributions of lower soil levels and their ability to provide the plant with water and nutrients.

Zinc (Zn)

Definition: Zinc (Zn) is a metallic micronutrient present in the soil and adsorbed by plants as the Zn^{+2} ion. Its oxidation state in the soil remains the same.

Agronomics: Zinc was one of the first micronutrients recognized as essential for plants. Zinc aids synthesis of plant growth substances and enzyme systems and is essential for promoting certain metabolic reactions. It is necessary for production of chlorophyll and carbohydrates. The metal is not translocated within the plants, so deficiency symptoms appear first on the younger leaves and other plant parts. Zinc deficiency in corn is called "white bud" because new growth turns white or light yellow. Corn leaves may develop broad yellow bands (chlorosis) on one or both sides of the center mid-rib. Other symptoms include bronzing of rice, rosette of pecans, "little leaf" of fruit trees, and severe stunting of corn, sorghum, dry beans, and soybeans. Zinc becomes less available as soil pH increases. High soil P availability can increase the severity of zinc deficiency. Much of the soil's available zinc is associated with the organic fraction and deficiencies may be associated with low soil organic matter. Deficiencies of this element can be determined by soil and plant analysis.

Application**Banded Fertilizer**

Definition: Placement of fertilizer in a concentrated zone either on or below the soil surface.

Agronomics: Concentrated zones or bands of fertilizer tend to minimize fixation of added nutrients by the soil or crop residues and make them positionally more available to plant roots.

See Also: Banding; Deep Banding Fertilization; Dribble Fertilization.

Banding

Definition: Method of fertilizer application. Banding is a general term that implies applications which concentrate fertilizers into narrow zones that are kept intact to provide a concentrated source of nutrients. Applications may be made prior to, during, or after planting.

See Also: Banding; Deep Banding Fertilization; Dribble Fertilization; Starter Fertilizer.

Broadcast Application

Definition: Application of either solid or fluid fertilizer to the soil surface with or without subsequent incorporation by tillage. No specific location relative to the plant is implied. Nutrients may be applied prior to or after the crop is planted.

See Also: Weed-and-Feed; Top-Dressed Application.

Chemigation

Definition: Applying fertilizers and/or pesticides in irrigation water to fertilize crops and control pests.

Agronomics: Application of fertilizer, particularly nitrogen, in irrigation water is an accepted means of application close to the time of plant need. Sulfur can also be easily applied in this manner. This technique is also known as fertigation. Herbicide and insecticide application through sprinkler irrigation systems can be an effective means of pest control. Special precautions are required to prevent fertilizers and pesticides from siphoning into the well.

See Also: Fertigation.

Conservation Tillage

Definition: Any tillage system that maintains at least 30% of the soil surface covered by residue after planting to reduce soil erosion by water; or where soil erosion by wind is the primary concern, maintains at least 1000 pounds of flat small grain residue equivalent on the surface during

the critical wind erosion period.

Agronomics: Many different types of tillage systems can be used to meet the requirements of this definition. Emphasis should be placed on the achievement of the desired goal and development of a systematic approach to that goal. There is no reason to replace or eliminate a piece of equipment from a tillage system if it is helping to achieve the goals established for that field. Several specific types of tillage systems are included under the general heading of conservation tillage. These terms include:

No-till: The soil is left undisturbed from harvest to planting except for nutrient injection. Planting or drilling is accomplished in a narrow seed bed or slot created by coulters, row cleaners, disk openers, in-row chisels or rototillers. Weed control is accomplished primarily with herbicides. Cultivation may be used for emergency weed control. In addition to deep placement of nutrients, starter fertilization is advisable and widely practiced. Side-dressed nitrogen for row crops and top-dressed nitrogen for small grains with dribble techniques may improve use efficiency. Fertigation is an option.

Ridge-till: The soil is left undisturbed from harvest to planting except for nutrient injection. Planting is completed in a seedbed prepared on ridges with sweeps, disk openers, coulters or row cleaners. Residue is left on the surface between ridges. Weed control is accomplished with herbicides and/or cultivation. Ridges are rebuilt during cultivation. Methods of fertilizer application include knife placement into the ridge prior to planting, use of starters, side-dressed applications and fertigation.

Mulch-till: The soil is disturbed prior to planting. Tillage tools such as chisels, field cultivators, disks, sweeps or blades are used. Weed control is accomplished with herbicides and/or cultivation. Fertilizer application methods include broadcast applications; knifed applications with tillage equipment including sweeps; starter application; side-dressing; top-dressing; and fertigation.

Conventional Tillage

Definition: Conventional tillage systems vary widely from region to region and crop to crop. The term conventional tillage originally implied use of the moldboard plow, disking, and harrowing to level the soil surface prior to seeding. In actuality, however, conventional tillage systems have now evolved to the use of other tillage implements including widespread use of the chisel plow or other primary tillage implements. Conventional tillage today is actually a reduced tillage system compared to past practices.

Coulter Injection

Definition: Use of a narrow coulter and high pressure to place a fluid fertilizer in a vertical band from the soil surface to the depth of coulter penetration. A variation of banded fertilizer application.

Crop Residue Management (CRM)

Definition: A year-round system beginning with the selection of crops that produce sufficient quantities of residue and may include limited secondary harvest of residue. CRM includes all field operations that affect residue amounts, orientation and distribution throughout the period requiring protection. Site-specific residue cover amounts needed are usually expressed in percentage but may also be in pounds.

Deep Banding Fertilization

Definition: Deep banding refers to preplant applications of nutrients placed 2 to 6 inches below the soil surface. Some applications are deeper, as much as 15 inches. The applied nutrients may be in solid, fluid, or gaseous forms.

Agronomics: Concentrated zones of nutrients are produced, either streams, sheets or points, depending on the design of the applicator. In some areas this fertilization technique is performed many months before the next crop is seeded, often in conjunction with a tillage operation. Reduced tillage grain drills have been adapted for one-pass seeding and deep placement of fertilizer either between the rows or below the seed.

Other common terms for deep banding include "deep placement," "dual placement," "dual banding," "knifing," "preplant banding," "double shooting," "triple shooting," "root zone banding," and "tillage implement application." Dual application implies simultaneous application of anhydrous ammonia as the main nitrogen source and either fluid or solid phosphorus, potassium, and sulfur fertilizers. Otherwise, deep banding terminology can imply the use of either fluid or solid fertilizers.

See Also: Banded Fertilizer; Coulter Injection; Double Shooting; Dual Placement; Knifed Application; Triple Shooting.

Double Shooting

Definition: Synonymous with dual placement or dual application. Placement of two fertilizer materials in subsurface bands using separate delivery tubes.

See Also: Dual Placement.

Dribble Fertilization

Definition: Dribbling or strip banding is a form of band placement that involves application of solid or fluid fertilizers in bands or strips of varying widths on the soil surface or on the surface of crop residues.

Application

Agronomics: Zones of high nutrient concentration are produced which improve nutrient use efficiency. Typically, the fertilizer material contacts 25% to 30% of the soil surface. If these surface strip applications are followed by tillage, the concentration effect is diluted to something between broadcast application and deep banding where the concentrated zones remain intact.

See Also: Broadcast Application; Deep Banding Fertilization.

Dual Placement or Application

Definition: Placement of two fertilizer materials in subsurface bands.
Application: Usually accomplished through injection of the two materials from two tubes at two points on an applicator shank. For example, anhydrous ammonia and fluid ammonium polyphosphate (10-34-0) or a mixed liquid fertilizer containing other nutrients may be dual applied.
See Also: Deep Banding Fertilization; Double Shooting.

Fertigation

Definition: Application of fertilizer in irrigation water.
Agronomics: Nitrogen is the most common plant nutrient applied in irrigation water. Both sprinkler and furrow irrigation systems can be utilized. Anhydrous ammonia, urea-ammonium nitrate (UAN) solutions and solid nitrogen sources such as urea have been effectively applied in this manner. Care has to be given to the injection of anhydrous ammonia into water containing large amounts of dissolved carbonates and bicarbonates to avoid precipitation of salts within the irrigation system. Ammonia application through a sprinkler irrigation system can lead to substantial volatilization losses. Sulfur can also be easily applied in this manner. Common sulfur sources for fertigation would include ammonium thiosulfate, ammonium sulfate, ammonium polysulfide and potassium thiosulfate.
See Also: Chemigation.

Fertilizer Application

Definition: Various methods of delivery of chemical fertilizer to the soil.

Fertilizer Placement

Definition: Concentrating fertilizer into a band or strip at a specific location on or below the soil surface. Examples: starter, dribble fertilization, deep banding.

Flotation Applicator

Definition: A type of fertilizer applicator equipped with large, low pressure tires intended to spread the weight of the vehicle over a larger soil surface area.

Flow Divider

Definition: Mechanical device used for splitting a stream of liquid fertilizer to achieve uniform distribution to individual application points.

Foliar Fertilization

Definition: Application of soluble fertilizers in the form of spray to the foliage of plants.

Geographic Information Systems (GIS)

Definition: Technology that links satellite positioning data to on-board map information for variable rate applications, variable rate planting and yield mapping.

Global Positioning Systems (GPS)

Definition: The term global positioning system (GPS) refers to a network of U.S. Defense Department satellites that provide exact location coordinates to computers on board tractors, fertilizer applicators, trucks, combines and other vehicles.

Agronomics: The GPS system is an integral part of variable rate fertilization systems that allow site-specific fertilizer application and permit the applicator operator with an on-board computer to know precisely the equipment's location within the field at all times. The GPS system is also utilized with variable-rate planting equipment and field-mapping harvesting equipment. A cursor on the on-board computer screen relates the equipment location to a field map. The applicator operator is then able to change rates of application while traveling across the field to adapt to soil test information stored in the on-board computer. The equipment does not have to be operated in straight lines. A trail line on the screen lets the operator know where the applicator has been. GPS also benefits application on the increasing number of fields farmed on the contour or terrace.

High Pressure Injection

Definition: A stream or pulse of fluid fertilizer forced below the soil surface at 2000 to 6000 psi without prior opening of the soil by some mechanical means. Pressures for this type of application are many times higher than those used in coulter injection.

Impregnation

Definition: Thorough mixing or spraying of a small amount of herbicide,

fungicide, or other pesticide in a large amount of fertilizer.

Application: Normally done through bulk blending operations. On-board impregnation during application is growing in importance.

Incorporation

Definition: Mechanical mixing of fertilizer materials with the surface soil.

Injection

Definition: Placement of fluid fertilizer or anhydrous ammonia in the soil either through use of pressure or nonpressure systems.

See Also: Deep Banding Fertilization; Double Shooting; Dual Placement; Knifed Application; Point Injection; Spoke Injection.

Knifed Application

Definition: Process where fertilizer materials are banded into the soil with a slender knifing tool.

See Also: Deep Banding Fertilization; Double Shooting; Dual Placement; Injection.

Mulch-Till — see Conservation Tillage

Nesting

Definition: Pockets or very large granules of solid fertilizers placed below the soil surface.

Agronomics: Research has indicated superior performance for subsurface placement of large urea granules or briquettes for rice. Nesting or deep placement of urea increases efficiency in lowland rice by minimizing losses due to ammonia volatilization and microbial oxidation.

No-Till — see Conservation Tillage

Plowdown Fertilizer

Definition: Fertilizer applied to the soil surface prior to tillage with a moldboard plow.

Agronomics: Broadcast applications of nutrients, particularly phosphorus (P) and potassium (K), are often incorporated into the soil by moldboard plowing or some other type of deep tillage operation. Nutrient applications prior to plowing or deep cultivation can be incorporated more deeply into the soil to build soil nutrient availability levels (soil tests) and improve subsoil nutrient availability.

Point Injection

Definition: Use of a spoked wheel to inject fluid fertilizer into the rooting zone (4 to 5 inches) at points about 8 inches apart.

Agronomics: Where the potential exists for positional unavailability in dry surface soils or immobilization of nutrients in high residue soils, point injection of liquid fertilizers can increase nutrient use efficiency. Under dryland conditions in the northern Great Plains and Prairies, post-emergent point injection has been shown to improve winter wheat yields, and substantially increase the efficiency of nitrogen fertilizer. Nitrogen use efficiency can be increased by point injection directly into the rooting zone just prior to the period of maximum assimilation by the crop. Advantages to point injection have also been reported under rain fed and irrigated conditions for small grains and row crops.

See Also: Spoke Injection.

Pop-Up Fertilizer

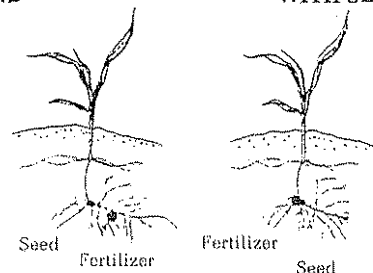
Definition: Fertilizer applied at planting in direct seed contact. (See Figure 2-6.) A form of starter fertilizer.

Agronomics: Pop-up fertilization rates are necessarily low to avoid seedling damage from soluble salts. Pop-up formulations should involve only very small amounts of urea to avoid ammonia damage to germinating seedlings.

See Also: Starter Fertilizer.

SIDE-BAND

WITH SEED (POP-UP)



For corn only, not suggested for soybeans

Figure 2-6

Source: R.D. Voss and J.C. Herman. "Three Ways to Place Row Fertilizer." Iowa State University Pamphlet 361, Feb. 1967.

Postplant Fertilizer

Definition: Fertilizer applied after planting without specific references to method of application. Side-dressing, top-dressing, and weed-and-feed applications are forms of postplant fertilization.

Preplant Fertilizer

Definition: Fertilizer applied to the soil prior to planting.

Reduced Tillage

Definition: A system of land preparation for crop planting that implies omitting one or more of the operations from a conventional tillage system for that region. Specific definition varies widely, however. In recent years, economics and concerns for environment as well as availability of alternatives for pest control, have resulted in most farmers reducing tillage operations to some degree, further complicating the question of what is conventional.

Agronomics: Methods of fertilizer application for reduced tillage systems include pre-plant, deep-banding of nutrients below the surface residue, dribbling or strip banding, point injection of liquid fertilizers, starter fertilization, side-dressing, top-dressing or fertigation, depending upon the cropping system. Broadcast applications of nutrients in significantly reduced tillage systems tend to be subjected to reduced availability because of the large amounts of crop residue on the soil surface.

Retention Zone

Definition: Soil zone where nutrients are concentrated following a fertilizer application. Usually refers to some sort of banded application.

Ridge-Till — see Conservation Tillage**Side-Banded Fertilizer**

Definition: Placement of fertilizer in bands on one or both sides of the seed or seedlings. (See Figure 2-6.)

Agronomics: Placement of starter fertilizers is often termed side-banded when fertilizer material is placed to the side and below the seed on one or both sides of the row. The term may also refer to placement of fertilizers in a side-dressed application after plants are established.

Side-Dressed Fertilizer

Definition: Application made to the side of crop rows after plant emergence.

Agronomics: Side-dressing usually refers to application of nitrogen (N), although any other nutrient may be applied in a similar manner. The term usually refers to application on row crops, particularly corn, cotton, and grain sorghum. Applications may be on or below the soil surface.

Split Application

Definition: Fertilizer applied two or more times during the crop growing season. Preplant and one or more postplant applications are common.

Agronomics: The intent of split fertilizer applications is to enhance the use efficiency of a particular nutrient. Usually, the terminology applies to nitrogen (N) utilization, particularly on soils which may be subject to nitrogen leaching. Application of nutrients nearest the time of greatest plant demand tends to improve use efficiency.

Spoke Injection

Definition: Application of liquid fertilizer at defined points in the soil through a wheel which has hollow spokes extending about 6 inches beyond the wheel radius. Fertilizer is injected under pressure only when the spoke is pointing straight down.

See Also: Point Injection.

Starter Fertilizer

Definition: Fertilizer applied at planting either in direct seed contact or to the side and below the seed. Exact position is not implied.

Agronomics: Liquid or solid fertilizer, placed near or in contact with the seed or the roots of new transplants, is commonly considered as starter fertilizer. In early practice, the low-analysis fertilizer then on the market was usually placed with the seed. Later, with increased concentration and higher rates of application, the fertilizer was banded approximately 2 inches below and 2 inches to the side of the seed (Figure 2-6) to avoid germination damage and seedling injury from soluble salts. Starter fertilizers provide high concentrations of nutrients near developing seedlings which can overcome nutrient uptake problems associated with low soil nutrient content, low soil temperature and compaction.

See Also: Pop-Up Fertilizer; Side-Banded Fertilizer.

Strip Fertilization

Definition: Fertilizer applied in surface bands that may be incorporated by tillage or remain on the soil/residue surface.

See Also: Surface Band Application.

Surface Band Application

Definition: Placement of a liquid or solid fertilizer as either a dribble or

forced stream on the soil surface.

Agronomics: The techniques of surface band application have been developed primarily to improve use efficiency of nitrogen (N) and phosphorus (P). Some data also show an enhanced use efficiency for potassium (K) applied in this manner. Surface band applications increase nutrient concentration in the area of the band which may enhance penetration of heavy surface residues or diminish soil fixation reactions for phosphorus. *Surface band applications are frequently more effective than broadcasting treatments but less nutrient-use efficient than knifed or sub-surface banding.*

See Also: Strip Fertilization.

Top-Dressed Application

Definition: Surface application of fertilizer to the soil after crop has been established.

Agronomics: Top-dressing is frequently used to describe the application of top-dressed fertilizer. Top-dressing is an important management practice in fertilization of established crops such as legumes, forage grasses and small grains. The terminology implies surface application which is most effective in an environment with adequate moisture. For small grains, the terminology usually refers to nitrogen and sulfur applications. For grasses and alfalfa, all nutrients are usually applied as top-dressed applications.

Triple Shooting

Definition: Placement of three fertilizer materials in separate subsurface bands.

Application: Accomplished through the injection of incompatible materials from three tubes on an applicator shank. For example, anhydrous ammonia, ammonium polyphosphate or other mixed liquid fertilizer and ammonium polysulfide are sometimes used with this application technology in the western U.S.

Variable-Rate Application

Definition: Variable-rate fertilization is a technique which changes nutrient application rates according to changes in available nutrient levels in soil as the applicator moves across the field.

Agronomics: This technology requires either soil survey maps, aerial infrared photographs and/or grid maps to delineate soil types and other physical features. Soils are sampled according to the soil maps, and that information is stored in an applicator's on-board computer. As the applicator moves across the map shown on an on-board monitor, impulses from the computer change the rate of application from the applicator's bins or tanks. To do this, the computer has to know precisely where the applicator is at all times and that job is handled by information from a global positioning satellite.

Weed-And-Feed

Definition: A term used in the agricultural chemical industry to denote mixing and application of fertilizers and herbicides.

Agronomics: Combination fertilizer and herbicide applications have been developed as a crop production cost-cutting practice. These dual applications potentially reduce equipment, labor, and time requirement and reduce soil compaction by elimination of operations. In some cases, performance of the herbicide may be enhanced by the combined application. However, fluid mixtures should always be tested on a small scale for compatibility prior to large scale mixing to avoid physical, chemical, and performance problems.

FERTILIZER REFERENCES

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Section 3

FERTILIZER DICTIONARY

Suppliers/Tradenames/Statistics

Section 3 of the Fertilizer Dictionary provides a quick reference to nutrient suppliers and their products. The first index, "Nutrient Suppliers," below, lists suppliers under specific nutrient categories. The table on page B 57, "Companies/Products," lists producers

and distributors and all of their fertilizer products. If you know a trade name but not its supplier, check the handy index, "Trade Names," on page B 76. U.S. production and consumption of major fertilizer materials are tracked in the charts which begin on page B 82.

NUTRIENT SUPPLIERS

N

Aglukon Spezialdünger GmbH
AgrEvo USA Co.
Agrimar Corp.
Agrolinz (Austria)
AlliedSignal Inc.
Alpine Plant Foods, Inc.
Amereq, Inc.
American Colloid Co.
American Cyanamid Co.¹
Ampel, Inc.¹
Arcadian Corp.
H.J. Baker & Bro., Inc.
Brandt Consolidated
Cedar Chemical Corp.
Chilean Nitrate Corp.
W.A. Cleary Chemical Corp.
Clifton Chemicals, Ltd.¹
C.M.I. Ltd.
Cominco Fertilizers (U.S.) Inc.
Conklin Co., Inc.
Cornbelt Chemical Co.
CoRoN Corp.
Custom Chemicides
DSM Chemicals North America
Englehard Corp.
Farmland Industries, Inc.
Goodpasture, Inc.¹
Haifa Chemicals Ltd.
Helena Chemical Co.
Hickson Kerley, Inc.
Humus Products of America, Inc.
Hydro Agri North America, Inc.
IMC Global USA
IMC-Agrico Co.
J & J Agri-Products & Services, Inc.
LaRoche Industries Inc.
Mineral Research & Dev., Div. Chemical Specialties Inc.
Mississippi Chemical Corp.
Monterey Chemical Co.
Plant Health Technologies, Crop Protection Products
PureGro Co.¹
Pursell Industries, Inc.
The O.M. Scott & Sons Co.
Seaborn/Lane, Inc.

Shield Brite, Div. of Pace International LP
J.R. Simplot Co., Minerals & Chemical Group¹
J.R. Simplot Co., Professional Turf Products¹
Smith & Ardussi, Inc.
Tecomag SRL
Terra International, Inc.
Terra Nitrogen Co. L.P.
Traylor Chemical & Supply Co., Inc.
Unocal Petroleum Products & Chemicals Div.
Vigoro Industries, Inc.¹
Westbridge Agricultural Products
Western Nutrients Corp.
Wilbur-Ellis Co.¹

NK

Aglukon Spezialdünger GmbH
Cedar Chemical Corp.
Chilean Nitrate Corp.
Custom Chemicides
Fertilizer Corp. of America
Grow More Inc.
Haifa Chemicals Ltd.
JH Biotech, Inc.
Lidochem, Inc.
Pursell Industries, Inc.
The O.M. Scott & Sons Co.
Shield Brite, Div. of Pace International LP
Terra International, Inc.

NP

Aglukon Spezialdünger GmbH
Cargill Fertilizer, Inc.
Cominco Fertilizers (U.S.) Inc.
Conklin Co., Inc.
Custom Chemicides
Farmland Industries, Inc.
Fertilizer Corp. of America
Goodpasture, Inc.¹
Grow More Inc.
Hydro Agri North America, Inc.
IMC-Agrico Co.
JH Biotech, Inc.

Lidochem, Inc.
Monterey Chemical Co.
PureGro Co.¹
Ruffin Micronutrients
Shield Brite, Div. of Pace International LP
Terra International, Inc.
Texasgulf Inc.
Western Nutrients Corp.

NPK

Aglukon Spezialdünger GmbH
Agro Products, S.A.
Agrolinz (Austria)
Alpine Plant Foods, Inc.
Amereq, Inc.
Biofix Co.
Brandt Consolidated
Cedar Chemical Corp.
Chemia S.p.A.
Chemical Dynamics, Inc.
Chilean Nitrate Corp.
W.A. Cleary Chemical Corp.
C.M.I. Ltd.
Cominco Fertilizers (U.S.) Inc.
Conklin Co., Inc.
Crystal Chemical Inter-America
C.S.I. Chemical Corp.
Custom Chemicides
Diachem S.p.A.
The Doggett Corp.
Faesy & Besthoff, Inc.¹
Farmland Industries, Inc.
Fertilizer Corp. of America
Goodpasture, Inc.¹
Grace-Sierra International B.V.
Grow More Inc.
Grupo Bioquimico Mexicano, S.A. de C.V.
Haifa Chemicals Ltd.
Humate International, Inc.
Humus Products of America, Inc.
Hydro Agri North America, Inc.
IMC Global USA
Imperial Products, Inc.
JH Biotech, Inc.
K & N. Efthyriadis S.A.

Mammoth International Chemical Corp.¹
Medina Agriculture Products Co., Inc.
Monterey Chemical Co.
Na-Churs Plant Food Co.
Plant Health Technologies, Crop Protection Products
Probelite, S.A.
PureGro Co.¹
Pursell Industries, Inc.
The O.M. Scott & Sons Co.
SeaBorn/Lane, Inc.
Shield Brite, Div. of Pace International LP
J.R. Simplot Co., Minerals & Chemical Group¹
Smith & Ardussi, Inc.
Terra International, Inc.
Traylor Chemical & Supply Co., Inc.
Vigoro Industries, Inc.¹
Violmet S.A.
Western Nutrients Corp.
Wilbur-Ellis Co.¹

K

Aglukon Spezialdünger GmbH
Agrimar Corp.
Cedar Chemical Corp.
W.A. Cleary Chemical Corp.
Cominco Fertilizers (U.S.) Inc.
Custom Chemicides
Diachem S.p.A.
Farmland Industries, Inc.
Fertilizer Corp. of America
Great Salt Lake Minerals Corp.
Grupo Bioquimico Mexicano, S.A. de C.V.
Hickson Kerley, Inc.
Hydro Agri North America, Inc.
Kalium Chemicals, Ltd.
Mississippi Chemical Corp.
Na-Churs Plant Food Co.
PCS Sales
Plant Health Technologies, Crop Protection Products
Prince Agri Products
Pursell Industries, Inc.

1 - Information not updated by company for 1995

Nutrient Suppliers

K (cont.)

Seaborn/Lane, Inc.
Terra International, Inc.
Western Ag Minerals Co.

P

Aglukon Spezialdünger GmbH
Cargill Fertilizer, Inc.
Cedar Chemical Corp.
Cominco Fertilizers (U.S.) Inc.
Custom Chemicides
Farmland Industries, Inc.
Fertilizer Corp. of America
Hydro Agri North America, Inc.
IMC Global USA
IMC-Agrico Co.
J & J Agri-Products & Services, Inc.
Monterey Chemical Co.
Na-Churs Plant Food Co.
Plant Health Technologies, Crop Protection Products
Shield Brite, Div. of Pace International LP
J.R. Simplot Co., Minerals & Chemical Group¹
Terra International, Inc.
Western Nutrients Corp.

PK

Aglukon Spezialdünger GmbH
Agrimar Corp.
Brandt Consolidated
Cedar Chemical Corp.
Cominco Fertilizers (U.S.) Inc.
Custom Chemicides
Grow More Inc.
Grupo Bioquimico Mexicano, S.A. de C.V.
Hydro Agri North America, Inc.
JH Biotech, Inc.
Lidochem, Inc.
Monterey Chemical Co.
Nutrient Technologies, Inc.
Shield Brite, Div. of Pace International LP
Terra International, Inc.

BORON

Aglukon Spezialdünger GmbH
Agrimar Corp.
Agrolinz (Austria)
Albion Laboratories, Inc.
Allied Colloids, Inc.
Brandt Consolidated
Chem One Corp.
Chemia S.p.A.
Chemical Dynamics, Inc.
W.A. Cleary Chemical Corp.
Clifton Chemicals, Ltd.¹
C.M.I. Ltd.
Conklin Co., Inc.
Cornbelt Chemical Co.
Crystal Chemical Inter-America
Custom Chemicides
Diachem S.p.A.
Enichem America, Inc.¹
Farmland Industries, Inc.
Fertilizer Corp. of America

Frit Industries
Georgia-Pacific Corp.¹
Grow More Inc.
Grupo Bioquimico Mexicano, S.A. de C.V.
Helena Chemical Co.
Imperial Products, Inc.
JH Biotech, Inc.
Martin Resources, Inc.
Mineral Research & Dev., Div. Chemical Specialties Inc.
Monterey Chemical Co.
N.R. Consa, S.A. de C.V.
Nutrient Technologies, Inc.
Probelte, S.A.
Product Formulations, Inc.
PureGro Co.¹
R.G.B. Laboratories, Inc.¹
Rhône-Poulenc Chemicals Ltd.
The O.M. Scott & Sons Co.
SeaBorn/Lane, Inc.
Shield Brite, Div. of Pace International LP
Smith & Ardussi, Inc.
Terra International, Inc.
Traylor Chemical & Supply Co., Inc.
U.S. Borax Inc.
Westbridge Agricultural Products
Western Nutrients Corp.
Wilbur-Ellis Co.¹

CALCIUM

Aglukon Spezialdünger GmbH
Agrimar Corp.
Agrolinz (Austria)
Albion Laboratories, Inc.
Allied Colloids, Inc.
Alpine Plant Foods, Inc.
Amereq, Inc.
Ampel, Inc.¹
Best Sulfur Products
Bio-Gard Agronomics, Inc.
Brandt Consolidated
Celite Corp./World Minerals Inc.
Chemical Dynamics, Inc.
C.M.I. Ltd.
Conklin Co., Inc.
Cornbelt Chemical Co.
C.S.I. Chemical Corp.
Custom Chemicides
Farmland Industries, Inc.
Fertilizer Corp. of America
Georgia-Pacific Corp.¹
Grow More Inc.
Grupo Bioquimico Mexicano, S.A. de C.V.
Hampshire Chemical Corp.
J.M. Huber Corp., Calcium Carbonate Div.
Humate International, Inc.
Hydro Agri North America, Inc.
International Humate Fertilizer Co.¹
J & J Agri-Products & Services, Inc.
JH Biotech, Inc.
Lidochem, Inc.
Mineral Research & Dev., Div. Chemical Specialties Inc.
Monterey Chemical Co.
Nutrient Technologies, Inc.
Prince Agri Products

Probelte, S.A.
Product Formulations, Inc.
PureGro Co.¹
R.G.B. Laboratories, Inc.¹
Rhône-Poulenc Chemicals Ltd.
Ruffin Micronutrients
The O.M. Scott & Sons Co.
SeaBorn/Lane, Inc.
Shield Brite, Div. of Pace International LP
Smith & Ardussi, Inc.
Terra International, Inc.
Traylor Chemical & Supply Co., Inc.
Unocal Petroleum Products & Chemicals Div.
Westbridge Agricultural Products
Western Nutrients Corp.
Wilbur-Ellis Co.¹

COPPER

Aglukon Spezialdünger GmbH
Agrolinz (Austria)
Albion Laboratories, Inc.
Allied Colloids, Inc.
Aries Agro-Vet Ind. Pvt. Ltd.
Boliden Intertrade, Inc.
Brandt Consolidated
Chem One Corp.
Chemia S.p.A.
W.A. Cleary Chemical Corp.
Clifton Chemicals, Ltd.¹
C.M.I. Ltd.
Cominco Fertilizers (U.S.) Inc.
Conklin Co., Inc.
Cornbelt Chemical Co.
Crystal Chemical Inter-America
Custom Chemicides
Diachem S.p.A.
The Doggett Corp.
Enichem America, Inc.¹
Farmland Industries, Inc.
Fertilizer Corp. of America
Frit Industries
Georgia-Pacific Corp.¹
Grow More Inc.
Grupo Bioquimico Mexicano, S.A. de C.V.
Hampshire Chemical Corp.
Helena Chemical Co.
J.M. Huber Corp., Calcium Carbonate Div.
Imperial Products, Inc.
JH Biotech, Inc.
La Cornubia S.A.
Lidochem, Inc.
Mineral Research & Dev., Div. Chemical Specialties Inc.
Monterey Chemical Co.
N.R. Consa, S.A. de C.V.
Nutrient Technologies, Inc.
Old Bridge Chemicals, Inc.
Phelps Dodge Refining Corp.
Plant Health Technologies, Crop Protection Products
Prince Agri Products
Product Formulations, Inc.
PureGro Co.¹
Rhône-Poulenc Chemicals Ltd.
Ruffin Micronutrients
The O.M. Scott & Sons Co.
SeaBorn/Lane, Inc.

Shield Brite, Div. of Pace International LP
Smith & Ardussi, Inc.
Terra International, Inc.
Traylor Chemical & Supply Co., Inc.
Vigoro Industries, Inc.¹
Westbridge Agricultural Products
Western Nutrients Corp.
Westvaco Corp. Polychemicals Dept.
Wilbur-Ellis Co.¹

IRON

Aglukon Spezialdünger GmbH
Agrimar Corp.
Agrolinz (Austria)
Albion Laboratories, Inc.
Allied Colloids, Inc.
Amereq, Inc.
American Minerals, Inc.
Ampel, Inc.¹
Arcadian Corp.
Aries Agro-Vet Ind. Pvt. Ltd.
Boliden Intertrade, Inc.
Brandt Consolidated
Chem One Corp.
Chemia S.p.A.
Chemical Dynamics, Inc.
Ciba Crop Protection, Ciba-Geigy Corp.
W.A. Cleary Chemical Corp.
Clifton Chemicals, Ltd.¹
C.M.I. Ltd.
Conklin Co., Inc.
Cornbelt Chemical Co.
Crystal Chemical Inter-America
Custom Chemicides
Diachem S.p.A.
The Doggett Corp.
Farmland Industries, Inc.
Fertilizer Corp. of America
Frit Industries
Georgia-Pacific Corp.¹
Grow More Inc.
Grupo Bioquimico Mexicano, S.A. de C.V.
Hampshire Chemical Corp.
Helena Chemical Co.
Hickson Kerley, Inc.
J.M. Huber Corp., Calcium Carbonate Div.
Humate International, Inc.
Humus Products of America, Inc.
Hydro Agri North America, Inc.
Imperial Products, Inc.
International Humate Fertilizer Co.¹
JH Biotech, Inc.
K & N. Eftymiadis S.A.
Lidochem, Inc.
LignoTech USA, Inc.
Mammoth International Chemical Corp.¹
Martin Resources, Inc.
Medina Agriculture Products Co., Inc.
Mineral Research & Dev., Div. Chemical Specialties Inc.
Monterey Chemical Co.
Moyer & Son, Inc.¹
N.R. Consa, S.A. de C.V.
Nutrient Technologies, Inc.

Nutrient Suppliers

Plant Health Technologies, Crop Protection Products
 Prince Agri Products
 Probelte, S.A.
 Product Formulations, Inc.
 PureGro Co.¹
 QC Corp.
 R.G.B. Laboratories, Inc.¹
 Rhône-Poulenc Chemicals Ltd.
 Ruffin Micronutrients
 The O.M. Scott & Sons Co.
 SeaBorn/Lane, Inc.
 Shield Brite, Div. of Pace International LP
 J.R. Simplot Co., Professional Turf Products¹
 Smith & Ardussi, Inc.
 Tecomag SRL
 Terra International, Inc.
 Traylor Chemical & Supply Co., Inc.
 Vigoro Industries, Inc.¹
 Westbridge Agricultural Products
 Western Nutrients Corp.
 Westvaco Corp. Polychemicals Dept.
 Wilbur-Ellis Co.¹

MAGNESIUM

Aglukon Spezialdünger GmbH Agrimar Corp.
 Albion Laboratories, Inc.
 Allied Colloids, Inc.
 Alpine Plant Foods, Inc.
 Amereq, Inc.
 American Minerals, Inc.
 Ampel, Inc.¹
 Arcadian Corp.
 Biofix Co.
 Brandt Consolidated
 Cedar Chemical Corp.
 Celite Corp./World Minerals Inc.
 Chem One Corp.
 Chemia S.p.A.
 Chemical Dynamics, Inc.
 W.A. Cleary Chemical Corp.
 Clifton Chemicals, Ltd.¹
 C.M.I. Ltd.
 Conklin Co., Inc.
 Cornbelt Chemical Co.
 CoZinCo Sales, Inc.
 Crystal Chemical Inter-America
 Custom Chemicides
 Diachem S.p.A.
 The Doggett Corp.
 Farmland Industries, Inc.
 Fertilizer Corp. of America
 Frit Industries
 Georgia-Pacific Corp.¹
 Grow More Inc.
 Grupo Bioquimico Mexicano, S.A. de C.V.
 Hampshire Chemical Corp.
 Helena Chemical Co.
 Hickson Kerley, Inc.
 J.M. Huber Corp., Calcium Carbonate Div.
 Humus Products of America, Inc.
 Hydro Agri North America, Inc.
 IMC Global USA
 Imperial Products, Inc.
 JH Biotech, Inc.

Lidochem, Inc.
 Martin Marietta Magnesia Specialties Inc.
 Medina Agriculture Products Co., Inc.
 Mineral Research & Dev., Div. Chemical Specialties Inc.
 Monterey Chemical Co.
 N.R. Consa, S.A. de C.V.
 National Magnesia Chemicals
 Nutrient Technologies, Inc.
 PQ Corp.
 Prince Agri Products
 PureGro Co.¹
 R.G.B. Laboratories, Inc.¹
 Rhône-Poulenc Chemicals Ltd.
 Ruffin Micronutrients
 The O.M. Scott & Sons Co.
 SeaBorn/Lane, Inc.
 Shield Brite, Div. of Pace International LP
 J.R. Simplot Co., Professional Turf Products¹
 Smith & Ardussi, Inc.
 Terra International, Inc.
 Traylor Chemical & Supply Co., Inc.
 Violmet S.A.
 Westbridge Agricultural Products
 Western Ag Minerals Co.

MANGANESE

Aglukon Spezialdünger GmbH Agrimar Corp.
 Agrolinz (Austria)
 Albion Laboratories, Inc.
 Allied Colloids, Inc.
 Amereq, Inc.
 American MicroTrace Corp.
 American Minerals, Inc.
 Aries Agro-Vet Ind. Pvt. Ltd.
 Brandt Consolidated
 Chem One Corp.
 Chemetals Inc.
 Chemia S.p.A.
 Chemical Dynamics, Inc.
 W.A. Cleary Chemical Corp.
 Clifton Chemicals, Ltd.¹
 C.M.I. Ltd.
 Conklin Co., Inc.
 Cornbelt Chemical Co.
 CoZinCo Sales, Inc.
 Crystal Chemical Inter-America
 Custom Chemicides
 Diachem S.p.A.
 The Doggett Corp.
 Farmland Industries, Inc.
 Fertilizer Corp. of America
 Frit Industries
 Georgia-Pacific Corp.¹
 Grow More Inc.
 Grupo Bioquimico Mexicano, S.A. de C.V.
 Hampshire Chemical Corp.
 Helena Chemical Co.
 J.M. Huber Corp., Calcium Carbonate Div.
 Humate International, Inc.
 Humus Products of America, Inc.
 Hydro Agri North America, Inc.
 Imperial Products, Inc.
 International Humate Fertilizer Co.¹

JH Biotech, Inc.
 Lidochem, Inc.
 LignoTech USA, Inc.
 Martin Resources, Inc.
 Mineral Research & Dev., Div. Chemical Specialties Inc.
 Monterey Chemical Co.
 N.R. Consa, S.A. de C.V.
 Nutrient Technologies, Inc.
 Plant Health Technologies, Crop Protection Products
 Prince Agri Products
 Product Formulations, Inc.
 PureGro Co.¹
 R.G.B. Laboratories, Inc.¹
 Rhône-Poulenc Chemicals Ltd.
 Ruffin Micronutrients
 The O.M. Scott & Sons Co.
 SeaBorn/Lane, Inc.
 Shield Brite, Div. of Pace International LP
 J.R. Simplot Co., Professional Turf Products¹
 Smith & Ardussi, Inc.
 Terra International, Inc.
 Traylor Chemical & Supply Co., Inc.
 Vigoro Industries, Inc.¹
 Westbridge Agricultural Products
 Western Nutrients Corp.
 Westvaco Corp. Polychemicals Dept.
 Wilbur-Ellis Co.¹

MOLYBDENUM

Aglukon Spezialdünger GmbH
 Allied Colloids, Inc.
 Brandt Consolidated
 Chemical Dynamics, Inc.
 Clifton Chemicals, Ltd.¹
 C.M.I. Ltd.
 Crystal Chemical Inter-America
 Custom Chemicides
 Diachem S.p.A.
 Fertilizer Corp. of America
 Frit Industries
 Georgia-Pacific Corp.¹
 Grupo Bioquimico Mexicano, S.A. de C.V.
 Humus Products of America, Inc.
 Imperial Products, Inc.
 Monterey Chemical Co.
 N.R. Consa, S.A. de C.V.
 Nutrient Technologies, Inc.
 Prince Agri Products
 Product Formulations, Inc.
 PureGro Co.¹
 The O.M. Scott & Sons Co.
 Smith & Ardussi, Inc.
 Terra International, Inc.
 Traylor Chemical & Supply Co., Inc.
 Westbridge Agricultural Products
 Wilbur-Ellis Co.¹

SULFUR

AlliedSignal Inc.
 Alpine Plant Foods, Inc.
 Amereq, Inc.
 Ampel, Inc.¹
 Arcadian Corp.
 H.J. Baker & Bro., Inc.

Best Sulfur Products
 Brandt Consolidated
 W.A. Cleary Chemical Corp.
 Clifton Chemicals, Ltd.¹
 C.M.I. Ltd.
 Cominco Fertilizers (U.S.) Inc.
 Cornbelt Chemical Co.
 CoZinCo Sales, Inc.
 Crystal Chemical Inter-America
 Custom Chemicides
 Farmland Industries, Inc.
 Fertilizer Corp. of America
 Frit Industries
 Goodpasture, Inc.¹
 Great Salt Lake Minerals Corp.
 Grow More Inc.
 Grupo Bioquimico Mexicano, S.A. de C.V.
 Helena Chemical Co.
 Hickson Kerley, Inc.
 Humus Products of America, Inc.
 IMC Global USA
 International Humate Fertilizer Co.¹
 J & J Agri-Products & Services, Inc.
 Martin Resources, Inc.
 Monterey Chemical Co.
 N.R. Consa, S.A. de C.V.
 Plant Health Technologies, Crop Protection Products
 Prince Agri Products
 Probelte, S.A.
 Product Formulations, Inc.
 PureGro Co.¹
 R.G.B. Laboratories, Inc.¹
 The O.M. Scott & Sons Co.
 SeaBorn/Lane, Inc.
 Shield Brite, Div. of Pace International LP
 J.R. Simplot Co., Professional Turf Products¹
 Smith & Ardussi, Inc.
 Terra International, Inc.
 Traylor Chemical & Supply Co., Inc.
 Unocal Petroleum Products & Chemicals Div.
 Westbridge Agricultural Products
 Western Ag Minerals Co.
 Western Nutrients Corp.
 Wilbur-Ellis Co.¹

ZINC

Aglukon Spezialdünger GmbH Agrimar Corp.
 Agrolinz (Austria)
 Albion Laboratories, Inc.
 Allied Colloids, Inc.
 Alpine Plant Foods, Inc.
 Amereq, Inc.
 American MicroTrace Corp.
 American Minerals, Inc.
 Ampel, Inc.¹
 Arcadian Corp.
 Aries Agro-Vet Ind. Pvt. Ltd.
 Bay Zinc Co., Inc.
 Brandt Consolidated
 Chem One Corp.
 Chemia S.p.A.
 Chemical & Pigment Co.
 Chemical Dynamics, Inc.
 W.A. Cleary Chemical Corp.

1 - Information not updated by company for 1995

Zinc (cont.)

Clifton Chemicals, Ltd.¹
C.M.I. Ltd.
Conklin Co., Inc.
Cornbelt Chemical Co.
CoZinco, Inc.
CoZinCo Sales, Inc.
Crystal Chemical Inter-America
Custom Chemicides
Diachem S.p.A.
The Doggett Corp.
Farmland Industries, Inc.
Fertilizer Corp. of America
Frit Industries
Georgia-Pacific Corp.¹
Grow More Inc.
Grupo Bioquimico Mexicano, S.A.
de C.V.
Hampshire Chemical Corp.
Helena Chemical Co.
Hickson Kerley, Inc.
J.M. Huber Corp., Calcium
Carbonate Div.
Humate International, Inc.
Humus Products of America, Inc.
Hydro Agri North America, Inc.
Imperial Products, Inc.
International Humate Fertilizer Co.¹
JH Biotech, Inc.
Lidochem, Inc.
LignoTech USA, Inc.
Mammoth International Chemical
Corp.¹
Medina Agriculture Products Co.,
Inc.
Mineral Research & Dev., Div.
Chemical Specialties Inc.
Monterey Chemical Co.
Nutrient Technologies, Inc.
Old Bridge Chemicals, Inc.
Plant Health Technologies, Crop
Protection Products
Prince Agri Products
Product Formulations, Inc.
PureGro Co.¹
R.G.B. Laboratories, Inc.¹
Rhône-Poulenc Chemicals Ltd.
Ruffin Micronutrients
The O.M. Scott & Sons Co.
SeaBorn/Lane, Inc.
Shield Brite, Div. of Pace
International LP
J.R. Simplot Co., Professional Turf
Products¹
Smith & Ardussi, Inc.
Terra International, Inc.
Traylor Chemical & Supply Co., Inc.
Vigoro Industries, Inc.¹
Westbridge Agricultural Products
Western Nutrients Corp.
Westvaco Corp. Polychemicals
Dept.
Wilbur-Ellis Co.¹
Zinc Corp. of America

COMPANIES/PRODUCTS

Company	Trade Name/Material	Type	Description
Acadian Seaplants Ltd.			
	Cytokinins	O	Natural plant growth regulator.
	Kelp Meal/Powder	O	Soil conditioners + feed supplements. Naturally chelated trace minerals.
	Seaweed Extract	O	Soluble powder and liquid for foliar and soil applications. Natural source biostimulants, micronutrients + complexing agents.
Aglukon Spezialdünger GmbH			
	Azolon* 38 N	F	38% N. Biologically controlled release. Granular, powder, manufacturing grade.
	Azolon* Special	F	15-10-15 + 1.8% Mg. Biologically controlled N-release. Granular.
	Crescal* Iron	M	6% Fe. Iron chelate. EDDHA chelated.
	Fertisal*	F	Soluble nutrient salts.
	Hortazon* Micro	M	0.5% B, 1.5% Cu, 4.0% Fe, 1.0% Mn, 0.5% Mo, 0.5% Zn. Slow release.
	Nitroform*	F	38% N. Biologically controlled release. Granular, mini-granular, powder.
	Nutralene* Green-Keeper	F	15-0-20 + 1.8 Mg. Biologically controlled N-release. Granular.
	Nutralene* Green-Speed	F	20-6-18 + 1.2% Mg + micros. Biologically controlled N-release. Granular.
	Nutralene* Premium 40N	F	40% N. Biologically controlled release. Mini granular.
	Nutralene* Sports-Master	F	15-5-15 + 1.8% Mg. Biologically controlled N-release. Granular.
	Nutralene* Turf-Master	F	20-5-8 + 1.8 Mg. Biologically controlled N-release. Granular.
	Plantacote* Depot	F	NPK coated. Controlled plant nutrition. 4,6,8,12 month.
	Plantacote* Mix	F	NPK + Mg, micros, coated/granulated. Controlled plant nutrition. 4,6,8,12 month.
	Plantacote* Start	F	NPK + Mg, micros, granulated. Controlled plant nutrition.
	Plantodur*	F	NPK + Mg + micros. Tree fertilizer tablet with controlled release effect up to 3 years.
	Plantosan*	F	NPK + Mg, micros, granulated. Controlled plant nutrition.
	Wuxal* Basis N	F	27-0-5 + EDTA chelated micros. Suspension.
	Wuxal* Calcium	S	10-0-0 + 1.2% Mg, 10.7% Ca. EDTA chelated micros. Suspension.
	Wuxal* Combi B	F	20-0-15 + 1.2% Mg, 1% B, micros. EDTA chelated. Suspension.
	Wuxal* Combi Fe	F	10-0-20 + 1.2% Mg, 1% Fe, micros. EDTA chelated. Suspension.
	Wuxal* Combi Mg	F	20-0-15 + 2.4 Mg, EDTA chelated micros. Suspension.
	Wuxal* Combi Mn	M	20-0-15 + 1.2% Mg, 1% Mn, micros. EDTA chelated. Suspension.
	Wuxal* Endivo	F	9-0-33 + 2.4% Mg. EDTA chelated micros. water soluble micro granular.
	Wuxal* Folibor	M	12% B.
	Wuxal* Iron	M	5-0-0 + 5% Fe. EDTA chelated. Suspension.
	Wuxal* Macromix	F	16-16-12 + EDTA chelated micros. Suspension.
	Wuxal* Magnesium	S	15-0-0 + 4.8% Mg. EDTA chelated micros. Suspension.
	Wuxal* Manganese	M	10-0-0 + 1.8% Mg, 6% Mn. EDTA chelated. Suspension.
	Wuxal* Micro Fe-Mn-Zn	M	10-0-0 + 2% Fe, 2% Mn, 2% Zn. EDTA chelated. Suspension.
	Wuxal* Micro Mn	M	10-0-0 + 3% Mn, 1% Fe, 2% Zn. EDTA chelated. Suspension.
	Wuxal* Micro Mn-Zn	M	10-0-0 + 2.2% Mn, 2.2% Zn, 1.1% Fe. EDTA chelated. Suspension.
	Wuxal* Micro Zn	M	10-0-0 + 1% Fe, 2% Mn, 3% Zn. EDTA chelated. Suspension.
	Wuxal* Microplant	M	5-0-10 + 1.8% Mg, 0.3% B, 0.5% Cu, 1% Fe, 1.5% Mn, 1% Zn. EDTA chelated. Suspension.
	Wuxal* Polymicro	M	10-0-10 + 1.8% Mg, 0.02% B, 0.5% Cu, 0.5% Fe, 1% Mn, 0.5% Zn. EDTA chelated. Suspension.
	Wuxal* super	F	8-8-6 + EDTA chelated micros. Liquid.

Company	Trade Name/Material	Type	Description
	Wuxal* top K	F	5-8-12 + EDTA chelated micros. Liquid.
	Wuxal* top N	F	12-4-6 + EDTA chelated micros. Liquid.
	Wuxal* top P	F	5-20-5 + EDTA chelated micros. Liquid.
AgrEvo USA Co.			
	Nitroform*	F	Nitrogen urea-formaldehyde reaction products. Controlled release.
	Nitroform Blue Chip*		
	Nitroform Blue Granular*		
	Nitroform Blue Powder*		
	Nutralene Chip*	F	Methylene urea products. Controlled release.
	Nutralene Granular*		
Agrimar Corp.			
	Goëmar* BM 86	M	5-0-0 + 2.89% Mg, 1.79% B + seaweed.
	Goëmar* Folical	S	10% Ca, 0.5% B + seaweed.
	Goëmar* Foliphos	F	0-24-4 + 0.3% B + seaweed.
	Goëmar* MZ 63	M	5-0-0 + 1.93% Mg, 1.57% Mn, 2.36% Zn + seaweed.
	Goëmar* MZO	O	1.76% Mg, 5.2% S, 5.47% Zn + seaweed.
	Goëmar* Pigmentil	M	0-0-5 + 3% Ca, 0.5% Mg, 1% B + seaweed.
	Goëmar* Seedbooster	M	0.50% Mg, 0.75% Zn, 0.005% Mo, 0.25% Cu, 0.75% Fe, 0.05% B + seaweed.
Agrisorbents Product Group, Div. of OIL-DRI Corp. of America			
	AGSORB*	C	Montmorillonite and attapulgite clays.
	TERRA-GREEN*	O	Soil conditioner.
Agro Products, S.A.			
	Bio-Tech*	O	Freeze dried bacteria + liquid biological activator.
Agrolinz (Austria)			
	Agrolinz*	F	28% N. Ammonium nitrate urea. Liquid.
		F	30% N. Ammonium nitrate urea. Liquid.
		F	21% N. Ammonium sulfate.
		M	26% N + 0.3% B, 23% Ca. Boron-calcium ammonium nitrate.
		S	27% N, 22% Ca.
		S	28% N, 20% Ca. Calcium ammonium nitrate.
		F	46% N + prilled acid amide of carbonic acid. Urea.
	Folifert* Super	M	20-6-6 + 10% MgO, 0.3% B, 0.2% Fe, 0.1% Mn, 0.1% Zn, 0.05% Cu. Fine granular, water soluble containing potassium chloride.
		M	14-7-7 + 8% MgO. Crystalline, water soluble foliar feed.
	Vollkorn*	F	15-15-15. Granular, containing chloride.
		F	13-13-21. Granular, containing chloride.
		F	15-8-20. Granular, containing chloride.
		F	24-8-8. Granular, containing chloride.
		M	15-10-10 + 3% MgO. Granular, containing chloride.
		F	15-8-20 + 2% MgO. Granular, containing chloride.
		M	20-8-8 + 3% MgO. Granular, containing chloride.
		M	12-12-17 + 2% MgO, B, Zn. Granular, containing chloride + sulfate.
		M	15-5-18 + 2.5% MgO, 0.1% B, 0.1% Fe, Mn, Zn, Cu. Granular, containing potassium sulfate.
		M	10-15-20 + 3% MgO. Granular, containing chloride.
Albion Laboratories, Inc.			
	Albion* Metalosates	M	5% B. Liquid.
		S	5% Ca chelate. Liquid.
		M	2% Cu chelate. Liquid.
		M	5% Fe chelate. Liquid.
		S	2.1% Mg chelate. Liquid.
		M	5.6% Mn chelate. Liquid.
		M	6.8% Zn chelate. Liquid.
	Bean & Vegetable Yield Booster*	M	B, Fe, Zn, Cu, Mn, Mg chelate. Liquid.
	Crop UP*	M	B, Fe, Zn, Cu, Mn, Mg chelate. Liquid.

(Continued)

* - Trade Name R/T/M

1 - Information not updated for 1995

Company	Trade Name/Material	Type	Description
	Grain Yield Booster*	M	B, Fe, Zn, Cu, Mn, Mg chelate. Liquid.
	Multimineral*	M	Fe, Zn, Cu, Mn, Ca, Mg chelate. Liquid.
	Zinc Plus	M	Mg, B, Cu, Fe, Mn, Zn chelate. Liquid.

Allied Colloids, Inc.			
	DP10-6585*	M	8.5% Fe EDTA. Powder, granule.
	LibFer* SP	M	6% Fe EDDHA. Powder.
	Librel* Ca	M	9.5% Ca EDTA. Powder, granule.
	Librel* Cu	M	14% Cu EDTA. Powder, granule.
	Librel* Fe-Lo	M	13.2% Fe EDTA. Powder, granule.
	Librel* Mg	S	5% Mg EDTA. Powder, granule.
	Librel* Mn	M	13% Mn EDTA. Powder, granule.
	Librel* RMX3	M	5% Fe EDTA, 2.5% Mn EDTA, 2.5% Zn EDTA, 2.5% Cu EDTA, 1% B chelate. Granule.
	Librel* RMX4	M	3.5% Fe EDTA, 1.5% Mg EDTA, 0.75% Mn EDTA, 0.75% Zn EDTA, 0.025% B, 0.025% Mo, 0.006% Cu EDTA chelate. Granule.
	Librel* RMX8	M	5.6% Fe EDTA, 2.6% Mn EDTA, 2.6% Zn EDTA, 2.6% Cu EDTA chelate. Powder.
	Librel* Zn	M	14% Zn EDTA. Powder, granule.

AlliedSignal Inc.			
	Sulf-N 45*	S	21-0-0 + 24% S. Ammonium sulfate. Granular, standard, fluid.
		A	Ammonium sulfate, specially screened. Water soluble.
	Sulf-N Liquor*	S	8-0-0 + 9% S. Ammonium sulfate solution.

Alpine Plant Foods, Inc.			
	Liqui-Cal*	S	8-0-0 + 8% Ca chelate. Liquid.
		M	2.5% Mg chelate. Liquid.
		S	12-0-0 + 26% S. Ammonium thiosulfate.
		F	9-18-9 starter.
		F	6-24-6 starter.
		M	9% Zn chelate. Liquid.

Amereq, Inc.			
	Biozone*	O	Humic acids, Biostimulants, soil conditioners.
	Keep-On*	A	Spreader, sticker.
	N-Safe*	F	Slow release nitrogen.
	Viterra* Agri-gel*	C	Gelled fertilizers.
	Wuxal*	M	10-0-0 + 10.7% Ca, 1.2% Mg, EDTA chelated micros.

American Colloid Co.			
	Agro-Gel*	C	Bentonite clay. Powdered.
	Agro-Lig*	O	Humic acid. Dry powder, granules.
	Enersol*	O	Organic humic acid solutions. Ground and foliar.
	Organo-Plex*	O	Organic fulvic acid solution used for chelating agent.

American Cyanamid Co.*			
	Aero*	F	Anhydrous ammonia.
	Aeroprills*	F	Ammonium nitrate.

American MicroTrace Corp.			
	Coarse Zink*	M	35.5% Zn. Zinc sulfate monohydrate. Water soluble, fine granular.
	Man-Gro*	M	29% Mn. Manganese sulfate. Water soluble, granular.
	Man-Gro* AS	M	29% Mn. Manganese sulfate. Water soluble, granular.
	Super Fine Zink*	M	35.5% Zn. Zinc sulfate monohydrate. Water soluble powder.
	Super TEL Zn*	M	35.5% Zn. Zinc sulfate monohydrate. Powder, water soluble.
	Zink-33*	M	33.5% Zn. Zinc sulfate monohydrate. Highly water soluble, granular.
	Zink-Gro*	M	35.5% Zn. Zinc sulfate monohydrate. Granular, water soluble.
	Zink-Gro* AS	M	35.5% Zn. Zinc sulfate monohydrate. Water soluble, fine granular.

American Minerals, Inc.			
	Fert-O-Mag*	S	51.5% Mg. Magnesium oxide. Granular.

Company	Trade Name/Material	Type	Description
	Granusol*	S	45% Mg. Magnesium sucrate. Solubilized granules.
		M	50% Fe. Iron sucrate. Solubilized granules.
		M	40% Mn. Manganese sucrate. Solubilized granules.
		M	36% Zn. Zinc sucrate. Solubilized granules.
	Manganous Oxide	M	60% Mn. Spray. Granular for mixed fertilizer use.
		M	43% Mn. Coarse granular for bulk blending, fine granular for wet-process ammoniation.

Ampel, Inc.*			
	Cal-Sul*	S	17% S, 22% Ca. Pelletized calcium sulfate.
	Granulime Mini*	S	21-38% Ca, 0-12% Mg. Pelletized limestone.
	Pel-Lime*	S	21-38% Ca, 0-12% Mg. Pelletized limestone.

Arcadian Corp.			
	Amthio*	F	Ammonium thiosulfate.
	Columbia* Brand	F	Nitrogen solutions + high density ammonium nitrate.
	Liqui-Zinc*	M	10-12% Zn. Zn amine complex.
	NFE*	M	N + 4% Fe chelate. Foliar and soil.
	NMG*	M	N + 4% Mg. Foliar and soil.
	NZN*	M	N + 5% Zn. Foliar.
	Poly-N*	F	Ammonium polyphosphate. Liquid.
	S-25*	F	25% N + 3.5% S.
	Superprill*	F	Urea.
	Suran*	F	Nitrogen solution with S.
	Uran*	F	Nitrogen solution.

Aries Agro-Vet Ind. Pvt. Ltd.			
	Aries Chelacop*	M	7.5% Cu EDTA chelate. Foliar spray. Powder.
	Aries Chelafar*	M	6%, 12% Fe EDTA chelate. Foliar and soil spray. Powder.
	Aries Chelamin*	M	12% Zn EDTA chelate. Foliar and soil spray. Powder.
	Aries Mn-Chel*	M	9% Mn EDTA chelate. Foliar spray. Powder.

H.J. Baker & Bro., Inc.			
	Amsulgran 45*	S	21-0-0 + 24% S. Ammonium sulfate. Granular.
	Amsulstan 45*	S	21-0-0 + 24% S. Ammonium sulfate. Standard.
	Eliminol*	D	Fertilizer deodorizer.

Barclay Chemicals Mfg. Ltd.			
	Barclay*	M	Mn, Zn, Cu EDTA, Mg EDTA.
	Seagro*	F	Seaweed extract.

Bay Zinc Co., Inc.			
	Blu-Min*	M	18% Zn. Zinc oxysulfate. Granular.
		M	10.5% Zn. Zinc sulfate. Liquid.
	Blu-Min LHM*	M	18% Zn. Zinc sulfate. Granular.

Best Sulfur Products			
	Soil-Mend*	S	Calcium polysulfide solution. Liquid.

Biochem S.R.L.			
	Biolinta*	F	5% L cysteine derivates, 0.1% folic acid. Foliar spray.
	Biolinta Plus* A	F	2.5% L cysteine derivates, 0.2% folic acid, 23% amino acids + micronutrients. Foliar spray.

Biofix Co.			
	Bio Bac*	O	Bacterial seed treatment including legumes.
	Bio-Cure II*	O	Eliminates further production of organic odors through aerobic degradation.
	Bio-Cure A*	A	Freeze dried bacteria + liquid biological activator.
	Biofix-Gro*	O	Humic acid, enzymes, fermentation, water soluble nutrients, polysaccharides, amino acids, indolebutyric acid, auxins, surfactants, vitamins + alcohol. Soil amendment biocontrol, decontaminant growth regulator.
	Bion*	O	Odor neutralizer, organic, nonchemical odor control.
	Humus-Gro*	O	Humic acid. Concentrated liquid. Soil amendment, seed treatment.
	Inocu-Gro*	C	Rhizobium inoculant for peat carrier. Seed treatment.

Bio-gard Agronomics, Inc.			
	Calcium-25*	S	Ca. Plant mineral supplement/yield enhancer.

F = Fertilizer S = Secondary A = Adjuvant C = Carrier O = Organic M = Micronutrient D = Deodorizer

Companies/Products

Company	Trade Name/Material	Type	Description
Bolliden Intertrade, Inc.			
Copper	M	55% Cu as metallic. Copper carbonate.	
	M	25.2% Cu as metallic. Copper sulfate. Crystal, powdered and granular.	
	M	20% Fe. Iron sulfate.	
Ferri-Floc*	M	20% Fe. Iron sulfate.	
Fri-Basic*	M	53% Cu as metallic.	
Brandt Consolidated			
	A	Ammonium sulfate. 7-0-0 + 8% S. Surfactant grade.	
	A	Ammonium sulfate. 7-0-0-8. For pesticide applications. Surfactant grade.	
	S	Ammonium thiosulfate. 12-0-0 + 26% S.	
	S	Ammonium thiosulfate 12-0-0-26. Liquid sulfur source.	
ClawEI* Calcium	S	8% N, 8% Ca chelate.	
	S	3% Ca chelate. Fertilizer grade.	
	S	Folical 10% Ca. Foliar grade.	
ClawEI* Copper	M	7.5% Cu chelate. Fertilizer grade.	
	M	5% Cu. Foliar grade.	
ClawEI* Iron	M	5% Fe, 4% S chelate. Foliar grade.	
	M	5% Fe chelate. Fertilizer grade.	
ClawEI* Magnesium	S	4% Mg chelate. Foliar grade.	
	S	2.5% Mg chelate. Fertilizer grade.	
	S	Mg nitrate. 7-0-0-6 Mg.	
ClawEI* Manganese	M	5% Mn chelate. Foliar grade.	
	M	6% Mn chelate. Fertilizer grade.	
ClawEI* N-Boron	M	3.3% B, 4.5% N complex. Fertilizer and foliar grade.	
ClawEI* Zinc	M	9% Zn chelate. Fertilizer grade.	
	M	7% Zn chelate. Foliar grade.	
Commander*	F	Drip irrigation fertilizers.	
Foli-Cal*	S	10% Ca. Foliar grade.	
Indicate 5*	A	Acidifying/buffering spray adjuvant with surfactant.	
Inhance*	A	3 in 1 spray adjuvant.	
Inspray 90*	A	90% Non-ionic surfactant.	
Instill MSO*	A	Methylated seed oil.	
Intent*	A	Surfactant/UAN combination.	
N-Sure*	F	N. Non-burning, slow release for turf.	
Plant Start**	F	Transplant solution.	
Trisert*	F	N. Non-burning, slow release for vegetables.	
Burlington Bio-Medical & Scientific Corp.			
SpeedFeed*	F	Seaweed and lignite.	
Cargill Fertilizer, Inc.			
	F	18-46-0. DAP.	
	F	0-46-0. GTSP.	
	F	10-50-0. MAP.	
Fluosilicic Acid	F	Fluosilicic acid.	
Phosphoric Acid	F	52-54%. Phosphoric acid.	
Sodium Fluorosilicate	F	Sodium fluorsilicate.	
CCT Corp.			
Spark*	F	Cytokinin.	
Cedar Chemical Corp.			
K-Power*	F	Potassium nitrate. Soluble. Microprills.	
Magnisol*	F	Magnesium nitrate. Flaked.	
MAP	F	Monoammonium phosphate. Soluble.	
MKP	F	Monopotassium phosphate. Soluble.	
MOP*	F	Potassium chloride. Granular, standard and soluble.	
Multicote*	F	Coated, controlled release NPK granular and blends.	
Celite Corp./World Minerals Inc.			
Celite*	C	Diatomaceous earth.	
Calkate*	C	Magnesium silicate.	
Genite*	C	Diatomaceous earth.	

Company	Trade Name/Material	Type	Description
Micro-Cel*	C	Calcium silicate.	
Chandler Sales Co.			
Biobase*	M	Feed grade biological activator with Mn, Cu, Zn, and Fe. Liquid.	
Biobase Micros*	M	Feed grade proteinated micros including Co, Cu, Fe, Mg, Mn, Mo, Se, and Zn. Liquid.	
Biobase Premix*	A	Feed grade biological activator. Powder.	
Bioburst*	O	Humic acid, fermentation, seaweed and amino acids. Liquid concentrate.	
Biocat 1000*	M	6-0-0, 3% Mg, 3% S, 2% Zn, B, Cu, Fe, Mo and biological activator for post-harvest crop residues. Liquid concentrate. Suspension.	
Biocat 3000*	A	Biological activator for manure pits. Liquid concentrate. Suspension.	
Biocat 4000*	A	Biological activator for soil microbes. Liquid concentrate. Suspension.	
Biocat 5000*	A	Freeze dried bacteria and enzymes for manure pits.	
Calcium 5*	M	5-0-5, 5% Calcium organic complexed. Liquid.	
Chandler Foliar*	F	7-0-0 + 2% S, chelated and Mg, B, Cu, Fe, Mn, Mo and Zn organic complexed. Foliar spray concentrate.	
Chandler No Till*	F	14-4.5-1.5 Organic complexed. Soil spray concentrate.	
Chandler pH Acidifier*	A	Acidifying/buffering spray adjuvant.	
Chandler Seed Treat*	M	Biologic activator with 3% Ca, 4% Mg, 1.5% S, 2% Fe, 2% Zn, B, Co, Mn, and Mo. Powder.	
Chandler SilageMaster*	A	Freeze dried bacteria.	
Chandler Soil*	F	6-0-0 + 1% S, B, Cu, Fe, Mn, Mo and Zn chelated and organic complexed soil spray concentrate.	
Nutra Stimulants*	F	Macro, secondary and micros organic complexed to stimulate uptake of nutrients. Liquid concentrate. Suspension.	
Technical Grade	O	Organic complexing additives. Liquid concentrate.	
Chem One Corp.			
Boron	M	Boric acid, anhydrous 99.5%. Granular.	
Copper	M	39% Cu. Copper sulfate, anhydrous. Powder.	
	M	35% Cu. Copper sulfate, monohydrate. Powder.	
	M	25.2% Cu. Copper sulfate, pentahydrate. Large, medium, small, fine 20, fine 30, fine 100.	
Iron	M	Ferrous sulfate, heptahydrate. Crystal.	
Magnesium	M	Magnesium sulfate, anhydrous. Crystal.	
	M	Magnesium sulfate, heptahydrate. Crystal.	
Manganese	M	Manganese sulfate, monohydrate 29.5% Mn. Mini and maxi prills.	
	M	Manganese sulfate, monohydrate 31.5% Mn. Powder.	
Zinc	M	Zinc sulfate, monohydrate 35.5% Zn. Powder and granular.	
Chemetals Inc.			
Manganese Carbonate	M	44% Mn. Acid soluble.	
Manganese Chloride	M	43% Mn. Water soluble. Flakes.	
Manganous Oxide	M	60% Mn.	
	M	77% Mn.	
Chemia S.p.A.			
Nutrifix*	M	13-5-38 + B, Fe, Mg, Mn, Zn, Cu, Mo, Co. Foliar spray.	
Chemical & Pigment Co.			
Meteor*	M	52% Zn. Basic zinc sulfate.	
	M	36% Zn. Zinc sulfate monohydrate. Spray, dried and granular.	
	M	62% Zn. Zinc chloride. Solution.	
Chemical Dynamics, Inc.			
Dyna-Flo* 12-6-6 Plus	M	12% N, 6% P, 6% K, 0.25% Mg, 0.20% Mn, 0.15% Fe, 0.10% Zn, 0.02% B, 0.003% Mo. Liquid.	
Dyna-Gold* Calcium	M	8.25% Ca. Secondary compound. Liquid.	
Dyna-Gold* C-B Mix	M	5% Ca, 2% B. Liquid.	

(Continued)

* - Trade Name R/T/M

1 - Information not updated for 1995

Company Trade Name/Material	Type	Description
Dyna-Gold* Copper	M	5% Cu. Liquid.
Dyna-Gold* Iron	M	15% Fe. Liquid.
Dyna-Gold* Magnesium	M	4% Mg. Secondary compound. Liquid.
Dyna-Gold* Manganese	M	5% Mn. Liquid.
Dyna-Gold* MZ Mix	M	3.6% Zn, 2.9% Mn, 3.5% S. Liquid.
Dyna-Gold* MZF Mix	M	1.6% Fe, 2% Mn, 2.4% Zn, 3.5% S. Liquid.
Dyna-Gold* Peanut & Soybean Mix	M	3% Mn, 2% Ca, 1% Mg, 0.5% Zn, 5% Fe, 0.1% B, 0.04% Mo. Liquid.
Dyna-Gold* Tomato & Pepper Mix	M	3% N, 2% Ca, 0.5% Mg, 0.25% Mn, 1% Zn, 2% Fe, 0.003% Mo, 0.01% B. Liquid.
Dyna-Gold* Vegetable Mix	M	1.5% Mg, 0.75% Mn, 0.75% Zn, 1.75% Fe, 1% Ca, 0.05% B, 0.003% Mo. Liquid.
Dyna-Gold* Zinc	M	7% Zn.

Chilean Nitrate Corp.

Champion Brand*	F	20-8-20. All purpose plus.
	F	17-4-28. High potash plus
	F	24-9-9. High nitrate acid-plus.
	F	17-17-17. General purpose plus.
	F	9-30-25. Starter plus.
	F	23-10-21. Foliar plus.
Champion Brand Bulldog*	F	16-0-0. Nitrate of soda.
	F	15-0-14. Nitrate of soda-potash.
	F	13.5-0-45. Potassium nitrate.

Ciba Crop Protection, Ciba-Geigy Corp.

Sequestrene* 138	M	6% Fe. Powder.
Sequestrene* 330	M	10% Fe. Powder.

W.A. Cleary Chemical Corp.

Clearys* Extra Iron	M	5% S, 4% Fe, 1% Zn, 1% Mn, 0.025% Cu.
Clearys* 16-2-4 Plus	F	16-2-4 + 0.5% chelated Fe. Low burning polymethylene urea provides liquid slow release nitrogen.
Gypsum	S	Calcium sulfate. 50% Gypsum. Flowable.
Limestone-F*	C	50% dolomitic limestone. Flowable liquid micronized.
Sulfur-F*	S	52% S. Flowable liquid micronized.
Trugreen*	M	2% K, 2% S, 1.25% Fe, 1% Mg, 0.05% Mn, 0.05% Zn, 0.02% B.
Trugreen*-Pro	F	15-0-0 6% + Fe. Complexed liquid iron. Amine herbicide compatible.

Clifton Chemicals, Ltd.

Clifton* Copper	M	25% Cu. Liquid.
	M	9.5% Cu EDTA chelate. Liquid.
Clifton Extra-Bor*	M	15% B. Liquid.
Clifton Extra-Bor SP*	M	21% B. Soluble powder.
Clifton Foliaran Plus*	M	36% N, Mg, Mn, Cu, B, Zn, Mo, Fe.
Clifton Foliaran Ultra DG*	M	40-0-1 + 2% S, Mn, Cu, Mg, B, Zn, Fe.
Clifton* Manganese	M	8% Mn EDTA chelate. Liquid.
Clifton 195 Super*	M	19.5 Mn. Liquid.
Clifton 309 Super DF*	M	31% Mn. Dry Flowable.
Clifton Trace Element Mix*	M	Mn, Cu, Zn, Fe, Mg, Co, B, Mo, S chelate. Powder.
Magnesium	S	Mg. N. Liquid.
Molybdenum	M	18% Mo. Liquid.
Ultrasulf*	S	S. N. Dry flowable.

C.M.I. Ltd.

CM* Calbo	M	2% B, 6% Ca.
CM* Calcium	S	10% Ca EDTA. Powder.
	S	6% Ca. Liquid.
CM* Copper	M	9.3% Cu EDTA. Liquid.
	M	14% Cu EDTA. Powder.

Company Trade Name/Material	Type	Description
CM* Iron	M	5% Fe. Liquid.
	M	7% Fe DTPA. Powder.
	M	13.2% Fe EDTA.
CM* Kelp	O	Seaweed. Concentrate.
CM* Magnesium	S	6% Mg EDTA. Powder.
	S	3.1% Mg. Liquid.
CM* Manganese	M	5% Mn. Liquid.
	M	6.5% Mn, 8.2% Mn EDTA. Liquid.
CM* Moly	M	4% Mo. Liquid.
CM Nitro-Boost*	M	35% N + 2-4% Mg, 1-3% Mn, 0-13% Cu. Liquid.
CM Perflor*	M	12-6-6 + 0.1% Mg, 0.1% Fe, 0.05% Mn, 0.02% B, 0.05% Cu, 0.05% Zn, 0.0005% Mo, 0.0005% Cu. Liquid.
CM Perflor* Boron	M	15% B. Liquid.
CM Plant Feed Mix 1*	M	0.25% Cu, 1% Fe, 1.4% Mg, 1.25% Mn, 1% Zn. Liquid.
CM Plant Feed Mix 4*	M	3% Fe, 2% Mn, 1% Zn. Liquid.
CM Plant Feed Mix 5*	M	1% Fe, 1% Mn, 4% Zn. Liquid.
CM Plant Feed Mix 6*	M	4.4% Mn, 1.5% Cu. Liquid.
CM Plant Feed Mix 7*	M	8-0-0 + 2% Mg, 1% Mn, 3.9% S. Liquid.
CM* 80% Sulphur	S	80% S. Powder
CM Super-Fer*	M	6% Fe EDDHA. Granular.
CM Superflor* Boron	M	21% B. Powder.
CM Yelder Mix 2*	M	8-0-0 + 2% Mn, 1% Mg. Liquid.
CM* Zinc	M	7% Zn. Liquid.
Superflor* Mn	M	31% Mn. Dry flowable.
	M	14% Zn EDTA. Powder.
Superflor Humi*	O	Humic acid. Concentrate.

Cominco Fertilizers (U.S.) Inc.

Elephant* Brand	F	Anhydrous ammonia.
	F	Ammonium nitrate.
	F	Ammonium sulfate
	M	Copper sulfate.
	F	Potassium chloride.
	F	Sulfuric acid.
	F	Urea.

Conklin Co., Inc.

Amplify-D*	F	2-10-0 seed nutrient from adenosine monophosphate. Also contains 1% Ca, 2% Fe, 0.5% Mn, and 2% Zn. Dry planter box treatment.
Feast*	F	9-18-9, 3-18-18, 16-4-4. Starters and foliar solutions.
	M	7.5% Cu EDTA fully chelated. Liquid.
	M	4.5% Fe HEDTA fully chelated. Liquid.
	M	6% Mn EDTA fully chelated. Liquid.
	M	9% Zn EDTA fully chelated. Liquid.
	S	3% Ca EDTA fully chelated. Liquid.
	S	2.5% Mg EDTA fully chelated. Liquid
	M	10% B solution.
Feast* Crop Mix	M	4% Zn, 1% Fe, 1% Mn EDTA, HEDTA fully chelated. Liquid.
Feast-XL*	F	26-0-0-0.5 B foliar solution.
Guardian*	F	66% N from dicyandiamide. Water soluble. Added to fluid, dry, nitrogen fertilizers, liquid manure.
Guardian-DL*	F	26% N from dicyandiamide. Water soluble. Added to suspensions, urea solutions. UAN and liquid manure.

Cornbelt Chemical Co.

Ammonia	F	12-0-0 + 26 S. Ammonium thiosulfate. Liquid.
Boron	M	Soluber powder. 14.3% B. Granulated. Borate 48%.
Corn Gro*	M	3.5% Zn, 0.6% Mn, 0.4% Cu EDTA fully chelated.
Cornbelt*	S	3% Ca EDTA fully chelated.
	M	7.5% Cu EDTA.
	M	5%, 4.5% Fe HEDTA.

F = Fertilizer S = Secondary A = Adjuvant C = Carrier O = Organic M = Micronutrient D = Deodorizer

Companies/Products

Company Trade Name/Material	Type	Description
	S	3% Mg EDTA fully chelated.
	M	5% Mn EDTA.
	M	9%, 6% Zn EDTA.
Soy Gro*	M	2.5% Mn, 1.5% Zn, 0.5% Fe, 0.5% Mg EDTA fully chelated.
Sulfur	S	90% S. Disintegrating granula, dispersible granule. Wettable powder.
Super Blend Plus*	M	3% Zn, 1% Fe, 1% Mn, 0.5% Cu EDTA fully chelated.
Super Iron Plus*	M	2.85% Fe, 0.6% Zn, 0.6% Mn, 0.4% Cu EDTA fully chelated.
CoRoN Corp.		
ArborFlo*	F	16-3-3. Liquid controlled release N with P & K for tree feeding.
CoRoN*	F	28-0-0. Liquid controlled release N.
CoRoN-Plus*	F	25-0-0-0.5 Fe. Liquid controlled release N with iron for turf.
	F	18-3-6-0.5 Fe. Liquid controlled release N with P, K & iron for turf.
	F	12-0-12. Liquid controlled release N with K for turf.
Folocron*	F	29-0-0. Liquid foliar controlled release N.
Folocron-Plus*	F	10-0-10. Liquid foliar controlled release N with potassium.
	F	15-0-5. Liquid foliar controlled release N with potassium.
	F	16-0-8. Liquid foliar controlled release N with potassium.
CoZinCo, Inc.		
CoZinCo*	M	35.5% Zn. Zinc sulfate. Granular.
	M	12% Zn. Liquid.
CoZinCo* SD36	M	35.5% Zn. Zinc sulfate. Powder.
CoZinCo Sales, Inc.		
CoZinCo*	M	31% Zn. Zinc sulfate. Granular.
Crystal Chemical Inter-America		
Kelaplex* Iron	M	11% Fe fully chelated. Soluble powder.
Kelaplex* Zinc	M	14% Zn fully chelated. Soluble powder.
Multi-Kelaplex*	M	4% Fe, 1.3% Zn, 1.2% Mn, 0.4% Cu, 0.1% Mo, 0.8% B fully chelated. Soluble powder.
Zinc	M	79% Zn for liquid fertilizer. Zinc oxide.
	M	75% Zn. Spray grade. Zinc oxide.
	M	72% Zn. Feed grade. Zinc oxide.
	M	36%, 20% Zn. Zinc sulfate. Water soluble powder.
	M	10%, 12% Zn. Zinc sulfate. Solution.
Zinc-Manganese Kelaplex*	M	6.0% Zn, 6.0 Mn fully chelated. Soluble powder.
Zinc Multi-Kelaplex*	M	3% Fe, 6.0% Zn, 1% Mn, 0.3% Cu, 0.1% Mo, 0.8% B.
Zinquel*	M	6.5% Zn, 4% S fully chelated. Liquid.
C.S.I. Chemical Corp.		
Nutri-Cal*	S	8% Ca chelated. For lawns, turf, fruit trees, and vegetables.
Promesol*	S	8% Ca chelate. Liquid.
Custom Chemicides		
Calgard*	S	Ca, S.
Charge*	F	8-32-5 + humic acid. Zn, Fe. Liquid.
Equalizer*	F	Foliar feed, soil applied, or starter for seed or transplant.
Mag-Four*	S	4% Mg, 5% S.
Navigator*	M	<i>Ascophyllum Nodosum</i> with minors.
N-Care* Calcium	S	12% Ca. For mixing with N solutions of urea or UAN solutions.
N-Care* Nitrogen	F	12% foliar applied nitrogen solution.
Nitro Zinc*	S	15% N, 5% Zn. Foliar or soil.
Nutra-Biz*	M	2% Zn, 1% Fe, 0.31% B.
Nutra-Boost*	F	11-8-5 Liquid.

* - Trade Name R/T/M

Company Trade Name/Material	Type	Description
Nutra-Burst*	F	Starter for seed or transplant.
Nutra-Feed 60*	F	20-20-20 Foliar.
Nutra-K*	F	0-0-27. Foliar or soil applied.
Nutra-Mip*	M	0-10-0 + Mn, Fe, phosphate +surfactants + buffering agents.
Nutra-Plus*	S	3% Ca chelate.
	S	6% Ca. Liquid.
	M	5% Cu. Liquid.
	M	7.5% Cu chelate.
	M	5% Fe chelate.
	M	5% Fe. Foliar and soil.
	M	0-8-0 + 3% Fe, 1% Zn. Buffer.
	S	2.5% Mg chelate.
	S	0-10-0 + 4% Mg. Buffer, acidifier.
	M	6% Mn chelate.
	M	7% Mn + 4% S. Deep irrigating, foliar and soil. Liquid.
	F	10% Potash, 1.5% Ca. Liquid.
	M	4% S, 2% Mn, 5% Zn. For citrus. Foliar.
	M	0-5-0 + 5% Zn, 2% Mn. Buffer.
	M	10-12-0 + 2% Zn. For field crops, vegetables, tree fruits and citrus.
	M	10-12-5 + 2% Zn. Buffer.
	M	5% Zn + 4% S. For citrus, field crops, vine and turf.
	M	5% Zn + 15% N. Foliar. For field, row, and vegetable crops.
	M	6%, 6.5%, 9% Zn chelate.
	M	5-18-5 + 2% Zn, 0.5% Fe. Buffer.
	M	8-8-4 + Zn, Fe, Mn, Mg, Cu, S. For citrus, deciduous fruits and grapes.
	M	5%, 6% Zn. For soil and foliar.
Nutra-Plus Concentrated Humate*	O	8%, 12%. Stimulates the uptake of nutrients.
Nutra-Plus Harvest Mix*	M	14-8-0. Liquid.
Nutra-Zim*	M	Zn, Fe, Mg. For citrus. Liquid and suspension.
Nutra Zinc*	M	7% Zn. Soil or foliar.
Surge*	F	Liquid humus, Fe, Zn.

Diachem S.p.A.		
Enerleaf 60*	F	20-20-20 + Cu, B, Fe, Zn, Mn, Mo chelate.
Fertigizer 55 + 2E*	F	3-16-36 + Mg, B, Cu, Fe, Mn, Mo, Zn chelate, 2% Energizer* (humic acid).
Nutrigizer 60 + 2E*	F	20-20-20 + B, Cu, Fe, Mn, Mo, Zn chelate + 2% Energizer* (humic acid).
Sequelane Combi E*	M	2.5% Mn, 2% Fe, 1.5% Zn, 0.5% Cu chelate + 3% Energizer* (humic acid).
Sequelane 5073E*	M	6% Fe OTPA, 3% humic acid.
Sequelane 77 E New*	M	6% Fe EDDHA, 5% humic acid.
Sequelane Fruttiferi*	M	0-0-10 + 5% Mg, 3% B, 3% Fe chelate +2% Energizer* (humic acid).

The Doggett Corp.		
Injecto Feed*	F	32-7-7, 12-24-24.
Natural Resource*	O	0-0-6 + 71.4% humate, 20.5% kelp extracts, 5% soluble fish meal, 2% Fe, 0.05% Mn, 0.05% Zn.
XL-310*	F	30-10-10.
XL-320*	F	20-20-20.
XL-550*	F	20-5-30.
XL-640*	F	16-32-16.

DowElanco		
N-Serve* 24, 24E	F	Nitrogen stabilizer.

DSM Chemicals North America		
Ammonium Sulfate	F	Standard + granular grades.

1 - Information not updated for 1995

Company	Trade Name/Material	Type	Description
Engelhard Corp.			
	Attaclay*	C	Carrier + conditioning agent.
	Attacote*	C	Conditioning agent.
	Attaflow* FL	A	Thickener. Liquid.
	Attaflow* SF	A	Thickener. Liquid.
	Attapel* 350	A	Suspension thickener + suspending aid.
	Attapel* 390	A	Suspension thickener + suspending aid.
	Attapulguis*	C	Carrier + conditioning agent.
	Kao-X*	C	Kaolin.
Enichem America, Inc. 1			
	Copper	M	23.5% Cu. Copper sulfate. Granular and powder.
	Foliarel*	M	21% B. Sodium octaborate.
Eurochem, S.A.			
	Amipron*	M	Amino acids.
	Euromix*	M	Glucoheptanates.
	Humipron* Extra-25	F	Humic acid.
	Quelapron*	M	Mn.
		M	Zn.
		M	Zn-Mn.
Faesly & Besthoff, Inc. 1			
	F & B*	O	7-2-0, 5-5-5. bone meal, cottonseed meal, dried blood, muriate of potash, nitrate of soda, ammonium sulfate, gypsum, iron sulfate, urea.
		F	Mixed fertilizers.
Farmland Industries, Inc.			
	Boron	M	14.3% Boron.
	Cal-Sul*	S	Calcium sulfate.
	Copper	M	17.5% Cu EDTA chelate. Liquid.
		M	25% Cu. Copper sulfate. Granular.
	Farmland*	M	Ammoniated Zn chloride, ammoniated Zn sulfate.
		F	10-50-0, 11-52-0, 16-20-0, 18-46-0 Ammonium phosphate.
		F	12-0-0 + 26% S. Ammonium thiosulfate. Liquid.
		F	Ammonium nitrate, ammonium sulfate, ammonium thiosulfate, anhydrous ammonia, DAP, MAP, muriated potash, nitrogen, wet process phosphoric acid, potassium chloride, potassium sulfate, potassium magnesium sulfate, sulfate of potash magnesia, wet process super-phosphoric acid, triple superphosphate, UAN solutions, urea, urea-ammonium nitrate.
	Iron	M	Iron oxysulfate.
		M	5% Fe HEDTA chelate. Liquid.
		M	25-30% Fe. Iron sulfate. Granular.
	Magnesium	F	Magnesium oxysulfate.
	Manganese	M	Manganese oxysulfate.
		M	Manganese sulfate Zn.
	Pei-lime*	S	Pelletized lime.
	Propell* Homogenized Plant Food	F	Ammonium phosphate sulfate 6-24-24, 8-32-16, 10-20-10 + 7% S, 10-30-5 + 6% S, 2% Zn, 12-24-12 + 6% S, 13-13-13 + 12% S, 14-28-4 + 9% S, 1% Zn, 16-10-8 + 15% S, Fe, Zn, Mn, 16-20-0 + 12% S, 16-20-6 + 12% S, 19-9-0 + 18% S.
	Quick Start*	F	Macro and secondary mixed liquids. Multiple grades.
	Sulfur	S	90% S. Water degradable. Granular.
	Zinc	M	10-20% Zn. Liquid.
		M	9% Zn chelate.
		M	20-35.5% Zn. Zinc sulfate. Granular.
Fertilizer Corp. of America			
	Balance* 15 B Granular	M	15% B. Granular.
	Balance* 15 B Powder	M	15% B. Powder.
	Balance* 20 CO SO ₄	M	20-21% Co. Water soluble crystals. Heptahydrate.
	Balance* 15 CU	M	15% Cu, 6% S. Granular.

Company	Trade Name/Material	Type	Description
	Balance* 50 FE	M	50% Fe, 5% S. Granular.
	Balance* 36 MG	M	36% Mg, 6% S. Granular.
	Balance* 28 MN	M	28% Mn, 5% S. Granular.
	Balance* 31 MN SO ₄	M	31% Mn, 18% S. Water soluble sulfate 2-4 mm prill.
	Balance* 18 ZN	M	18% Zn, 12% Fe, 1% Mn, 7% S. Granular blend.
	Balance* 36 ZN	M	36% Zn, 6% S. Granular.
	Balance* 36 ZN SO ₄	M	36% Zn, 17% S. Water soluble sulfate 2-4 mm prill.
	Calcium Nitrate	F	20% Ca, 15.5% N. 2-4mm Soluble granular.
	52% Flowable Sulfur	S	52% S. Flowable suspension.
	Liquid Boron	M	10% B. Liquid complexed.
	Microfol* Calcium	S	6% Ca. Liquid chelated.
	Microfol* Calcium Boron	S/M	6% Ca, 2% B. Liquid chelated.
	Microfol* Cobalt	M	4% Co, 4% Sulfur. Liquid chelated.
	Microfol* Copper	M	5% Cu, 4% S. Liquid chelated.
	Microfol* Iron	M	5% Fe, 4% S. Liquid chelated.
	Microfol* Magnesium	S	4% Mg, 5% S. Liquid chelated.
	Microfol* Manganese	M	7% Mn, 4% S. Liquid chelated.
	Microfol* Molybdenum	M	4% Mo. Liquid.
	Microfol* Tree Vine and Vegetable Mix	M	1% Fe, 1% Mg, 1% Mn, 4% S, 3% Zn. Liquid chelated.
	Microfol* Western Row Crop Mix	M	1% Fe, 1% Mn, 4% S, 4% Zn. Liquid chelated.
	Microfol* Zinc	M	7% Zn, 4% S. Liquid chelated.
		M	10% Zn, 5% S. Liquid chelated.
	Nutrifol* 5-17-2	F	5-17-2 + TE. Liquid foliar fertilizer.
	Nutrifol* 6-12-6	F	6-12-6 + TE. Liquid foliar fertilizer.
	Nutrifol* 14-8-2	F	14-8-2 + TE. Liquid foliar buffer.
	Nutrifol* K-Plus	F	27.7% K Plus humic acid. Liquid.
	Nutrimore* 10-55-10	F	10-55-10 + TE. Water soluble crystals.
	Nutrimore* 15-15-30	F	15-15-30 + TE. Water soluble crystals.
	Nutrimore* 15-30-15	F	15-30-15 + TE. Water soluble crystals.
	Nutrimore* 20-20-20	F	20-20-20 + TE. Water soluble crystals.
	Nutrimore* 30-10-10	F	30-10-10 + TE. Water soluble crystals.
Floidin Co.			
	Diluex*	C	Carrier + diluent. Granular and powder.
	Florex*	C	Carrier + diluent. Granular and powder.
	Florex Ag-Dri*	A	Drying agent. Granular.
	Min-U-Gel* 100	A	Suspending agent. For liquid fertilizers, fluid lime.
	Min-U-Gel* 200	A	Suspending agent. Powder for WDG.
	Min-U-Gel* 400	A	Suspending agent. For wet flowables.
Frit Industries			
	Borate* 32	M	10% B.
	Borate* 48	M	14.9% B.
	Copper	M	5% Cu citric acid EDTA chelate.
		M	5% Cu lignosulfonate complex.
		M	25% Cu. Copper sulfate. Granular and powder.
		M	50%, 70% Cu. Copper oxide. Powder.
	F-315G*	M	20% Cu CAC Chelate. 15% Cu. 15% Zn. oxide-sulfate. Granular.
	Iron	M	5% Fe citric acid-EDTA chelate.
		M	5% Fe lignosulfonate chelate.
		M	20% Fe CAC chelate.
		M	20-30% Fe. Iron sulfate. Granular and powder.
		M	20-50% Fe. Iron sulfate/iron oxide. Granular.
		M	40% Fe fritted. Powder and granular.
		M	56% Fe. Iron oxide. For fertilizer coloring.
	Manganese	M	5% Mn citric acid EDTA complex.
		M	5% Mn lignosulfonate complex.
		M	20% Mn CAC chelate.

F = Fertilizer S = Secondary A = Adjuvant C = Carrier O = Organic M = Micronutrient D = Deodorizer

Companies/Products

Company Trade Name/Material	Type	Description
	M	28% Mn. Manganese sulfate. Granular and powder.
	M	28%, 42%, 52% Mn. Manganese sulfate/manganous oxide. Granular.
	M	30-65% Mn. Manganous oxide. Granular and powder.
Nitra Zinc*	M	10% Zn, 10% N.
Soluble B-21	M	21% B.
Sulfate/Oxide	M	B, Fe, Zn, Cu, Mn, Mg.
Zinc	M	8% Zn citric acid-EDTA complex suspensions.
	M	9.6% Zn lignosulfonate complex suspensions.
	M	10% Zn.
	M	25% Zn CAC chelate.
	M	20% and 36% Zn. Zinc sulfate/zinc oxide. Granular.
	M	3% Zn. Zinc sulfate. Granular and powder.
	M	60% Zn, 80% Zn. Powder for suspensions.

Georgia-Pacific Corp. 1		
Insol-U25*	F	Urea-formaldehyde. Liquid concentrate.
Iron KE-MIN*	M	4.4% Fe. Liquid.
	M	11% Fe. Powder.
Multi KE-MIN*	M	1.6% Fe, 0.52% Zn, 0.48% Mn, 0.16% Cu, 0.04% Mo, 0.32% B. Liquid.
	M	4% Fe, 1.2% Mn, 0.4% Cu, 1.3% Zn, 0.08% B, 0.1% Mo. Powder.
Multi KE-MIN* Z	M	1.2% Fe, 2.4% Zn, 0.4% Mn, 0.1% Cu, 0.04% Mo. Liquid.
Resi-Grow*	F	Urea-formaldehyde. Water Suspension.
Sta-Form 60*	F	Urea-formaldehyde. Liquid concentrate.
Zinc KE-MIN*	M	14% Zn. Powder.
	M	5.6% Zn. Liquid.
Z-M-KE-MIN*	M	3.2% Zn, 1.6% Mn. Liquid.

Goodpasture, Inc. 1		
Sol-U-N*	S	28-0-0 + 5% S. Urea ammonium nitrate + ammonium thiosulfate.
	S	24-0-0 + 10% S. Urea ammonium nitrate + ammonium thiosulfate.
Sol-U-N* 28	F	Urea ammonium nitrate.
Sol-U-N* 32	F	Urea ammonium nitrate.
Sol-U-Phos*	F	10-34-0. Ammonium polyphosphate.
	F	3-9-9. Potash base. Liquid.
	F	2-6-12. Potash base. Liquid.
Sol-U-Spray*	F	Urea, furnace acid, caustic potash. Foliar. Liquid.
Thiovite*	S	12-0-0 + 26 S. Ammonium thiosulfate.

Grace-Sierra International B.V.		
Agriform*	F	Controlled release.
	F	Slow release tablets.
Agroblen*	F	Controlled release.
Agroblen* Tablet	F	Controlled release.
High N*	F	Controlled release.
Max Bac*	F	Controlled release nutrient package.
Micromax*	M	Micronutrient.
Once*	F	Controlled release.
Osmocote*	F	Controlled release.
Osmocote* Mini	F	Controlled release.
Osmocote* Nursery Mix	F	Controlled release.
Osmocote* Plus	F	Controlled release.
Osmocote* Plus Tablet	F	Controlled release.
Peters* Excel*	F	Water soluble.
Peters* Professional	F	Water soluble.
Sierrablen* Turfmix	F	Controlled release.
Sierratabs*	F	Slow release tablets.

Company Trade Name/Material	Type	Description
Great Salt Lake Minerals Corp.		
Boron	M	Boron products including liquid foliar.
Magnesium Chloride	S	Mg in brine and flake.
Potassium Sulfate	F	18% S. Granular, soluble, fine, industrial, and standard.
	F	52% K ₂ O. Granular, mini-granular, soluble fine, greens-grade, standard, and industrial.

Grow More Inc.		
	M	20-20-20 + 0.10% Fe, 0.05% Cu, 0.05% Mn, 0.05% Zn, 0.02% Bo, 0.0005% Mo.
	M	10-55-10 + 0.10% Fe, 0.05% Cu, 0.05% Mn, 0.05% Zn, 0.02% Bo, 0.0005% Mo.
	M	0-50-30 + 0.10% Fe, 0.05% Cu, 0.05% Mn, 0.05% Zn, 0.02% Bo, 0.0005% Mo.
	M	25-15-10 + 0.50% Mg, 2.00% S + 0.10% Fe, 0.05% Cu, 0.05% Mn, 0.05% Zn, 0.02% Bo, 0.0005% Mo.
	M	5-10-40 + 6.00% S + 0.10% Fe, 0.05% Cu, 0.05% Mn, 0.05% Zn, 0.02% Bo, 0.0005% Mo.
Fert-All* Bor Cal	M	1% B, 4% Ca. Foliar spray.
Fert-All* Boron	M	10% B.
Fert-All* Cal Mag	M	2.5% Nitrate, 2% Mg, 3% Ca. Foliar spray.
Fert-All* Foliage Booster	M	1.0% Fe, 0.10% Cu, 0.60% Mg, 0.60% Mn, 4.0% Zn, 4.0% S, 2.0% Potash, 5.0% Nitrate.
Fert-All* General Purpose	M	2.0% Fe, 0.16% Cu, 1.0% Mg, 0.50% Mn, 0.60% Zn, 0.03% B, 4.0% S, 0.04% Mo, 0.03% Co.
Fert-All* Nitro Cal Zinc	M	5% Nitrate, 3% Ca, 5% Zn. Foliar spray.
Fert-All* Nitro Zinc Plus	M	10% Zn. Foliar spray.
FERTAPLEX* 8-0-0	M	6.0% Fe, 8.0% S, 0.15% Mn, 0.05% Zn.
FERTAPLEX* PK 0-4-4	M	1.0% Mg, 5.0% Fe, 0.50% Mn, 0.50% Zn.
Grow More*	M	HEDTA. 4.5% Fe.
	M	EDTA. 5.0% Mn.
	M	EDTA. 6.0% Zn.
Nutra Sorb*	M	0-12-0 + 25% Zn. Slow absorption foliar spray.
	M	0-24-0 + 12% Zn, 22% Ca, 6% S. Slow absorption foliar spray.
	M	0-52-0 + 52% Zn. Slow absorption foliar spray.
	M	7-13-34 + 13% Zn. Slow absorption foliar spray.

Grupo Bioquimico Mexicano, S.A. de C.V.		
Foltron* Plus	F	10-20-5 + chelated micros. Liquid.
Humiplex* GS	O	50% humic acids. Soluble granular.
Humiplex* Plus	O	36% humic acids, 4% Fe, 2% Zn, 1% Mg, 0.5% Mn, 0.05% Cu, 0.05% B, 4.3% S. Powder.
Humiplex* Std	O	61% humic acids. Powder.
Humitron*	O	12% humic acids. Liquid.
Humitron* 60WP	O	60% humic acids. Wetttable powder.
K-Fol*	F	0-20-55 + 0.06% Mg, 0.08% S, 0.01% B, 0.0012% growth regulators. Crystals.
Poliquel* Ca	F	10% Ca, 1% Mg, 0.5% B, 10 ppm Mo. Liquid.
Poliquel* Fe	F	8% Fe. Multichelated. Liquid.
Poliquel* Multi	F	4% Zn, 3% Fe, 4% S, 1% Mg, 0.25% Mn, 0.04% Cu, 0.04% B, 0.005% Mo, 0.002% Co. Liquid.
Poliquel* Zn	F	8% Zn. Multichelated. Liquid.
Raizal*	F	9-45-11 + 0.6% Mg, 0.8% S, 400 ppm growth regulators.

Haifa Chemicals Ltd.		
K-Power*	F	Potassium nitrate. Soluble, prilled.
Magnisal*	F	Magnesium nitrate. Soluble, flaked.
Multicote*	F	Potash. Slow release.
	F	NPK. Slow release.
Phosphates	F	Monoammonium phosphate.
	F	Monopotassium phosphate.

Hampshire Chemical Corp.		
Hamp-ene*	M	3.0% Ca EDTA chelate. Solution.

(Continued)

* - Trade Name R/T/M

Company Trade Name/Material	Type	Description
	M	7.5% Cu EDTA chelate. Solution.
	M	14.5% Cu EDTA chelate. Powder.
	M	10.5% Cu EDTA chelate. Powder.
	M	13% Fe EDTA chelate. Powder.
	M	2.5% Mg EDTA chelate. Solution.
	M	6% Mn EDTA chelate. Solution.
	M	12% Mn EDTA chelate. Powder.
	M	6.5% Zn EDTA chelate. Solution.
	M	14% Zn EDTA chelate. Powder.
Hamp-ene*/Hamp-ol*	M	Fe, Zn, Mn, Cu EDTA or HEDTA chelate.
Hampex*	M	11% Fe DPTA chelate. Powder.
Hamp-Iron* 806	M	6% Fe EDDHA chelate. Powder.
Hamp-ol*	M	4.5% Fe HEDTA chelate. Solution.
	M	9% Fe HEDTA chelate. Powder.
	M	4.0% Mg HEDTA chelate. Powder.
Hampshire*	M	5% Fe EDTA/HEDTA on vermiculite. Granular.
Hampshire* K-Zinc	M	Zn EDTA chelate. Solution.
Hampshire* NTA Zinc	M	Zn NTA chelate. Solution.
Helena Chemical Co.		
Asset*	S	2% Mg, 20% N. Liquid.
Bayfolan Plus*	M	11-8-5 + micros. Liquid.
Helena*	F	Ammonium nitrate.
	F	Ammonium sulfate.
	F	Aqua ammonia.
	S	Calcium nitrate.
	F	Controlled release nitrogen.
	F	Controlled release nitrogen with boron.
	C	Dolomite 65.
	F	Lime.
	F	Muriate of potash.
	F	NPK.
	F	Urea.
Meister*	F	18-0-0 Ammonium sulfate (200 days).
	F	17-6-12 Citrus blend (9-12 months).
	F	14-14-14. 6-8 months.
	F	18-6-12. 6-8 months.
	F	20-4-11. 8-9 months.
	F	19-6-12. 8-9 months.
	F	0-0-52 Potassium chloride (100-270 days).
	F	0-0-43 Potassium sulfate (100-270 days).
	F	40-0-0 Urea (70-700 days).
	F	40-0-0 Urea (30-45 days delayed release).
	F	Various regional mixes (3-12 months).
Tracite*	M	6% Cu, 5% Fe, 4% Mg, 5% Mn, 7%, 9%, 10% Zn, 10% B complexed, chelated and elemental + flowable S. Liquid.
	M	2.5% Zn, 2% Fe, 2% Mn, 1.5% Mg. Liquid.
	M	20-20-20 + 7 micros.
	M	20-0-25.
Tracite* Crop Mix	M	1% Fe, 4% Mg, 1% Mn, 4% Zn complexed, chelated and elemental. Liquid.
Tracite* Hi-Phos	M	12-48-8 + 7 micros.
Tracite* ZFM	M	1.5% Fe, 1.5%, 3% Mn, 4.5% Zn. Liquid.
Tracite* ZFM Plus	M	2.5% Zn, 2% Fe, 2% Mn, 1.5% Mg. Liquid.
Tracite* ZM Special	M	3% Mn, 4.7% S, 5% Zn. Liquid.
Hickson Kerley, Inc.		
APS 600*	S	20-0-0-40 S. Ammonium polysulphide. Liquid.
Formolene-Plus*	F	30-0-0. Urea triazone. Liquid, 60% CRN.
Form-U-Sol*	F	30-0-0. Urea triazone. Liquid, 50% CRN.
KPS*	F	0-0-22 + 22% S. Potassium polysulphide. Liquid.

Company Trade Name/Material	Type	Description
KTS*	F	0-0-25 + 17% S. Potassium thiosulphate. Liquid.
NFE*	M	16-0-0-4 Fe. Liquid iron.
Nitro-Sul*	S	20-0-0 + 40% S. Ammonium polysulphide. Liquid.
NMG*	M	14-0-0-4 Mg. Liquid magnesium.
N-Sure*	F	28-0-0. Urea triazone. Liquid, 72% CRN.
NZN*	M	15-0-0-5 Zn. Liquid zinc.
Thio-Sul*	S	12-0-0 + 26% S. Ammonium thiosulfate. Liquid.
Trisert*	F	13-3-4. Urea triazone. Liquid, 72% CRN.
Trisert*-CB	F	26-0-0-0.5 B. Urea triazone + B. Liquid, 33% CRN.
Trisert*-KS	F	15-0-12-8 S. Urea triazone + K & S. Liquid, 60% CRN.
Trisert*-KSB	F	26-0-5-3 S-0.3 B. Urea triazone + K, S & B. Liquid, 33% CRN.

Horizon Ag-Products		
Agri-Plus*	O	70% Humic acids. Granular leonardite.
Fortify*	F	8-16-4 + 1.0% S, 0.10% Fe, 0.05% Mn, 0.05% Zn + fulvic acid.
Micro-Plus*	F	2.0% Fe, 1.0% Mn, 3.0% Zn + fulvic acid.
Product-F*	O	Fulvic acid extract. Liquid.
Product-H*	O	Humic acids extract. 6% Liquid.

J.M. Huber Corp., Calcium Carbonate Div.		
Calcium	C	38% Ca. Calcium carbonate.
Copper	M	75% Cu. Copper oxide.
	M	25.2% Cu. Copper sulfate.
Iron	M	30% Fe. Ferrous sulfate monohydrate.
	M	57% Fe. Red iron oxide.
Magnesium	M	54%, 58% Mg. Magnesium oxide.
	M	9.8% Mg. Magnesium sulfate.
Manganese	M	60% Mn. Manganous oxide.
	M	31.5% Mn. Manganese sulfate.
Sulfur	S	99% S. Granular.
Zinc	M	72% Zn. Zinc oxide.
	M	36% Zn. Zinc sulfate.

Humate International, Inc.		
Aqua-Root*	O	Humic acid + wetting agent. Granular, liquid, pellets.
Humate Ag*	O	Humic acid. Granular.
Humate As*	O	Humic acid. Soluble powder.
Humate As* Fe Chelate	M	Humic acid iron chelate. Soluble powder.
Humate Ls*	O	Humic acid. Soluble liquid.
Humate Ls* Fe Chelate	M	Humic acid iron chelate. Liquid.
Humate Ls* Fe/Mn Chelate	M	Humic acid iron/manganese chelate. Liquid.
Humate Ls* Zn Chelate	M	Humic acid zinc chelate. Liquid.
Humate Stress Reliever*	O	Humic acid biostimulant.
Perform* N-P-K	F	Liquid fertilizer with humic acid.
Perform* T.O.G.	M	Organic calcium chelate.

Humus Products of America, Inc.		
Greens & Turf*	M	0.5% Mg, 2.6% S, 2.5% Fe, 0.1% Mn, 0.005% Mo, 1.5% glucoheptonate chelate + humus. Liquid.
HA-16*	F	Cold process seaweed.
Humus	F	8-20-5 + humus. Liquid.
Humus 12%	O	12% Humic acids. Liquid concentrate.
Humus HUK-12 Herbispray*	A	12% Spray adjuvant.
Humus WDG-70*	O	70% Humic acids, water dispersible granules.
Humus WP-80*	O	80% Humic acids.
Iron	M	5% Fe glucoheptonate chelate + humus. Liquid.
Iron Sea Humus Liquid Concentrate	M	5% Fe, 2.5% seaweed, 2.6% S, 3.0% Fe glucoheptonate chelate.
Multi-mix*	M	1% Mn, 1.6% Zn, 2.6% S, 5.0% Fe glucoheptonate chelate + humus. Liquid.

F = Fertilizer S = Secondary A = Adjuvant C = Carrier O = Organic M = Micronutrient D = Deodorizer

Companies/Products

Company	Trade Name/Material	Type	Description
	Zinc	M	7% Zn glucoheptonate chelate + humus. Liquid.
Hydro Agri North America, Inc.			
	Enspan*	F	39% N. Sulfur coated urea.
	Hydroform*	F	38% N. Ureaform.
	Hydroiene*	F	40% N. Methylene urea.
	K-Power*	F	Potassium nitrate. Soluble and prilled.
	Meteor*	M	Zinc sulfate.
	PICC*	S	9.8% Mg. Epsom salts.
	Techmangam*	M	29.5% Mn. Manganese sulfate.
	Viking Ship*	F	17% Calcium ammonium nitrate. Solution.
		F	15.5-0-0 + 19% Ca. Calcium nitrate.
		F	9-0-0 + 11% Ca. Calcium nitrate. Solution.
		M	19%, 21% Fe. Iron sulfate heptahydrate.
		M	31% Fe monohydrate. Iron sulfate. Granular, powder.
		F	46% N. Urea.
		F	21% N. 24% S. Ammonium sulfate.
		F	Homogenous hydro prills. NPK + NP.
		F	NPK. Nitric phosphate. Homogenous hydro prills.
		F	12-61-0. Monoammonium phosphate. Soluble.
		F	50% Potash. Potassium sulfate.
		F	32% Urea ammonium nitrate solution.
		M	12% Zn. Zinc sulfate solution.
		M	26% Zn. Zinc sulfate-iron sulfate. Granular and powder.
		M	36% Zn spray dried. Zinc sulfate.
		M	52% Zn. Zinc sulfate, basic.
		F	18-46-0 Diammonium phosphate.
		F	11-52-0 Monoammonium phosphate.
		F	34% N. Ammonium nitrate.
		F	60% Potash. Muriate of potash.
		F	82% N. Anhydrous ammonia.
		F	0-52.2-34.5. Monopotassium phosphate.
IMC Global USA			
	IMC*	F	DAP.
		F	MAP.
		F	Muriate of potash.
		F	Phosphate rock.
		F	Phosphoric acid.
		F	Potassium sulfate.
		F	Triple superphosphoric acid.
	international*	F	NPK.
	Rainbow*	F	NPK + micros and secondary nutrients.
	Sul-Po-Mag* (S.P.M*)	F	22% K ₂ O, 11% Mg, 22% S. Potassium magnesium sulfate.
	Super Rainbow*	F	NPK + micros and secondary nutrients.
IMC-Agrico Co.			
	Agrico Sun*	F	Nitrogen.
	IMC-Agrico*	F	Urea.
		F	Phosphoric Acid.
		F	Phosphate Rock.
	Super N*	F	Nitrogen solutions.
	Super N* Plus	F	Nitrogen solutions.
	Super Starter*	F	18-46-0 DAP.
		F	11-52-0 MAP.
		F	0-46-0 TSP.
	Super U*	F	Urea.
Imperial Products, Inc.			
	IPI* Boron	M	14.3% B. Borax granular.
		M	14.9% B. Borax fine.
		M	17.5% B. Boric acid.

Company	Trade Name/Material	Type	Description
		M	20.5% B. Solubor*. Powder.
	IPI* Copper	M	15% Cu EDTA. Powder.
		M	25.2% Cu, 12.8% S. Copper sulfate. Granular, crystalline and powder.
	IPI* Iron	M	6% Fe EDDHA. Powder.
		M	11% Fe DTPA. Powder.
		M	13% Fe EDTA. Powder.
		M	20.8% Fe, 11.5% S. Ferrous sulfate heptahydrate. Crystalline.
		M	30% Fe, 19% S. Ferrous sulfate monohydrate. Granular and powder.
	IPI* Magnesium	S	9.8% Mg, 13% S. Magnesium sulfate heptahydrate. Crystalline.
	IPI* Manganese	M	13% Mn EDTA. Powder.
		M	32% Mn, 18% S. Manganese sulfate monohydrate. Granular, fine granular and powder.
	IPI* Molybdenum	M	39.7% Mo. Sodium molybdate dihydrate. Crystalline.
	IPI* Zinc	M	15% Zn EDTA. Powder.
		M	36% Zn, 18% S. Zinc sulfate monohydrate. Powder and granular.
		M	80% Zn. Zinc oxide. Wettable powder.
	Nu-Trex*	M	10% B. Solution.
		F	16-32-16. Soluble fertilizer.
		F	20-20-20 Soluble fertilizer.
		M	32% Mn. Manganese sulfate monohydrate.
		M	36% Zn. Zinc sulfate monohydrate.
International Humate Fertilizer Co.!			
	Agri-Hume*	F/O	70% Humic/fulvic acids + trace elements. Dry chipped.
	Aqua-H*	S	8% Humic, 1% fulvic + trace elements. Liquid solution.
	Aqua-H Plus N*	F	18-0-0, complexed in a humic/fulvic acid solution.
	Aqua-H-F*	C/O	2% Fulvic acid + trace elements. Liquid solution.
	Calcium-Plus*	F	13-0-0, 12.45% Ca truly solubilized, complexed in fulvic acid.
	Macro-Plus*	F	9-14-8, 0.22% Fe, 0.11% Mn, 0.11% Zn, 0.30% S complexed in a humic/fulvic acid solution.
	Macro-Plus iron*	M	12-0-0, 4% Fe, 1% Zn, 6% S, 0.5% Ca, 0.6% Mn complexed in a humic/fulvic acid solution.
	Macro-Plus Zinc*	M	12-0-0, 4% Zn, 1% Ca, 6% S, 1% Fe, 0.5% Mn complexed in a humic/fulvic acid solution.
J & J Agri-Products & Services, Inc.			
	Calphos*	S	0-18-0 + 17% Ca. Colloidal clay phosphate. Soil (dry).
	Guardian*	A	Adjuvant. Seed, soil, foliar (liquid).
	Hume/Bac*	M	10% Humate. Soil, foliar (liquid.)
	J & J Soil Conditioner*	A	Adjuvant/soil conditioner for better soil porosity and water movement. Soil, foliar (liquid).
	Manure/Maximizer*	D	Agricultural waste treatment deodorizer and decomposer. Pit, stalls (dry).
	Ni/Cal*	S	7-0-0 + 10% Ca, with carbon source. Seed, soil, foliar.
	Nitro/Max*	O	Biological soil and plant activator. Soil, seed, foliar activator (liquid).
	Solu/Carb*	M	Corn syrup concentrate. Soil, foliar (liquid).
JH Biotech, Inc.			
	Biomate*	M	Granular micronutrients + humic acids.
	Bioimin*	M	3% B. Liquid.
		S	7% Ca chelate. Liquid.
		M	4% Cu chelate. Liquid.
		M	5% Fe chelate. Liquid.
		S	3% Mg chelate. Liquid.
		M	5% Mn chelate. Liquid.
		M	7% Zn chelate. Liquid.
	Buffermin*	M	5-15-5 + 1% Fe, 1% Mg. Liquid.
		M	5-15-5 + 1% Fe, 1% Mn, 1% Zn. Liquid.

(Continued)

* - Trade Name R/T/M

1 - Information not updated for 1995

Company Trade Name/Material	Type	Description
	M	5-15-5 + 1% Fe, 2% Zn. Liquid.
	M	5-15-5 + 1.5% Mn, 1.5% Zn. Liquid.
Humax*	C	12% Humic acid. Liquid.
Nutri-Aid*	F	20-20-20 water soluble powder + micronutrients.
	F	10-45-10 water soluble powder + micronutrients.
	F	0-40-40 water soluble powder + micronutrients.
	F	25-0-25 water soluble powder + micronutrients.
	F	32-10-10 water soluble powder + micronutrients.
	F	12-0-45 water soluble powder + micronutrients.
	F	20-45-5 water soluble powder + micronutrients.
Nutrimin*	M	3% B. Liquid.
	S	5% Ca chelate. Liquid.
	M	4% Cu chelate. Liquid.
	M	5% Fe chelate. Liquid.
	S	3% Mg chelate. Liquid.
	M	5% Mn chelate. Liquid.
	M	5% Zn chelate. Liquid.
Promot*	O	Biological preparation.
Relax*	A	Adjuvant.
Synergizer*	F	0-10-20. Liquid.
	M	8-32-4 + Mn, Zn, Fe chelate + humic acid.

K & N. Efthymiadis S.A.

Ferr-O*	M	Fe, EDDHA powdered chelate.
Murtonik*	M	NPK + TE. Water soluble foliar spray. Powder.

Kalium Chemicals, Ltd.

Kalium*	F	62.3-62.5% K ₂ O. Standard, coarse, granular, and soluble grades.
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La Cornubia S.A.

MACC.N*	M	Copper sulfate. Snow and crystals.
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LaRoche Industries Inc.

LaRoche*	F	Ammonium nitrate. Prilled and granular.
	F	Ammonium polyphosphate. Suspension.
	F	Ammonium sulfate.
	F	Anhydrous ammonia.
	F	DAP.
	F	MAP.
	F	Nitrogen solutions.
	F	Potash.
	F	Triple superphosphate.
	F	Urea. Granular and prilled.
	F	Urea ammonium nitrate. Solution.

Lidochem, Inc.

Calcium Nitrate, Granular	F	15.5-0-0 19% Calcium. Highly soluble granular greenhouse grade.
Citric Acid, Anhydrous	A	Micronutrient chelating agent.
Copper Sulfate	S	Ag or fine crystals, fully soluble 25.2% copper.
Diammonium Phosphate, Granular	F	21-53-0. Water soluble technical grade.
Dipotassium Citrate, USP	A	pH buffering agent.
Dipotassium Phosphate	F	0-40-44. Highly soluble greenhouse grade.
Lidoquest* Calcium 9P	M	Calcium ethylenediaminetetraacetic acid. 9% Calcium powder.
Lidoquest* Disodium EDTA	A	Disodium ethylenediaminetetraacetic acid. Na ₂ powder chelating agent.
Lidoquest* EDTA Acid	A	Ethylenediaminetetraacetic acid. 99% Powder chelating agent.
Lidoquest* Iron 13P	M	Iron ethylenediaminetetraacetic acid. 13% Iron powder.
Lidoquest* Manganese 13P	M	Manganese ethylenediaminetetraacetic acid. 13% Manganese powder.

Company Trade Name/Material	Type	Description
Lidoquest* Tetrasodium EDTA	A	Tetrasodium ethylenediaminetetraacetic acid. Na ₄ powder chelating agent.
Lidoquest* Zinc 14P	M	Zinc ethylenediaminetetraacetic acid. 14% Zinc powder.
Magnesium sulfate	S	10% Magnesium. Fully soluble.
Monoammonium Phosphate, Granular	F	12-62-0. Water soluble technical grade.
Monopotassium Phosphate	F	0-52-34. Highly soluble greenhouse grade.
Potassium Nitrate, Granular	F	13-0-44. Highly soluble granular greenhouse grade.
Potassium Tripolyphosphate	F	Highly soluble technical grade.
Tetrapotassium Pyrophosphate Technical Grade	F	0-42-28. Highly soluble technical grade.
Trisodium Citrate, USP	A	pH buffering agent.
Zinc Sulfate	S	35% Zinc fully soluble.

LignoTech USA, Inc.

Keig FS*	A	Chelating agent. Foliar spray applications.
Lignosol*	A	Dispersant.
Maracarb*	F	Chelating agent. Foliar spray applications.
Marasperse*	A	Dispersant.
Norig*	M	Fe.
	M	Mn.
	M	Zn.

Lobeco Products, Inc.

Galoryl* AT 725	A	Internal additive for industrial grade ammonium nitrate (crystal modifier).
Galoryl ATH* Series	A	Oil-soluble conditioning agent for antidusting and anti-caking of NPK and ammonium nitrate.

Mammoth International Chemical Corp.

Energizer*	O	Humic acids. Water soluble. Liquid and powder.
Powergizer 45*	F	8-32-5 Humic acids. Foliar.
Powergizer 700*	M	Humic acids + micronutrients. Powdered seed treatment.
Powertrace* Iron	M	5% Fe + humic acids. Liquid.
Powertrace* Zinc	M	7% Zn + humic acids. Liquid.

Martin Marietta Magnesia Specialties Inc.

CropMag* 36	S	36% Mg, 6% S. Magnesium oxysulfate. For dry fertilizer blends. Granular.
CropMag* 58	S	Magnesium oxide. For dry fertilizer blends or granular manufactured fertilizers.
CropMag* 200	S	Magnesium oxide for liquid suspension fertilizer mixtures.
WKD*	C	Dolomitic liming material for soil nutrition and neutralization.

Martin Resources, Inc.

AS7*	S	Emulsified sulfur.
A-T*	F	12-0-0 + 26% S. Ammonium thiosulfate.
Disper-Sul* AG	M	90% S. Granular
	M	90% S. Pastille.
Disper-Sul* Iron	M	80% S, 5% Fe.
Disper-Sul* Manganese	M	80% S, 5% Mn.
Disper-Sul* Turf Grade	M	90% S. Pastille.
Martin*	F	10-34-0. Liquid.

Medina Agriculture Products Co., Inc.

Actina*	D	Biological activator for manure pits.
Bactagro*	F	Biological seed treatment for use in starter fertilizer or sprayed on seeds.
Hastagro*	F	6-12-6. Foliar and starter fertilizer, humic acid and biological activators.
Humate*	O	12% Humic acid. Liquid.

F = Fertilizer S = Secondary A = Adjuvant C = Carrier O = Organic M = Micronutrient D = Deodorizer

Companies/Products

Company	Trade Name/Material	Type	Description
Medina*	Plus	M	Mg, Fe, Zn + seaweed extracts + biological activator for soil microbes.
	Soil Activator	M	Mg, Fe, Zn + biological activator for soil microbes.
Mineral Research & Dev., Div. Chemicals Specialties Inc.			
Mineral Research*		S	11.2% Ca. Calcium nitrate. Liquid.
		S	17% Ca. Calcium nitrate. Flake.
		M	8% Cu. Copper ammonia. Liquid.
		M	14% Cu. Copper nitrate. Liquid.
		M	7% Fe. Ferric nitrate.
		M	15% Mn. Manganese nitrate. Liquid.
		M	16.8% Mn. Manganous chloride. Liquid.
		S	6.3% Mg. Magnesium nitrate. Liquid.
		S	7.7% Mg. Magnesium chloride. Liquid.
		S	9.5% Mg. Magnesium nitrate. Flakes.
		M	Zn, Cu, Mn, Mg. Liquid.
		M	7.5% Zn. Zinc semi-chelate. Liquid.
		M	10% Zn. Zinc ammonia base. Liquid.
		M	17% Zn. Zinc nitrate. Liquid.
		M	23% Zn. Zinc nitrate. Flakes.
		M	24, 28, and 31% Zn. Zinc chloride. Liquid.
		M	46.6% Zn, 80% solids. Zinc carbonate. Dustless.
		M	47.49% Zn. Zinc chloride anhydrous.
		M	58% Zn. Zinc carbonate, dry.
		M	Zn, Mn, Mg, Fe. Foliar micronutrient with nitrogen.
	M	Zn, Mn. Foliar micronutrient with nitrogen.	
	M	Zn, B. Foliar micronutrient with nitrogen.	
Mississippi Chemical Corp.			
Amtrate*		F	Ammonium nitrate.
MCC*		F	Anhydrous ammonia.
		F	Ammonium nitrate.
		F	Urea.
		F	Nitrogen solutions.
		F	Potash. Granular.
N-Sol*		F	Nitrogen solutions.
Monterey Chemical Co.			
Blu-Min*		M	12% Fe, 1% Mn, 7% S. Granular.
Borate-48*		M	14.9% B. Fine crystals.
Borate Granular-46*		M	14.3% B. Granular.
Boro-Cal*		M	5% B, 3% Ca.
		S	1% B, 4% Ca lignosulfonate complex. Liquid.
Boron 48*		M	14.9% B. Granular.
Boron 68*		M	21.2% B. Granular.
Boro-Sol*		M	5% B lignosulfonate complex. Liquid.
Cal-Mag*		S	2% N, 3% Ca, 2% Mg lignosulfonate complex. Liquid.
Cal-Zin*		M	3% N, 5% Ca, 2.5% Zn lignosulfonate complex. Liquid.
CMR*		F	0-8-0. Liquid.
		F	10-12-0. Liquid.
Granusol*		M	40% Mn. Granular.
Hamp-Ene* 100		M	38% Sodium EDTA chelate. Liquid.
Hamp-Ene* Calcium		S	3% Ca EDTA chelate. Liquid.
Hamp-Ene* Copper		M	7.5% Cu EDTA chelate. Liquid.
		M	9.6% Cu EDTA chelate. Liquid.
		M	14.5% Cu EDTA chelate. Powder.
Hamp-Ene* Iron		M	8% Fe chelate on vermiculite.
		M	14% Fe chelate.
Hamp-Ene* Magnesium		S	2.5% Mg EDTA chelate. Liquid.
Hamp-Ene* Manganese		M	5% Mn chelate. Liquid.
		M	6% Mn EDTA chelate. Liquid.

Company	Trade Name/Material	Type	Description
		M	12% Mn EDTA chelate. Powder.
Hamp-Ene* Zinc		M	6% Zn EDTA chelate. Liquid.
		M	6.5% Zn EDTA chelate. Liquid.
		M	14% Zn EDTA chelate. Powder.
Hamp-Ex* Iron		M	11% Fe DTPA chelate. Powder.
Hamp-OI* 120		M	HEDTA chelating agent. Liquid.
Hamp-OI* Copper		M	9% Cu chelate.
Hamp-OI* Iron		M	4.5% Fe HEDTA chelate. Liquid.
		M	5% Fe. Liquid.
		M	9% Fe HEDTA. Powder.
Hamp-OI* Magnesium		S	4% Mg HEDTA chelate. Powder.
Hamp-OI* Manganese		M	9% Mn chelate.
Hampshire*		M	4-1-1 + Zn, Fe, Mn EDTA/HEDTA chelate. Liquid.
Hampshire* Iron		M	5% Fe EDTA chelate on vermiculite. Granular.
Hampshire* K-Zinc		M	8.4% Zn EDTA chelate. Liquid.
Hampshire* Zinc		M	6% Zn NTA chelate. Liquid.
		M	9.6% Zn NTA. Liquid.
Maxi-Bor*		M	20% B.
Maxi-K*		F	2-12-30 + humic acid. Water soluble.
Maximo*		M	75%, 80% Zn. Zinc oxide.
Maxi-Phos*		M	7-50-7 + 0.05% B, 0.05% Cu, 0.1% Fe, 0.1% Mn, 0.001% Mo; 2.2% S, 0.25% Zn, humic acid.
Maxi-Pk*		M	4-24-30 + humic acids. Water soluble.
Maxi-Yield*		M	12-8-30 + humic acids. Water soluble.
Maxi-Yield Plus*		M	12-8-30 + humic acids. Water soluble.
Monterey*		F	17-17-17 + 0.1% Cu, 0.3% Fe, 0.2% Mn, 6.5% S, 1.0% Zn, 1% humic acid. Water soluble.
Monterey* Boron		M	3.1%, 10% B.
Monterey* Calcium		S	6% Ca, 4% N lignosulfonate complex. Liquid.
		S	34.5% Ca. Calcium chloride. Flake and granular.
Monterey* Cal-Nite		S	7% N, 11% Ca. Liquid.
Monterey* CC Mix		M	1.4% Mg, 3.5% S, 0.1% Cu, 2% Fe, 2% Mn, 0.05% Mo, 1% Zn. Liquid.
Monterey* CCT & V Mix		M	2.25% S, 2% Cu, 1.5% Fe, 0.5% Mn, 0.05% Mo, 2.5% Zn. Liquid.
Monterey* Citrus Mix 2		M	4% S, 2% Mn, 5% Zn. Liquid.
Monterey* Cobalt		M	21% Co. Cobalt sulfate. Soluble powder. Crystals.
		M	45.4% Co. Cobalt carbonate. Soluble powder.
Monterey* Copper		M	5% Cu. Liquid.
		M	5% Cu EDTA-citric acid.
		M	5% Cu lignosulfonate complex.
		M	25% Cu. Copper sulfate.
		M	25% Cu lignosulfonate complex. Copper sulfate.
		M	53% Cu. Basic copper.
		M	53% Cu. Basic copper sulfate.
		M	75% Cu. Copper oxide. Suspensible powder.
Monterey* Copper/Zinc		M	10.5% Cu, 24.5% Zn.
		M	25% Cu, 25% Zn.
Monterey* Crop Mix		M	1% Fe, 1% Mg, 1% Mn, 4% S, 3% Zn. Liquid.
Monterey* Desert Crop Mix		M	Lignosulfonate complex.
Monterey* Field Crop Mix		M	1% Fe, 1% Mn, 4% S, 4% Zn lignosulfonate complex. Liquid.
Monterey* HA-12		O	12% Humic acid. Liquid.
Monterey* HA-60FG		O	60% Humic acid. Fine granular.
Monterey* HA-60G		O	60% Humic acid. Granular.
Monterey* HA-55WD		O	55% Humic acid. Water dispersible powder.
Monterey* HA-70WS		O	70% Humic acid. Water soluble powder.

(Continued)

* - Trade Name R/T/M

- 1 - Information not updated for 1995

Monterey Chemical Co. (cont.)

Company	Trade Name/Material	Type	Description
Monterey*	Hawaiian Mix	M	1% Mg, 2.5% S, 0.15% Cu, 1.5% Fe, 0.45% Mn, 0.05% Mo, 0.5% Zn, 0.35% B, 0.03% Co. Liquid.
Monterey*	Hi-Phos	M	8-32-7 + 0.1% Fe, 0.2% Zn, humic acid. Liquid.
Monterey*	Hi-PK	F	0-21-28 + humic acid.
Monterey*	Iron	M	5% Fe lignosulfonate complex. Liquid.
		M	20% Fe. Soluble ferrous sulfate heptahydrate. Crystals.
		M	20.4% Fe. Insoluble ferric sulfate heptahydrate. Powder.
		M	30% Fe. Soluble ferrous sulfate monohydrate. Powder.
		M	31% Fe. Ferrous sulfate monohydrate. Granular.
Monterey*	Lime	S	90% Calcium hydroxide. Hydrated lime. Powder.
Monterey*	Magnesium	S	4% Mg lignosulfonate complex. Liquid.
		S	9.8% Mg. Magnesium sulfate. Soluble crystals.
Monterey*	Mag-Nite	M	7% N, 6.31% Mg. Liquid.
Monterey*	Manganese	M	6% Mn EDTA citric acid.
		M	6% Mn lignin.
		M	7% Mn lignosulfonate complex. Liquid.
		M	28% Mn. Manganese sulfate. Soluble powder.
		M	31% Mn. Manganese sulfate. Soluble powder.
		M	45% Mn. Manganese oxide.
		M	60% Mn. Manganous oxide. Powder.
Monterey*	Mix	M	3% S, 18.5% Zn, 7% Mn.
		M	3.5% S, 2% Fe, 2% Mn, 3% Zn.
		M	22% Zn, 10% Fe.
		M	52% Zn. Zinc oxysulfate. Powder.
Monterey*	Molybdenum	M	5% Mo lignosulfonate complex. Liquid.
		M	39.5% Mo. Sodium molybdate. Soluble crystals.
Monterey*	Tree & Vine Mix	M	0.5% B, 0.2% Cu, 1.5% Fe, 0.5% Mn, 0.05% Mo, 2.25% S, 2.5% Zn lignosulfonate complex. Liquid.
Monterey*	Turf	M	4% N, 4% Fe, 0.5% Mg, 0.5% Mn, 3% S, 0.5% Zn. Ornamental lignosulfonate complex. Liquid.
Monterey*	Zinc	M	6.5% Zn, 9.6% Zn NTA chelate. Liquid.
		M	7%, 10% Zn lignosulfonate complex. Liquid.
		M	72%, 75% Zn. Zinc oxide. Suspendable powder.
		M	6% Zn EDTA citric acid.
		M	12% Zn. Zinc sulfate. Liquid.
		M	31% Zn. Zinc sulfate. Granular.
		M	36% Zn. Zinc sulfate. Spray-dried powder or granular.
Monterey*	Zinc-All	M	7.5% Zn citrate chelate. Liquid.
Monterey*	ZNM	M	4% S, 1% Fe, 1% Mg, 4% Zn + humic acid. Water dispersible.
No Foam*		F	0-16-9. Liquid.
N.T.A. Zinc*		M	13% Zn. Granules.
Nutrient Buffer*		F	11-4-6. Liquid.
P-30*		M	0-30-0 + 11% Ca, 2.5% Mn, 2.5% S, 15% Zn + 1% humic acid. Water dispersible powder.
Semi-Tropic Mix*		M	Lignosulfonate complex.
Sequestar*		M	6% Fe EDDHA chelate. Water dispersible granule.
Solubor*		M	6.2% B.
		M	20.5% B. Powder.
Sulfia 6#*		S	Sulfur. Flowable.
Super Blu-Min*		M	17% S, 9% Fe, 20% Zn.
ULB Urea*		M	20% Zn + ultra-low biuret urea.
ZNM*		M	4-0-0 + 10% Mn, 6% S, 30% Zn + humic acids. Water dispersible powder.
Moyer & Son, Inc. 1			
Green Gro*		F	Custom blended dry fertilizers.
Microflo*		M	5% Fe, 3% S chelated liquid micronutrient.
Turflo*		F	Custom blended liquid fertilizers.

FERTILIZER DICTIONARY / SECTION 3

Companies/Products

Company	Trade Name/Material	Type	Description
Na-Churs Plant Food Co.			
	Double-OK*	F	0-0-30. Liquid.
	NaChurs*	F	9-18-9, 3-18-18, 10-10-10, 15-3-3, 15-5-5, 16-2-2, 16-4-4, 8-16-8, 9-18-9-1, 3-18-18-1. Liquid.
National Magnesia Chemicals			
	Nutri-Mag*	S	58% Mg. Magnesium oxide. For liquid and dry fertilizer. Powdered and granular.
N.R. Consa, S.A. de C.V.			
	N.R. Ca*	S	97% Calcium hydroxide hydrated lime. Powder.
	N.R. Ca Mg*	S	55%-65% Calcium hydroxide, 35-45% magnesium hydroxide. Powder.
	N.R. Calcium*	S	90% Calcium carbonate. Powder.
	N.R. Dolomite*	F	40%-45% Magnesium carbonate, 55%-60% calcium carbonate.
	Phyto-Plus*	S	5% Ca chelates. Liquid.
		M	5% Cu chelates. Liquid.
		M	5% Fe chelates. Liquid.
		S	5% Mg chelates. Liquid.
		M	5% Zn chelates. Liquid.
		M	3% B complex. Liquid.
		S	15% Ca complex. Liquid.
		M	3% Co complex. Liquid.
		M	5% Cu complex. Liquid.
		S	5% Mg complex. Liquid.
		M	10% Mn complex. Liquid.
		M	3% Mo complex. Liquid.
		M	14% Zn complex. Liquid.
	Phyto-Plus Alfalfa Mix*	F	5% N, 5% P, 0.3% Mo, 0.3% Co, 0.5% Cu, 5% K, 1% Fe chelates complexes. Liquid.
	Phyto-Plus Combo Chelate*	F	5% Fe, 1% Mn, 0.5% B, 1% N, 2% K, 1% Zn, 0.5% Cu chelates complexes. Liquid.
	Phyto-Plus Complete*	F	5% N, 10% P, 5% K, 1% Fe, 1% Mo, 0.5% S, 0.25% Ca, 0.1% Cu, 0.1% Zn, 0.15% B, 0.5% Mn, 20% organic base chelates complexes. Liquid.
	Phyto-Plus Continuum Nutra Gel*	F	Acrylamide copolymer which has all 13 essential macro and micronutrients. Granular.
	Phyto-Plus Gene's Green*	F	21% N, 3% K, 3% P, 1% Fe chelates complexes. Liquid.
	Phyto-Plus Lucky 7, 7, 24-7*	F	7% N, 7% K, 0.07% Mn, 0.04% Cu, 27% P, 0.7% Fe, 0.07% Zn, 5% organic chelates complexes. Liquid.
	Phyto-Plus Wheatrix*	F	5% N, 5% P, 5% K, 1% Fe, 0.5% Cu chelates complexes. Liquid.
Nutrient Technologies, Inc.			
	Tech-Flo* Alpha	M	0-10-0 + 5% Zn, 8% Ca. Flowable.
	Tech-Flo* Beta	M	0-6-0 + 6.5% Zn, 6.5% Mn. Flowable.
	Tech-Flo* Cal-Bor	M	10% Ca, 8% S, 1% B. Flowable.
	Tech-Flo* Cal-Bor+Moly	M	10% Ca, 8% S, 1% B, 0.5% Mo. Flowable.
	Tech-Flo* Copocal*	M	0-14-0 + 7.5% Ca, 5% Cu. Flowable.
	Tech-Flo* Gamma	S	0-10-0 + 5% Mg, 4% Ca. Flowable.
	Tech-Flo* Hi-Mag	S	20% Mg. Flowable.
	Tech-Flo* Phi	M	2-4-0 + 5% Fe. Flowable.
	Tech-Flo* Sigma	M	3-6-14 + 5% Zn. Flowable.
	Tech-Flo* Zeta	M	22% Zn. Flowable.
	Tech-Flo* ZMC	M	0-5-0 + 5% Zn, 5% Mn, 2.5% Cu. Flowable.
	Tech-Spray* Cobalt	M	2-6-2 + 0.25% Co. Liquid.
	Tech-Spray* Copper	M	0-10-0 + 5% Cu. Liquid.
	Tech-Spray* Hi-K	F	0-26-28. Liquid.
	Tech-Spray* IZP	M	0-8-0 + 1% Zn, 3% Fe. Liquid.
	Tech-Spray* Liquibor*	M	2.5% B. Liquid.
	Tech-Spray* MG	M	0-12-0 + 1% Zn, 3% Mg. Liquid.
	Tech-Spray* Moly-Mag	M	6-0-0 + 0.5% Mg, 1% Mo. Liquid.

F = Fertilizer S = Secondary A = Adjuvant C = Carrier O = Organic M = Micronutrient D = Deodorizer

Companies/Products

Company	Trade Name/Material	Type	Description
	Tech-Spray* PZn	M	0-25-0 + 5% Zn. Liquid.
	Tech-Spray* ZnPK	M	0-6-19 + 1% Zn. Liquid.
Old Bridge Chemicals, Inc.			
	Copper	M	53% Cu. Basic copper sulfate.
		M	25.2% minimum Cu. Copper sulfate.
		M	6.25% Cu. Copper sulfate. Solution.
	Zinc	M	30% Zn. Zinc chloride. Solution.
		M	13% Zn. Zinc sulfate. Solution.
PCS Sales			
	Potash	F	Potash. All grades.
Pfizer, Inc.¹			
	Fert Lime* Ag Stone	F	Limestone.
Phelps Dodge Refining Corp.			
	Triangle*	M	25.2% Cu. Copper sulfate.
Plant Health Technologies, Crop Protection Products			
	2-26-26	F	With micronutrients. Soluble concentrate.
	Folo K Plus*	M	12-5-40. 40% Potash + trace elements. Soluble.
	Folo Spray*	F	16-32-16. Foliar for vegetables, field crops, fruit and nut trees and grapes.
		F	20-20-20. Foliar for vegetable, fruit and field crops. Soluble concentrate.
		F	10-45-10. Foliar for vegetable, fruit and field crops. Water soluble concentrate.
		M	4% Zn, 2% Fe, 2% Mn. Foliar for most trees, vines, field crops, turf and ornamentals.
	Folo Spray Che-Cop*	M	7.5% Cu EDTA chelate. Liquid.
	Folo Spray Che-Man*	M	6% Mn EDTA chelate. Liquid.
	Folo Spray Che-Zinc*	M	9% Zn chelate. Liquid.
		M	6% Zn EDTA. Liquid.
	Folo Spray Neutral Zinc*	M	52% Zn. For fruits, nuts and grapes. Slowly soluble (micronized).
	Folo Spray Nutra Wet*	M	NPK + 20% Zn.
	Folo ZnK*	M	14-0-22 + 15% Zn, 2% Mn. For orchards and vineyards.
	Nutrient Buffer*	F	0-8-0.
		M	0-8-0 + 3% Fe, 1% Zn.
		M	10-12-0 + 1% Zn.
	Zn-B	F	24-2-6. 5% S, 10% Zn. Hops, apples and pears.
	Long* 4F	F	31-0-0. Slow-release nitrogen. Liquid.
PQ Corp.			
	PQ* Epsom Salt	S	Magnesium sulfate. Agricultural, technical and USP grade for foliar fertilizer. Crystals.
Prince Agri Products			
	Copper	M	25.2% Cu. Copper sulfate.
		M	75% Cu. Copper oxide.
	Dical*	F	21%, 18.5% and 18% Phosphates.
	Dyna K*	F	Potassium chloride.
	DynaMate*	F	Potassium magnesium sulfate.
	Gypsum	S	Calcium sulfate.
	Iron	M	20.8%, 30% Fe. Iron sulfate.
		M	Iron oxide. For coloring.
	K-S*	F	Potassium sulfate.
	Magnesium Oxide	M	54%, 58% Mg. Magnesium oxide.
	Magnesium Sulfate	M	9.8%, 19.5% Mg. Magnesium sulfate.
	Manganese	M	29.5% Mn. Manganese sulfate. Granular and powder.
		M	60%, 62% Mn. Manganous oxide.
	Molybdenum	M	39% Mo. Sodium molybdate.
	Sulfur	S	99% S. Granular and powder.
	Zinc	M	36% Zn. Zinc sulfate. Granular and powder.
		M	72% Zn. Zinc oxide.

Company	Trade Name/Material	Type	Description
Probette, S.A.			
	A-Miscur*	M	11-4-7 + amino acids + micros.
	A-Miscur* Ca L.S.	M/S	Ca (CaO) 11.5% + Amino acids 9% P/P.
	Boro Probette* L.S.	M	B Salt monoethanolamine 10%PV.
	Calcipron* L.S.	S	Ca (CaO) 10.5% + Az polyhydroxycarboxylic 21% P/P.
	Fitopron* L.S.	S	Potassium phosphite 70% P/V.
	Hioromix Proan* L.S.	M	Fe, Mn, Cu, Zn Glucoheptanates chelate.
	Sinergipron* 20	O	Humic + fulvic acids. Liquid.
	Sinergipron* Complex	O	Humic + fulvic acids + micros. Liquid.
	Sinergipron* Fe-3-20	M	Fe EDDHA chelate + humic. Liquid.
	Sinergipron* Fe-6	M	Fe DTPA Chelated.
	Sinergipron* Fe-6 M.S.	M	Fe EDDHA Chelate. Soluble microgranules.
Product Formulations, Inc.			
	Boron Plus*	F	0-0-0 Organically complexed foliar boron. 5.0% B. Liquid.
	Enhance*	F	3-20-0 Organically complexed foliar fertilizer. 0.55% Cu, 1.08% Zn, 12.6% PGR-IV plant growth regulator. Liquid.
	Fulvore*	O	Complexing agent.
	Gro-Coat*	M	Seed treatment (hopper box). Dry.
	Nutri-Lease*	O	21-0-0 Soil amendment 1% S, 0.4% C, 0.4% Fe, 0.8% Zn. Liquid.
	Perk*	F	4-22-0 Organically complexed foliar fertilizer. 1.0% S, 0.6% Cu, 1.2% Zn. Liquid.
	Perk Plus*	F	3-18-0 Organically complexed foliar fertilizer. 1.5% S, 0.7% Cu, 0.26% Fe, 0.22% Mn, 1.5% Zn. Liquid.
	Perk + Moly*	F	3-17-0 Organically complexed foliar fertilizer. 1.35% S, 0.62% Cu, 0.23% Fe, 0.20% Mn, 0.55% Mo, 1.3% Zn. Liquid.
	Plexal*	A	Adjuvant. Liquid.
	Replenish*	O	21-0-0 Soil amendment 1% S, 0.4% C, 0.4% Fe, 0.8% Zn. Liquid.
	Thrust*	C	0-0-0 Organically complexed foliar carrier for herbicides. 2.0% Zn. Liquid.
	Turftouch*	F	0-0-0 Organically complexed sod/turf stimulant. 1.40% Mg, 3.00% S, 0.03%B, 0.50% Cu, 0.50% Fe, 2.00% Mn, 0.70% Zn. Liquid.
	Vantage*	A	Penetrating agent. Liquid.
PRO•SOL			
	CAC*	M	Chelated micronutrients, single element or mixtures.
	Calfix*	S	Liquid calcium for foliar application.
	III Iron*	M	10% Fe in 0.5 oz. water soluble sachet. EDDHA, DTPA, EDTA.
	PROMAX*	F/M	Nutrient mixture for growing media.
	PRO•SOL Tobacco Transplant*	F	10-52-8. Additive for tobacco transplant solution.
	Sul-15 Plus*	S	Water soluble sulfur for foliar application.
	Water Soluble Fertilizers*	F	Over 300 different NPK + micronutrient formulations.
PureGro Co.¹			
	Leaf Life*	M	6% Mn EDTA chelate. Liquid.
		M	Manganese sulfate. Liquid.
		M	7% Mn complex. Liquid.
		M	9% Zn EDTA chelate. Liquid.
		M	10% Zn complex. Liquid.
		M	9% Zinc sulfate. Liquid.
	Leaf Life 3*	M	10-12-0 + 2% Zn, 1% Mn. Liquid.
	Leaf Life 7*	M	6% N, 3% Zn, 1% Fe, 1% Mn. Liquid.
	Leaf Life 8*	M	0-13-17 + 1% Zn, 0.5% Mn. Liquid.
	Leaf Life* Boron	M	0-4-6 + 1% Zn, 1.1% B. Liquid.
	Leaf Life* Citrus	M	5% Zn, 4% S, 2% Mn lignosulfonates. Foliar.

(Continued)

* - Trade Name R/T/M

1 - Information not updated for 1995

Company	Trade Name/Material	Type	Description
	Leaf Life* Heads-Up	M	5% N, 5% Ca, 2.5% Zn.
	Leaf Life* Magnesium	M	5% N, 4% Mg, 1% Zn, 5.3% S. Liquid.
	Leaf Life* Powergizer 45	M	8-32-5 + 1% Zn, 0.05% Zn.
	Leaf Life* Super Zinc 10	M	10% N, 10% Zn. Liquid.
	Nutri-Comp*	M	11-8-5 + 0.5% Zn, 0.05% Cu, 0.1% Fe, 0.05% Mn, 0.02% B, 0.0005% Co, 0.0005% Mo.
	Super Sol-Nutri Boost*	M	22-9-18 + 4.4% S, 0.02% B, 0.05% Cu, 0.1% Fe, 0.05% Mn, 0.0005% Mo, 0.05% Zn.
	Super Sol-U* 60	M	20-20-20 + 0.5% Zn.
	Super Sol-U* K	M	12-8-30 + 4% Zn.
	Super Sol-U* Phos	M	12-46-4 + 2.75% S, 3% Zn.

Purseil Industries, Inc.

	Greenskote*	F	Greens fertilizers. Controlled release. Granular.
	POLYON*	F	Polymer coated fertilizers. Controlled release. Granular.
	TriKote*	F	Polymer enhanced sulfur coated urea (SCU). Controlled release. Granular.

QC Corp.

	Iron	M	20% Fe heptahydrate. Iron sulfate.
		M	30% Fe monohydrate. Iron sulfate. Granular and powder.
		M	5.5% Fe liquid ferrous sulfate.

R.G.B. Laboratories, Inc.

	Agri-Plex* Ca	S	PK + 20% Ca chelate. Powder.
	Agri-Plex* Fe	M	8% Fe chelate. Liquid.
		M	20% Fe chelate. Powder.
	Agri-Plex For-X*	M	PK + 2% Mg, 5% Fe, 0.5% Mn, 0.5% Zn, 0.02% B, 3% S chelate. Liquid.
	Lawn-Plex*	M	8% Fe, 8% S chelate. Liquid.
	Solu-Plex*	M	4% N, 13% S, 15% Fe. Dry soluble, foliar.

Rhône-Poulenc Chemicals Ltd.

	Ferriplus*	M	Fe EDDHMA chelate. For calcareous soils.
	Nervanaid*	M	12.7% Fe EDTA.
		M	Zn, Mn, Fe, Cu, Mg, Ca, Co chelate.

Ruffin Micronutrients

	Ruffin Redy*	S	Ca.
		M	5% Cu. Liquid.
		M	5% Fe. Liquid.
		S	4% Mg. Liquid.
		M	5% Mn. Liquid.
		M	10% Zn. Liquid.
	Ruffin Tuff*	S	Ca.
		M	5% Cu. Granular and liquid.
		M	7% Cu. Powder.
		M	10% Fe. Granular.
		M	11% Fe. Powder.
		M	5% Fe. Liquid.
		S	4% Mg. Granular.
		M	5% Mn liquid, 8% Mn granular, 10% Mn powder.
		M	15% N, 6% Fe. For turf.
		M	6% N, 6% Fe, 2% N. For turf.
		M	14% Zn. Powder.
		M	10% Zn. Granular and liquid.
		M	10% N, 4% S, 10% Zn. For foliar spray. Pecans.
		F	5% N, 22% P, 3.0% S, 2.0% Fe, 1.0% Mn, 1.0% Zn. Foliar spray.
		M	6% N, 4% S, 6% Fe, 2% Mn.

SAMPOLK Corp.

	Calsomag*	S	10% Ca, 15% Mg, 3% S. Complexed with glutaric acid. Liquid.
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Company	Trade Name/Material	Type	Description
	Humek*	F	5.0% K. Humic acid 55%.
	MegaCal*	F	6.2%N, 2.0% K, 8.2% Ca. Complexed with glutaric acid.
	MegaFlo*	F	7.0% N, 7.0% P, 7.0% K. With traces of micros. Contains glutaric acid.
	MegaMag*	F	5.5% N, 2.0% K, 5.0% Mg. Complexed with glutaric acid.
	MegaZn*	F	10% Zn, 4.0% S, 0.4% Mn, 0.38% Fe, 0.16% Cu, 0.07% B. Complexed with glutaric acid.
	Vita Mega fol*	F	20-20-20, 16-32-16, 30-10-10, 10-30-20. Soluble fertilizers with trace elements.
	Vitol*	M	Soluble. 7.1% Mn, 7.0% Fe, 3.2% Cu, 4.5% Zn, 1.45%B, 0.069% Mo, 14% S. With EDTA for soil treatment.

The O.M. Scott & Sons Co.

	Scotts* Fertilizer Plus Iron	F	29-3-6+ Fe, Mg, S. Small particle. Triaforn.
	Scotts* Flowable K	F	9-0-32. Powder.
	Scotts* Fluid Fertilizer	F	29-2-3 Triazone nitrogen. Liquid.
	Scotts* Fluid Minors Pk.	M	Cu, Fe, Mn, Mo, Zn. Liquid.
	Scotts* HD Fairway	F	32-3-10 + S. Methylene urea.
	Scotts* HD Fertilizer +	M	22-0-12 + S, Mn. Small particle. Methylene urea.
	Scotts* HD Fertilizer w/Minors	F	26-4-13 + Mg, S, Cu, Fe, Mn, Mo, Zn. Small particle. Methylene urea.
	Scotts* HD Greens	M	22-0-16 + Cu, Fe, Mn, Mg, Mo, B, Zn. Small particle. Methylene urea.
	Scotts* HD Hi-Maintenance Turf Fertilizer	F	32-3-10 + S. Small particle. Methylene urea.
	Scotts* HD Nitrogen/Potassium	F	22-0-22 + S. Methylene urea.
	Scotts* HD NPK Greens	F	21-3-21 + S. Small particle. Methylene urea.
	Scotts* HD Super Fairway	F	35-3-7 + S. Methylene urea.
	Scotts* HD Super Greens	F	19-0-17 + S, Fe, Mn. Small particle. Methylene urea.
	Scotts* High K Fertilizer	F	15-0-30 + S. Small particle. Triaforn.
	Scotts* High K Fertilizer Plus Minors	F	15-0-28 + S, Fe, Mn. Small particle. Triaforn.
	Scotts* High K Turf Fertilizer	F	15-0-29 + S. Small particle. Polymer encapsulated. Slow release.
	Scotts* Hi-Maintenance Plus Minors	F	31-3-10 + S, Fe, Mn. Small particle. Triaforn.
	Scotts* Iron-S	M	16-0-0 + Fe, S. Granular.
	Scotts* Nitrogen/Potassium Turf Fertilizer	F	21-0-20 + S. Small Particle. Polymer encapsulated. Slow release.
	Scotts* NPK Fertilizer	F	18-9-18 + S. Small Particle. Triaforn.
	Scotts* NPK Fertilizer Plus Minors	F	18-9-18 + S, Fe, Mn. Small particle. Triaforn.
	Scotts* NPK Turf Fertilizer	F	21-3-20 + S. Polymer encapsulated. Slow release.
	Scotts* NPK Turf Fertilizer Plus Minors	F	19-3-19 + Fe, Mn, Mo, Zn, S. Polymer encapsulated. Slow release.
	Scotts* Starter Fertilizer	F	19-26-5 + S. Small particle. Triaforn.
	Scotts* Sulfur	M	90% S. Granular.
	Scotts* Super K Greens Turf Fertilizer	F	0-0-45 + S. Resin coated K. Small particle.
	Scotts* Super Turf Fertilizer	F	25-4-12 + S. Polymer encapsulated. Slow release. Small particle.
		F	26-4-12 + S. Polymer encapsulated. Slow release.
		F	34-3-3 + S. Polymer encapsulated. Slow release.
	Scotts* Turf Fertilizer	F	27-3-11 + S. Polymer encapsulated. Slow release. Small particle.

F = Fertilizer S = Secondary A = Adjuvant C = Carrier O = Organic M = Micronutrient D = Deodorizer

Companies/Products

Company Trade Name/Material	Type	Description
	F	32-3-5 + S. Polymer encapsulated. Slow release. Small particle.
	F	33-3-6 + S. Polymer encapsulated. Slow release.
	F	36-3-7 + S. Polymer encapsulated. Slow release.
Scotts* Turf Fertilizer Plus Iron	F	25-3-10 + Fe. Polymer encapsulated. Slow release.
	F	25-3-9 + Fe. Polymer encapsulated. Slow release. Small particle.
Scotts* Turf Nitrogen	F	40-0-0 + S. Polymer encapsulated. Slow release.
	F	38-0-0 + S. Polymer encapsulated. Slow release. Small particle.
Scotts* Turf Starter	F	16-25-12 + S. Polymer encapsulated. Slow release.
STEP-Trace Element*	M	Ca, Mg, S, Cu, Fe, Mn, Mo, Zn. Fine particle. Liquid.
SeaBorn/Lane, Inc.		
CMR*	S	Ca chelate. Liquid.
Sea Life*	O	1.5-3.1%. Fish + seaweed.
Sea-Born*	O	12-0-0. Blood.
	O	12-11-0 + 22% Ca bone.
	O	12-0.25-1. Fish powder, foliar spray.
	O	9-3-0. Fish meal.
	O	0-0-6. Green sand.
	O	Kelp meal.
	O	0-23-0 + 25% Ca. Rock phosphate.
	F	5-10-10 + Seaweed.
	F	12-6-6 + Seaweed.
	O	Seaweed. Liquid and soluble powder.
Seawet*	A	Spreader/sticker.
	O	3-5-1. Fish hydrolysate.
Sul-PO-Mag*	O	0-0-22, 22% S, 11% Mg.
Shield Brite, Div. of Pace International LP*		
Agri-Potash*	F	27% K ₂ O. Liquid concentrate.
Bortrac* 1	M	10.6% B. Liquid concentrate.
Coptrac* 9	M	6.8% Cu. Liquid concentrate.
Foliomag* 2	S	15% Mg. Liquid concentrate. Suspension.
Hydrophos* 3	S	29% Phosphoric acid, 15% Mg. Liquid concentrate.
Mantrac* 4	M	10.9% Mn. Liquid.
Mantrac* 500	M	27% Mn. Liquid concentrate. Suspension.
Molytrac*	M	15% Mo. Liquid concentrate.
Nutra-Phos* 3-15 Nutra-Phos* 10 Nutra-Phos* 12 Nutra-Phos* 24 Nutra-Phos* 28 Nutra-Phos* 40 Nutra-Phos* Fe Nutra-Phos* K Nutra-Phos* Mg Nutra-Phos* N Nutra-Phos* Super K Nutra-Phos* ZMC	M	Chemically reacted, spray-dried, wettable powder complex.
Nutra-Spray* Copophos Nutra-Spray* Cu25-Zn25 Nutra-Spray* Manganese Nutra-Spray* Zinc 50 Nutra-Spray* Zinc 50 Zn Nutra-Spray* Zn17.5-Mn4-Cu4 Nutra-Spray* Zn18.5-Mn7 Nutra-Spray* Zn25-Mn25	M	Chemically reacted, wettable powder complex.
Seniphos* 5	S	23% Phosphoric acid, 3% Ca. Liquid concentrate.

Company Trade Name/Material	Type	Description
Solu-Spray* 7-5-44 Solu-Spray* 9-15-32 Solu-Spray* 10-45-10 Solu-Spray* 10-55-10 Solu-Spray* 12-26-26 Solu-Spray* 15-20-20 Solu-Spray* 20-20-20	F	Soluble combination of NPKS and micronutrients.
Sorba-Spray* Ca	S	6% N, 8% Ca. Liquid concentrate.
Sorba-Spray* CaB	M	3%N, 5% Ca, 0.5% B. Liquid concentrate.
Sorba-Spray* Cu	M	10% P ₂ O ₅ , 4% Cu, 1% S, 1% Zn. Liquid concentrate.
Sorba-Spray* Mg	M	10% P ₂ O ₅ , 3% Mg, 3% S, 1% Zn. Liquid concentrate.
Sorba-Spray* MIP	M	10% P ₂ O ₅ , 2% Fe, 2% Mn, 2.5% S. Liquid concentrate.
Sorba-Spray* Mn	M	12% P ₂ O ₅ , 2% Mn, 2% S, 2% Zn. Liquid concentrate.
Sorba-Spray* ZBK	M	1% N, 1% B, 6% K ₂ O, 1% Zn. Liquid concentrate.
Sorba-Spray* ZIP	M	8% P ₂ O ₅ , 3% Fe, 2% S, 1% Zn. Liquid concentrate.
Sorba-Spray* ZKP	M	16% P ₂ O ₅ , 9% K ₂ O, 1% Zn. Liquid concentrate.
Sorba-Spray* ZNP	M	10% N, 12% P ₂ O ₅ , 1% S, 2% Zn. Liquid concentrate.
Stopit* 6	S	12% Ca. Liquid concentrate.
Uniflow* Sulfur	S	52.4% S. Liquid suspension concentrate.
Uniflow* Sulfur CF6	S	51.1% S. Liquid suspension concentrate.
Uniflow* Zinc	M	25% Zn. Liquid suspension concentrate.
Vitaton* Stabilized Iron	M	Chelated iron, 14% Fe. soluble powder.
Zinphos* 7	M	28% Phosphoric acid, 9.4% Zn. Liquid concentrate.
Zintrac* 8	M	40% Zn. Liquid concentrate. Suspension.
J.R. Simplot Co., Minerals & Chemical Group*		
Simplot*	F	Ammonium phosphates.
	F	Ammonium sulfate.
	F	Ammonium thiosulfate.
	F	Anhydrous ammonia.
	F	Ammonium nitrate. Dry and solutions.
	F	Calcium ammonium nitrate solution.
	F	DAP.
	F	MAP.
	F	Phosphoric acid.
	F	Superphosphoric acid.
	F	Triple superphosphate.
	F	UAN solutions.
	F	Urea.
J.R. Simplot Co., Professional Turf Products*		
Best Fast Green*	M	16-4-8, S, Fe, Zn.
Best Greens King Ultra*	M	18-4-10 + S, Fe, Mg, Mn.
Best Turf Gold*	M	21-3-5 + S, Fe. Controlled release.
Best Turf Supreme*	M	16-6-8 + S, Fe, Zn.
Best Turf Supreme/Best Cote*	M	15-5-7 + S, Fe.
Nitra-King*	M	22-3-9 + Fe, 8% nitrate.
Simplot*	F	21-0-0 + 24% S. Ammonium sulfate.
SIMS Ag-Products, Inc.		
Bin Buster* Boron 10%	M	10% Boron. Granular.
Bin Buster* Copper 15%	M	15% Copper oxysulfate. Granular.
Bin Buster* Iron 50%	M	50% Iron oxysulfate. Granular.
Bin Buster* Magnesium 36%	M	36% Magnesium oxysulfate. Granular.
Bin Buster* Manganese 28%	M	28% Manganese oxysulfate. Granular.
Bin Buster* Micro Mixes	M	Any combination of B, Cu, Fe, Mn, Zn, Mg, S, to make a granular oxysulfate.

(Continued)

* - Trade Name R/T/M

1 - Information not updated for 1995

Company Trade Name/Material	Type	Description
Bin Buster* Zinc 20%	M	20% Zinc oxysulfate. Granular.
Bin Buster* Zinc 31%	M	31% Zinc oxysulfate. Granular.
Bin Buster* Zinc 36%	M	36% Zinc oxysulfate. Granular.
Smith & Ardussi, Inc.		
Boron	M	Borates. For dry and liquid mixtures and sprays. Soluble. Granular and liquid.
	M	10% B.
Copper	M	14% Cu chelate. Powder.
	M	25.2% Cu. Copper sulfate.
Gainer High 20*	F	20-20-20 + 1% S, 0.02% B, 0.05% Cu, 0.1% Fe, 0.05% Mn, 0.0005% Mo, 0.05% Zn. Foliar concentrate. Water soluble powder.
Gainer High Gro*	F	28-4-12 + 1% Zn, 0.1% Fe, 0.1% Mn. Water soluble powder.
Gainer High K*	F	12-8-30 + 2% S, 1% B, 0.25% Cu, 0.1% Fe, 0.1% Mn, 0.0005% Mo, 1% Zn. Foliar concentrate for tree fruits, hops and grapes. Water soluble powder.
Gainer High Phos*	F	10-45-10 + 3% S, 0.02% B, 0.05% Cu, 0.1% Fe, 0.05% Mn, 0.0005% Mo, 0.05% Zn. Foliar concentrate. Water soluble powder.
Gainer High Yield*	F	15-20-20 + 2% S, 0.08% B, 0.15% Cu, 0.1% Fe, 0.1% Mn, 0.0005% Mo, 1% Zn. Foliar concentrate. Water soluble powder.
Gainer Humiphos*	F	14-48-10 + 0.05% Zn, 0.1% Fe, 0.5% Mn, 0.02% B. Water soluble powder.
Gainer K-B-Z*	F	9-0-24 + 4% B, 5% Zn. Water soluble powder.
Gainer Neu-II*	F	17-22-22 + 0.05% Zn, 0.1% Fe, 0.05% Cu, 0.05% Mn, 0.02% B, 0.0005% Mo. Water soluble powder.
Gainer N-P-Z*	F	16-20-5 + 10% Zn, 5% S. Water soluble powder.
Gainer P-K-Z*	F	9-18-17 + 10% Zn, 5% S. Water soluble powder.
Iron	M	13% Fe chelate. For liquid and dry fertilizers. Powder.
	M	5% Fe, 10% N. Liquid.
	M	20% Fe, 11.9% S. Ferrous sulfate. Water soluble. Crystal.
	M	31% Fe. Ferrous sulfate monohydrate. Granular, fine, powdered.
	M	23% Fe, 13% S. Fine.
Magnesium	S	7% Mg. Liquid.
	S	10% Mg. Soluble crystal.
Manganese	M	28% Mn. Manganese sulfate. Granular.
	M	13% Mn chelate. Powder.
	M	32% Mn. Manganese sulfate. Powder.
Molybdenum	M	39.5% Mo. Sodium molybdate. Water soluble. Crystals.
Poro-Sul*	S	99.5% S. For dry bulk blended fertilizers.
Ruffin-Redy*	S	5% Ca. Liquid.
	M	5% Cu chelate.
	M	5% Fe EDTA citric acid.
	S	4% Mg. Liquid.
	M	5% Mn EDTA citric acid.
	M	10% Zn EDTA citric acid.
Ruffin-Redy* Crop Mix I	M	5% Zn, 3% Mn, 1% Cu. Liquid.
Ruffin-Tuff*	S	4% Ca, 7.5% S. Granular.
	M	5% Cu. Granular.
	M	10% Fe. Granular.
	S	4% Mg. Granular.
	M	8% Mn. Granular.
	M	10% Zn. Granular.
Ruffin-Tuff* Crop Mix*	M	5% Zn, 4% Mn, 1% Cu, 1% Fe, 7% S. Granular.
	M	6% Zn, 3% Mn, 1.5% Cu, 1.5% B, 7% S. Granular.
S & A Boro-Cal*	M	0.5% S, 5% Ca. Liquid.
S & A Calcium +*	S	6% N, 6% Ca, 0.75% Mg + Micros. Liquid.
S & A Field Crop Mix*	M	4% Zn, 2% Mn, 1% Fe, 4% S.
S & A IronMan*	M	6% N, 6% Fe, 2% Mn, 5% S.

Company Trade Name/Material	Type	Description
S & A IronMan +*	M	6% N, 6% Fe, 2% Mn, 1% Zn, 5% S.
S & A Liq-Cu*	M	5% Cu, 4% S.
S & A Liq-Fe*	M	5% Fe, 4% S.
S & A Liq-Mn*	M	7% Mn, 4% S.
S & A Liq-Zn*	M	7% Zn, 4% S.
S & A Liqui-Phos*	F	8% N, 32% P, 5% K + micros. Liquid.
S & A Nitro Green*	M	15% N, 6% Fe, 4% S.
Solubor*	M	20.5% B.
Sul-Cop*	M	48% S, 8% Cu. Flowable.
Sul-Preme* Sulfur	M	70% S, 64% S, and 52% S. Flowable.
Zinc	M	15% Zn chelate. Powder.
	M	36% Zn. Zinc sulfate. Water soluble powder and granular.
Zinc 52*	M	52% Zn. Suspendable powder.
Spray-N-Grow Inc. 1		
Spray-N-Grow*	S	Foliar spray. Liquid.
SureCo, Inc.		
SMCP*	F	20-20-20 + EDTA chelated micros.
	F	16-32-16 + EDTA chelated micros.
	F	30-10-10 + EDTA chelated micros.
	F	10-30-20 + EDTA chelated micros.
	F	24-8-16 + EDTA chelated micros.
	F	9-45-15 + EDTA chelated micros.
	F	EDTA chelated micros.
Tecomag SRL		
Algabios P*	F	Seaweed liquid.
Bio-Flavex*	O	Borum + propolis.
Fertene-Tecofer*	M	Fe-Chelate EDDHA 6%.
Humotec L*	F	Humic acids 6, 30% + 12%.
Stimox*	F	Amino acids N. 6%.
Terra International, Inc.		
Attagel*	C	Suspension clay.
Crop Booster*	M	6-18-6 + 0.5% Cl, 0.02% B, 0.1% Fe, 0.05% Mn, 0.05% Zn EDTA chelate. Liquid.
	M	11-8-5 + 0.02% B, 0.05% Cu, 0.1% Fe, 0.05% Mn, 0.05% Zn EDTA chelate. Liquid.
	M	12-4-6 + 0.02% B, 0.05% Cu, 0.1% Fe, 0.05% Mn, 0.05% Zn EDTA chelate. Liquid.
	M	12-8-8 + 0.02% B, 0.05% Cu, 0.1% Fe, 0.05% Mn, 0.05% Zn HEDTA chelate. Liquid.
Granurea*	F	46% N. Urea. Granular.
Hiload*	O	Suspension clay.
Manganese	M	28% Mn.
Prolific*	M	10-20-30 + 0.02% B, 0.05% Cu, 0.1% Fe, 0.50% Mg, 0.05% Mn, 0.05% Zn, 0.0005% Mo, 0.0005% Co, 1% Cl. Water soluble.
	M	10-52-10 + 0.02% B, 0.0005% Co, 0.05% Cu, 0.1% Fe, 0.5% Mg, 0.50% Mn, 0.05% Zn, 0.0005% Mo, 1% Cl. Water soluble.
	M	15-15-15 + 0.5% Mg, 0.1% Fe, 0.05% Cu, 0.05% Mn, 0.05% Zn, 0.02% B, 0.0005% Co, 0.0005% Mo, 1% Cl. Water soluble.
	M	19-19-19 + 0.02% B, 0.05% Cu, 0.1% Fe, 0.5% Mg, 0.05% Mn, 0.05% Zn, 0.0005% Mo, 0.0005% Co. Water soluble.
	M	20-20-20 + 0.02% B, 0.05% Cu, 0.1% Fe, 0.05% Mg, 0.05% Mn, 0.05% Zn, 0.0005% Mo, 0.0005% Co, 1% Cl. Water soluble.
Prolific* Max	M	6% Mg, 0.03% B, 4% Fe, 3.87% Mn, 0.003% Mo, 2.41% Zn, 4.24% S. Water soluble.
Riverside*	S	3% Ca EDTA chelate. Liquid.
	S	6% Ca, 5% S. Liquid.
	M	5% Cu, 2.5% S glucoheptonate chelate. Liquid.

F = Fertilizer S = Secondary A = Adjuvant C = Carrier O = Organic M = Micronutrient D = Deodorizer

Companies/Products

Company Trade Name/Material	Type	Description
	M	7.5% Cu EDTA chelate. Liquid.
	M	4.5% Fe HEDTA chelate. Liquid.
	M	5% Fe, 4.5% S glucoheptonate chelate. Liquid.
	S	2.5% Mg EDTA chelate. Liquid.
	S	4% Mg, 5% S glucoheptonate chelate. Liquid.
	M	6% Mn EDTA chelate. Liquid.
	M	30% Mn, 10% S. Sulfate monohydrate. Liquid.
	M	7% Zn, 3.5% S glucoheptonate chelate. Liquid.
	M	9% Zn chelate. Liquid.
	M	36% Zn.
	M	80% Zn. Liquid.
Riverside* Citrus Knight	M	7% N, 0.5% Fe, 1.9% Mg, 5% Mn, 4.5% Zn. Liquid.
Riverside* Citrus Knight IV	M	7% N, 1.9% Mg, 0.5% Fe, 5% Mn, 4.5% Zn. Liquid.
Riverside* Citrus Maker LS	M	10% Mg, 4% S, 1% Fe, 2% Mn, 2% Zn.
Riverside* Corn Mix	M	4.5% Zn, 0.5% Mn, 0.5% Cu EDTA chelate. Liquid.
	M	4.5% Zn, 2.5% S, 0.05% Mn, 0.05% Cu glucoheptonate chelate. Liquid.
Riverside* Mag Knight	S	7% N, 6% Mg. Liquid.
Riverside* Mn, Zn, LS	M	6% S, 4% Mn, 4% Zn.
Riverside* Soybean Mix	M	3% Mn, 3% S, 2% Zn, 1% Fe EDTA chelate. Liquid.
	M	3% Mn, 3% S, 2% Zn, 1% Fe glucoheptonate chelate. Liquid.
Riverside* Vegetable Maker LS	M	2% Mg, 4% S, 2% Fe, 1% Mn, 1% Zn lignosulfonate. Liquid.
Riverside* White Knight Calcium	S	9% N, 11% Ca.
Super-45*	F	Wet process superphosphoric acid for production of high polyphosphate Super Suspension* fluid fertilizers via TVA pipe reactor process.
Super-49*	F	Wet process superphosphoric acid for use with TVA pipe reactor process for production of premium clear liquid fertilizers.
Terra*	F	28%, 32% N solution, urea and ammonium nitrate.
	F	30-0-0 + 1.5% Clay. Urea, ammonium nitrate suspension.
	F	82% N. Anhydrous ammonia.
Terran*	F	0-0-60 Potash. Granular, coarse, soluble.
	F	0-46-0. Triple superphosphate
	F	18-46-0. DAP. Granular.
	F	11-52-0. MAP. Granular.
	F	34% N. Ammonium nitrate.
Terrex*	M	10% Zn complex. Liquid.
Terra Nitrogen Co. L.P.		
AMC Sun*	F	Urea
Super N*	F	UAN - 28%, 30%, 32%.
Texasgulf Inc.		
Texasgulf*	F	DAP.
	F	Gypsum. Limestone.
	F	Granular triple superphosphate.
	F	MAP.
	F	Muriate of potash.
	F	Phosphate rock. Calcined.
	F	Phosphoric acid. Wet process.
	F	Superphosphoric acid.
Tgreen Solution*	F	10-34-0. High poly.
	F	11-37-0. High poly.
Traylor Chemical & Supply Co., Inc.		
Hepta-Gro* Liquid Calcium	M	8% Ca.

Company Trade Name/Material	Type	Description
Hepta-Gro* Liquid Citrus Special	M	1.5% Fe, 2% Mn, 2.5% Zn, 4% S.
Hepta-Gro* Liquid Copper	M	5% Cu, 2.5% S.
Hepta-Gro* Liquid Crop Mix	M	5% Zn, 1% Mn, 1% Fe, 3.5% S.
Hepta-Gro* Liquid Iron	M	5% Fe, 3% S.
Hepta-Gro* Liquid Magnesium	M	6% Mg.
Hepta-Gro* Liquid Manganese	M	5% Mn, 3% S.
Hepta-Gro* Liquid Molybdenum	M	5% Mo.
Hepta-Gro* Liquid Vegetable Mix	M	1.5% Mg, 1.5% Mn, 0.03% B, 0.05% Mo, 25% Cu, 0.25% Zn, 1.4% Fe, 4% S.
Hepta-Gro* Liquid Zinc	M	9% Zn, 4% S.
Hepta-Gro* SPC Mix	M	4% Mn, 0.5% B, 0.5% Zn, 0.0005% Mo, 2.5% S.
Magnesium Oxide	M	58%, 59% Mg. Powder and granule.
Magnesium OxySulfate	M	36% Mg. Granular.
Magnesium Sulfate	M	9.8% Mg. (Epsom salts).
	M	19.8% Mg. Anhydrous.
Manganese OxySulfate	M	28%, 40% Mn. Granular.
Metagro*	M	5% Cu complex. Liquid.
	M	5% Fe. Liquid complex.
	M	5% Mn. Liquid complex.
	M	39.6% Mo. Sodium molybdate. Water soluble crystals.
	M	10% Zn. Liquid complex.
Metagro* Cal-B	S	6% Ca, 2% B.
Metagro* Cal-Bor	S	10% Ca, 0.5% B.
Metagro* Calcium	S	6% Ca. Liquid complex.
Metagro* Calcium/N	S	8% Ca, 6% N.
Metagro* Corn Mix	M	5% Zn, 1% Mn, 1% Cu, 4% S.
Metagro* Cotton/Soybean Mix	M	4% Mn, 2% Zn, 1% Fe, 4% S.
Metagro* Crop Mix	M	2% Zn, 2% Mn, 1% Cu, 2% Fe, 4% S.
Metagro* Magnesium	M	4% Mg, 4% S. Liquid.
Metagro* Peanut Mix	M	3% Mn, 2% Mg, 1% Zn, 4% S.
Metagro Plus* Copper	M	5% Cu, 2.5% S. Liquid.
Metagro Plus* Corn Mix	M	5% Zn, 1% Mn, 1% Fe, 3.5% S. Liquid.
Metagro Plus* Iron	M	5% Fe, 3% S. Liquid.
Metagro Plus* Liquid Starter	M	4% Zn, 2% Mg, 4.5% S.
Metagro Plus* Magnesium	M	4% Mg.
Metagro Plus* Manganese	M	5% Mn, 3% S. Liquid.
Metagro Plus* Peanut/Cotton/Soybean Mix	M	2% Zn, 3% Mn, 1% Fe, 3.5% S. Liquid.
Metagro Plus* Pop-Up	M	4.5% Zn, 1% Mn, 1% Fe, 1% Cu, 4% S. Liquid.
Metagro Plus* Zinc	M	10% Mn, 5% S. Liquid.
Solubor*	M	20.5% B, 66% boric anhydride.
Sulfur	M	90% S. Granular.
	M	52%, 70% S. Liquid flowable.
TEM* 300B	M	3% B, 3% Cu, 18% Fe, 7.5% Mn, 7% Zn. Powder.
TEM* 300G	M	2.4% B, 2.4% Cu, 14.4% Fe, 6% Mn, 5.6% Zn. Granular.
Traco* Crop Kicker	F	8-8-8 + 0.05% Mn, 0.05% Zn, 0.05% Cu, 0.02% B, 0.10% Fe.
	F	12-4-6 + 0.05% Mn, 0.05% Zn, 0.05% Cu, 0.02% B, 0.10% Fe.

(Continued)

* - Trade Name R/T/M

1 - Information not updated for 1995

Company	Trade Name/Material	Type	Description
Traco*	Liquid Copper 5	M	5% Cu, 2.5% S. Partially chelated.
Traco*	Liquid Iron 5	M	5% Fe, 2.5% S. Partially chelated.
Traco*	Liquid Manganese 5	M	5% Mn, 3% S. Partially chelated.
Traco*	Liquid Zinc 10	M	10% Zn, 5% S. Partially chelated.
Traco*	Yield King*	M	14% N, 3% S, 2% Mg, 2% Zn, 2% Mn, 1.5% Fe, 0.10% Cu, 0.10% B, 0.02% Mo.
Traco*	B5*	M	26-0-0, 0.5% B.
Traylor*	Boron	M	10% B. Liquid.
		M	14.3% B. Granular.
		M	14.9% B.
		M	17% B. Boric acid.
Traylor*	Copper	M	7.5% Cu chelate. Liquid.
		M	10.5% Cu.
		M	14.5% Cu chelate. Powder.
		M	25.2% Cu. Copper sulfate.
		M	53% Cu. Copper sulfate, basic.
		M	50%, 60%, 75% Cu. Copper oxide. Fertilizer and spray grades.
Traylor*	Iron	M	42%, 50% Fe. Granule.
		M	Iron oxide. Fine powder.
		M	4.5%, 5%, 9%, 13% Fe. Powder, liquid, and on vermiculite.
		M	20.8% Fe. Iron sulfate.
		M	30%, 31% Fe. Iron sulfate. Granular and powder, monohydrate.
Traylor*	Manganese	M	28.5%, 29.5% Mn. Manganese sulfate. Granular.
		M	6% Mn chelate. Liquid.
		M	12% Mn chelate. Powder.
		M	15% Mn, 7% N. Manganese nitrate. Liquid.
		M	29.5% Mn. Manganese sulfate. Powder.
		M	33%, 60% Mn. Manganous oxide. Granular and powder.
Traylor*	Zinc	M	50% - 65% Zn. Zinc oxide. Dustless. Granular and powder.
		M	52%, 78%, 80% Zn. Zinc oxide. Wettable powder.
		M	20%, 36% Zn. Zinc oxysulfate. Granules.
		M	35.5% Zn. Zinc sulfate. Granular and powder.
		M	4%, 6%, 8.4% Zn chelate. Liquid.
		M	9.6% Zn chelate. Liquid.
		M	10% Zn. Zinc ammonium sulfate. Liquid.
		M	14% Zn chelate. Powder.
		M	17% Zn, 7% N. Zinc nitrate.
Turf-Pro*	Iron	M	15% N, 6% Fe, 3.5% S chelate.
Zinc Ammonium Chloride Sulfate		M	13% N, 4.5% S, 15% Zn.

United States Gypsum Co. 1

USG Ben Franklin*	F	Gypsum. Coarse and fine grind.
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Unocal Petroleum Products & Chemicals Div.

N-pHuric*	F	Water treatment additive, fertilizer.
Popcorn*	S	Sulfur.
SurpHtac*	A	Adjuvant.
The Original CAN 17*	F	Calcium ammonium nitrate solution.
Unocal*	F	Ammonium nitrate. Granular.
	F	Ammonium nitrate solutions.
	F	Anhydrous ammonia.
	F	Aqua ammonia.
	S	Sulfur. Molten.
	F	UAN. 32% solution.
	F	Urea. Granular and prilled.
	F	Urea solution.
Unocal Plus*	F	Low biuret urea solution.

U.S. Borax Inc.

FERTIBOR*	M	14.9% B. Fine.
GRANUBOR*	M	14.3% B. Granular.
SOLUBOR*	M	20.5% B. Powder.

Vigoro Industries, Inc. 1

Certified Harvest King*	F	Farm fertilizer.
Flow-On*	F	Suspension fertilizer. Liquid.
Fun*	F	12-4-8. Turf and garden fertilizer.
Hydro-Pak*	F	10-30-2. Fish fertilizer. Liquid.
	F	20-20-5. Fishpond fertilizer.
Kaiser/Estech*	M	5% Cu.
	M	5% Fe.
	M	5% Mn.
	M	9% Zn fully chelated.
	M	1% Cu, 0.5% Mn, 5% Zn chelate. Water soluble.
	M	0.5% Fe, 2.5% Mn, 1.5% Zn chelate. Water soluble.
Key-Lime*	F	Fluid lime.
Key-Start*	M	Fluid fertilizer with micros.
Suitech*	S	Sulfur.
Zintech*	M	Zn.

Violmet S.A.

Ammophoska* 60	M	15-30-15 + TE.
Coprohum*	M	NPK + micros. Yellow and black turf, perlite, dolomite.
Evexel*	S	16-8-24 + 2.4% Mg + TE. Powder.
	M	18-14-14 + TE. Powder.
	M	19-6-6 + TE. Powder.
	S	24-8-16 + 0.6% Mg + TE. Powder.
Filozal*	S	5-8-10 + Mg. Liquid.
	S	12-4-6 + Mg + TE. Liquid.
Green Top*	M	25-15-20 + TE. Powder.
Humotrel*	O	Humic acid.
Humozal* Basic	M	4-20-17 + 12% MgO + 10% humic acid + TE.
	M	2-14-14 + 8% MgO + 10% humic acid + TE.
	M	14-8-16 + 3% MgO + 10% humic acid + TE.
	M	16-8-12 + 12% MgO + 10% humic acid + TE.
Humozal L*	O	NPK + humic acid. Liquid.
Hy-Pot*	M	NPK + micros. Yellow and black turf, perlite, dolomite.
New Vachs*	F	11-7-27 + 5 MgO + TE, 20-20-20 + TE, 27-9-18 + TE.
Terra*	S	NPK pelleted compound fertilizers with organic matter content + TE.
Tom* MG4	S	15-10-25 + 2.4% Mg + TE.
Zoom*	S	20-20-20 + growth regulator. Powder.
	S	12-18-36 + growth regulator. Powder.

Westbridge Agricultural Products

Dry Seed Triggrr*	M	2.0% Ca, 0.5% Mg, 3% S, 0.02% B, 0.0005% Co, 2% Fe, 0.05% Mn, 0.0005% Mo, 2.0% Zn. Dry powder seed treatment.
Spring*	M	2.5% S, 0.02% B, 0.5% Cu, 1% Fe, 1% Mn, 3% Zn, 0.0005% Mo chelate. Liquid.
Sunburst* Foliar	M	5-0-0, 5% S, 0.02% B, 1% Fe, 1% Mg, 3% Mn, 0.0005% Mo, 3% Zn chelate, humic acid. Liquid.
Sunburst* Soil	M	5-0-0, 4% S, 0.02% B, 1% Fe, 1% Mg, 2% Mn, 0.0005% Mo, 2% Zn chelate, humic acid. Liquid.
SunUp*	M	2% S, 0.02% B, 0.05% Cu, 1% Fe, 1% Mn, 0.0005% Mo, 2% Zn chelate. Liquid.

Western Ag Minerals Co.

K-Mag* Compacted	F	21% K ₂ O, 10% Mg, 21% S, max 2.5% chloride. Potassium magnesium sulfate.
K-Mag* Granular	F	22% K ₂ O, 11% Mg, 20% S, 1.5% chloride. Potassium magnesium sulfate.

F = Fertilizer S = Secondary A = Adjuvant C = Carrier O = Organic M = Micronutrient D = Deodorizer

Companies/Products

Company	Trade Name/Material	Type	Description
Western Nutrients Corp.			
	Blend*	F	NPK.
	Boll Popper*	A	Defoliant additive.
	Crop Plus*	F	Neutralized complexed foliar fertilizer.
	Enhance*	O	Humic acid. Liquid and dry.
	HPZN*	M	22% N, 10% Zn chelate.
	Humi Plus*	M	Humic acid + micros complexed.
	Humiplex*	O	Humic acid. Neutralized. Foliar.
	Humiplex* HP	M	22% N, 10% Zn.
	Humiplex* HP 40	M	7-28-4 + 2% Fe, 0.1% Zn.
	Iron	M	6% Fe. Iron sulfate. Liquid.
	Micro Plus*	F	11-5-8 + 0.02% B, 0.05% Cu, 0.1% Fe, 0.05% Mn, 0.05% Zn.
	Multimix*	M	Fe complex.
		M	Zn complex.
	Nutramix*	M	5.6% Zn complexed chelate for rice.
	Nutraplex* Calcium	S	6% Ca complexed spray.
	Nutraplex* Crop Mix	M	3% Zn, 2% Fe, 2% Mn, 4% S.
	Nutraplex* Iron	M	5% Fe, 4% S complexed chelate.
	Nutraplex* Manganese	M	5% Mn, 4% S complexed chelate.
	Nutraplex* Western Crop Mix	M	4% Zn, 1% Fe, 1% Mn, 4% S.
	Nutraplex* Zinc	M	7% Zn, 4% S complexed chelate.
	Start Up*	M	5% Fe chelate, 5% Mn chelate.
	Western* Mineral Spray	M	10-20-0 + 1.5% Zn.
		M	0-8-0 + 1% Zn, 3% Fe.
	Zinc	M	7% Zn chelate.
		M	10%, 12% Zn. Zinc sulfate. Liquid.
Westvaco Corp. Polychemicals Dept.			
	REAX* 88B	O	Zn, Fe, Cu, Mn organic complexing agents.
	REAX* 100-M		
Wilbur-Ellis Co.1			
	Foli-Gro*	M	15-10-5 + B, Cu, Fe, Mn, Mo, Zn. Liquid.
		M	6-18-6 + B, Cu, Fe, Mn, Mo, Zn. Foliar. Liquid.
	Foli-Gro* 434†	M	10-0-0 + 4% S, 4% Fe, 3% Zn. Liquid.
	Foli-Gro* Aminofol	F	5-0-0 + ATCA and folic acid. Foliar. Liquid.
	Foli-Gro* Crop Mix	S	2.5% Ca, 0.10% Cu, 1% Fe, 5% Mn, 2.25% Zn + ATCA and folic acid. Foliar. Liquid.
	Foli-Gro* NZN	M	15-0-0 + 5% Zn. Foliar. Liquid.
	Foli-Gro* Rayplex 531	M	1.9% Fe, 1.2% Zn, 3% Mn, 3% S. Foliar. Liquid.
	Link* 44	F	8-31-5 + Humic acid. Foliar. Liquid.
	Link* Calcium	S	6% Ca complex. Foliar. Liquid.
	Link* Ca-Zn	S	5% Ca, 2.5% Zn complexes. Foliar. Liquid.
	Link* K-35	F	5-10-20 + Humic acid. Foliar. Liquid.
	Link* Multi-Mix	M	2.5% Ca, 0.1% Cu, 1% Fe, 0.5% Mn, 2.5% Zn chelate. Foliar. Liquid.
	Link* N-25	F	15-5-5 + Humic acid. Foliar. Liquid.
	Mora-Leaf*	S	94% Calcium chloride. Foliar applicaiton. Powder.
		M	20-20-20 + 0.05% Cu, 0.1% Fe, 0.0005% Mo, 0.05% Zn, 0.02% B. Foliar. Water soluble powder.
	Mora-Leaf* HIK	M	9-15-30 + 5% S, 0.02% B, 0.05% Cu, 0.01% Fe, 0.0005% Mo, 0.05% Zn.
		M	15-5-12 + 5% S, 3% Ca, 3% Zn, 1% Fe, 1% Mn. Foliar. Water soluble powder.
	Mora-Leaf* HI-P	M	10-45-10 + 3% S, 0.02% B, 0.05% Cu, 0.1% Fe, 0.0005% Mo, 0.05% Zn. Foliar. Water soluble powder.
Zinc Corp. of America			
	Kadox 911*, 920*, 930*	M	80% Zn. Powder and granular.
	Nuzox 78*	M	Nutritional spray.
	Zinc	M	11% Zn. Zinc sulfate. Liquid.

* - Trade Name R/T/M

1 - Information not updated for 1995

TRADE NAMES

- A**
- Actina* Medina Agriculture
 Aero* American Cyanamid Co.¹
 Aeroprills* American Cyanamid Co.¹
 Agrico Sun* IMC-Agrico Co.
 Agriform* Grace-Sierra Intl.
 Agri-Hume* Intl. Humate Fertilizer Co.¹
 Agri-Plex* Ca R.G.B. Laboratories, Inc.¹
 Agri-Plex* Fe R.G.B. Laboratories, Inc.¹
 Agri-Plex For-X* R.G.B. Laboratories, Inc.¹
 Agri-Plus* Horizon Ag-Products
 Agri-Potash* Shield Brite
 Agrobren* Grace-Sierra Intl.
 Agrobren* Tablet Grace-Sierra Intl.
 Agro-Gel* American Colloid Co.
 Agro-Lig* American Colloid Co.
 Agrolinz* Agrolinz (Austria)
 AGSORB* Agrisorbents Product Group
 Albion* Metalosates Albion Laboratories, Inc.
 Algabios P* Tecomag SRL
 AMC Sun* Terra Nitrogen Co. L.P.
 Amipron* Eurochem, S.A.
 A-Miscur* Probelte, S.A.
 A-Miscur* Ca L.S. Probelte, S.A.
 Ammophoska* 60 Viomet S.A.
 Amplify-D* Conklin Co., Inc.
 Amsulgran 45* H.J. Baker & Bro., Inc.
 Amsulstan 45* H.J. Baker & Bro., Inc.
 Amthio* Arcadian Corp.
 Amtrate* Mississippi Chemical Corp.
 APS 600* Hickson Kerley, Inc.
 Aqua-H* Intl. Humate Fertilizer Co.¹
 Aqua-H Plus N* Intl. Humate Fertilizer Co.¹
 Aqua-H-F* Intl. Humate Fertilizer Co.¹
 Aqua-Root* Humate International, Inc.
 ArborFlo* CoRoN Corp.
 Aries Chelacop* Aries Agro-Vet Ind. Pvt. Ltd.
 Aries Chelafer* Aries Agro-Vet Ind. Pvt. Ltd.
 Aries Chelamin* Aries Agro-Vet Ind. Pvt. Ltd.
 Aries Mn-Chel* Aries Agro-Vet Ind. Pvt. Ltd.
 AS7* Martin Resources, Inc.
 Asset* Helena Chemical Co.
 A-T* Martin Resources, Inc.
 Attaclay* Engelhard Corp.
 Attacote* Engelhard Corp.
 Attaflow* FL Engelhard Corp.
 Attaflow* SF Engelhard Corp.
 Attagel* Terra International, Inc.
 Attagel* 350 Engelhard Corp.
 Attagel* 390 Engelhard Corp.
 Attapulcus* Engelhard Corp.
 Azolon* 38 N Aglukon Spezialdünger GmbH
 Azolon* Special Aglukon Spezialdünger GmbH
- B**
- Bactagro* Medina Agriculture
 Balance* 15 B Granular Fertilizer Corp. of America
 Balance* 15 B Powder Fertilizer Corp. of America
 Balance* 20 CO SO₄ Fertilizer Corp. of America
 Balance* 15 CU Fertilizer Corp. of America
 Balance* 50 FE Fertilizer Corp. of America
 Balance* 28 MN Fertilizer Corp. of America
 Balance* 31 MN SO₄ Fertilizer Corp. of America
 Balance* 36 MG Fertilizer Corp. of America
 Balance* 18 ZN Fertilizer Corp. of America
 Balance* 36 ZN Fertilizer Corp. of America
 Balance* 36 ZN SO₄ Fertilizer Corp. of America
 Barclay* Barclay Chemicals Mfg. Ltd.
 Bayfolan Plus* Helena Chemical Co.
 Bean & Vegetable Yield Booster* Albion Laboratories, Inc.
- C**
- Best Fast Green* J.R. Simplot Co., Professional¹
 Best Greens King Ultra* J.R. Simplot Co., Professional¹
 Best Turf Gold* J.R. Simplot Co., Professional¹
 Best Turf Supreme* J.R. Simplot Co., Professional¹
 Best Turf Supreme/Best Cote* J.R. Simplot Co., Professional¹
 Bin Buster* Boron 10% SIMS Ag-Products
 Bin Buster* Copper 15% SIMS Ag-Products
 Bin Buster* Iron 50% SIMS Ag-Products
 Bin Buster* Magnesium 36% SIMS Ag-Products
 Bin Buster* Manganese 28% SIMS Ag-Products
 Bin Buster* Micro Mixes SIMS Ag-Products
 Bin Buster* Zinc 20% SIMS Ag-Products
 Bin Buster* Zinc 31% SIMS Ag-Products
 Bin Buster* Zinc 36% SIMS Ag-Products
 Bio Bac* Biofix Co.
 Biobase* Chandler Sales Co.
 Biobase Micros* Chandler Sales Co.
 Biobase Premix* Chandler Sales Co.
 Bioburst* Chandler Sales Co.
 Biocat 1000* Chandler Sales Co.
 Biocat 3000* Chandler Sales Co.
 Biocat 4000* Chandler Sales Co.
 Biocat 5000* Chandler Sales Co.
 Bio-Cure A* Biofix Co.
 Bio-Cure II* Biofix Co.
 Biofix-Gro* Biofix Co.
 Bio-Flavex* Tecomag SRL
 Biolifina* Biochem S.R.L.
 Biolifina Plus* A Biochem S.R.L.
 Biomate* JH Biotech, Inc.
 Biomin* JH Biotech, Inc.
 Bion* Biofix Co.
 Bio-Tech* Agro Products, S.A.
 Biozone* Amereq, Inc.
 Blend* Western Nutrients Corp.
 Blu-Min* Bay Zinc Co., Inc.
 Blu-Min* Monterey Chemical Co.
 Blu-Min LHM* Bay Zinc Co., Inc.
 Boll Popper* Western Nutrients Corp.
 Borate* 32 Frit Industries
 Borate* 48 Frit Industries
 Borate Granular-46* Monterey Chemical Co.
 Borate-48* Monterey Chemical Co.
 Boro Probelte* L.S. Probelte, S.A.
 Boro-Cal* Monterey Chemical Co.
 Boron 48* Monterey Chemical Co.
 Boron 68* Monterey Chemical Co.
 Boron Plus* Product Formulations, Inc.
 Boro-Sol* Monterey Chemical Co.
 Bortrac* 1 Shield Brite
 Buffermin* JH Biotech, Inc.
- C**
- CAC* PRO-SOL
 Calcipron* L.S. Probelte, S.A.
 Calcium 5* Chandler Sales Co.
 Calcium-25* Bio-gard Agronomics, Inc.
 Calcium-Plus* Intl. Humate Fertilizer Co.¹
 Califix* PRO-SOL
 Calgard* Custom Chemicides
 Cal-Mag* Monterey Chemical Co.
 Calphos* J & J Agri-Products
 Cal-Sul* Ampel, Inc.¹
 Cal-Sul* Farmland Industries, Inc.
 Calsumag* SAMPOLK Corp.
 Cal-Zin* Monterey Chemical Co.
 Celite* Celite Corp./World Minerals Inc.
 Celkate* Celite Corp./World Minerals Inc.
 Certified Harvest King* Vigoro Industries, Inc.¹
 Champion Brand* Chilean Nitrate Corp.
 Champion Brand Bulldog* Chilean Nitrate Corp.
 Chandler Foliar* Chandler Sales Co.
 Chandler No Till* Chandler Sales Co.
 Chandler pH Acidifier* Chandler Sales Co.
 Chandler Seed Treat* Chandler Sales Co.
 Chandler SilageMaster* Chandler Sales Co.
 Chandler Soil* Chandler Sales Co.
 Charge* Custom Chemicides
 ClawEI* Calcium Brandt Consolidated
 ClawEI* Copper Brandt Consolidated
 ClawEI* Iron Brandt Consolidated
 ClawEI* Magnesium Brandt Consolidated
 ClawEI* Manganese Brandt Consolidated
 ClawEI* N-Boron Brandt Consolidated
 ClawEI* Zinc Brandt Consolidated
 Cleary's* 16-2-4 Plus W.A. Cleary Chemical Corp.
 Cleary's* Extra Iron W.A. Cleary Chemical Corp.
 Clifton 195 Super* Clifton Chemicals, Ltd.¹
 Clifton 309 Super DF* Clifton Chemicals, Ltd.¹
 Clifton* Copper Clifton Chemicals, Ltd.¹
 Clifton Extra-Bor* Clifton Chemicals, Ltd.¹
 Clifton Extra-Bor SP* Clifton Chemicals, Ltd.¹
 Clifton Foliaran Plus* Clifton Chemicals, Ltd.¹
 Clifton Foliaran Ultra DG* Clifton Chemicals, Ltd.¹
 Clifton* Manganese Clifton Chemicals, Ltd.¹
 Clifton Trace Element Mix* Clifton Chemicals, Ltd.¹
 CM* Calbo C.M.I. Ltd.
 CM* Calcium C.M.I. Ltd.
 CM* Copper C.M.I. Ltd.
 CM* Iron C.M.I. Ltd.
 CM* Kelp C.M.I. Ltd.
 CM* Magnesium C.M.I. Ltd.
 CM* Manganese C.M.I. Ltd.
 CM* Moly C.M.I. Ltd.
 CM Nitro-Boost* C.M.I. Ltd.
 CM Perflor* C.M.I. Ltd.
 CM Perflor* Boron C.M.I. Ltd.
 CM Plant Feed Mix 1* C.M.I. Ltd.
 CM Plant Feed Mix 4* C.M.I. Ltd.
 CM Plant Feed Mix 5* C.M.I. Ltd.
 CM Plant Feed Mix 6* C.M.I. Ltd.
 CM Plant Feed Mix 7* C.M.I. Ltd.
 CM* 80% Sulphur C.M.I. Ltd.
 CM Super-Fer* C.M.I. Ltd.
 CM Superflor* Boron C.M.I. Ltd.
 CM Yelder Mix 2* C.M.I. Ltd.
 CM* Zinc C.M.I. Ltd.
 CMR* Monterey Chemical Co.
 CMR* SeaBorn/Lane, Inc.
 Coarse Zink* American MicroTrace Corp.
 Columbia* Brand Arcadian Corp.
 Commander* Brandt Consolidated
 Coprophum* Viomet S.A.
 Coptrac* 9 Shield Brite
 Corn Gro* Cornbelt Chemical Co.
 Cornbelt* Cornbelt Chemical Co.
 CoRoN* CoRoN Corp.
 CoRoN-Plus* CoRoN Corp.
 CoZinCo* CoZinCo, Inc.
 CoZinCo* CoZinCo Sales, Inc.
 CoZinCo* SD36 CoZinCo, Inc.
 Crescal* Iron Aglukon Spezialdünger GmbH
 Crop Booster* Terra International, Inc.
 Crop Plus* Western Nutrients Corp.
 Crop UP* Albion Laboratories, Inc.
 CropMag* 36 Martin Marietta Magnesia
 CropMag* 58 Martin Marietta Magnesia
 CropMag* 200 Martin Marietta Magnesia

Trade Names

D
 Dical* Prince Agri Products
 Dilluex* Floridin Co.
 Disper-Sul* AG Martin Resources, Inc.
 Disper-Sul* Iron Martin Resources, Inc.
 Disper-Sul* Manganese Martin Resources, Inc.
 Disper-Sul* Turf Grade Martin Resources, Inc.
 Double-OK* Na-Churs Plant Food Co.
 DP10-6585* Allied Colloids, Inc.
 Dry Seed Triggrr* Westbridge Agricultural Products
 Dyna K* Prince Agri Products
 Dyna-Flo* 12-6-6 Plus Chemical Dynamics, Inc.
 Dyna-Gold* Calcium Chemical Dynamics, Inc.
 Dyna-Gold* C-B Mix Chemical Dynamics, Inc.
 Dyna-Gold* Copper Chemical Dynamics, Inc.
 Dyna-Gold* Iron Chemical Dynamics, Inc.
 Dyna-Gold* Magnesium Chemical Dynamics, Inc.
 Dyna-Gold* Manganese Chemical Dynamics, Inc.
 Dyna-Gold* MZ Mix Chemical Dynamics, Inc.
 Dyna-Gold* MZF Mix Chemical Dynamics, Inc.
 Dyna-Gold* Peanut & Soybean Mix Chemical Dynamics, Inc.
 Dyna-Gold* Tomato & Pepper Mix Chemical Dynamics, Inc.
 Dyna-Gold* Vegetable Mix Chemical Dynamics, Inc.
 Dyna-Gold* Zinc Chemical Dynamics, Inc.
 DynaMate* Prince Agri Products

E
 Elephant* Brand Cominco Fertilizers (U.S.) Inc.
 Efilminol* H.J. Baker & Bro., Inc.
 Energizer* Mammoth Intl. Chemical Corp.¹
 Enerleaf 60* Diachem S.p.A.
 Enersol* American Colloid Co.
 Enhance* Product Formulations, Inc.
 Enhance* Western Nutrients Corp.
 Enspan* Hydro Agri North America, Inc.
 Equalizer* Custom Chemicides
 Euromix* Eurochem, S.A.
 Evexel* Violmet S.A.

F
 F & B* Faesy & Besthoff, Inc.¹
 F-315G Frit Industries
 Farmland* Farmland Industries, Inc.
 Feast* Conklin Co., Inc.
 Feast* Crop Mix Conklin Co., Inc.
 Feast-XL* Conklin Co., Inc.
 Ferri-Floc* Boliden Intertrade, Inc.
 Ferriplus* Rhône-Poulenc Chemicals Ltd.
 Ferr-O* K & N. Efthymiadis S.A.
 Fert Lime* Ag Stone Pfizer, Inc.¹
 Fert-All* Bor Cal Grow More Inc.
 Fert-All* Boron Grow More Inc.
 Fert-All* Cal Mag Grow More Inc.
 Fert-All* Foliage Booster Grow More Inc.
 Fert-All* General Purpose Grow More Inc.
 Fert-All* Nitro Cal Zinc Grow More Inc.
 Fert-All* Nitro Zinc Plus Grow More Inc.
 FERTAPLEX* 8-0-0 Grow More Inc.
 FERTAPLEX* PK 0-4-4 Grow More Inc.
 Fertene-Tecofer* Tecomag SRL
 FERTIBOR* U.S. Borax Inc.
 Fertilizer 55 + 2E* Diachem S.p.A.
 Fertilal* Aglukon Spezialdünger GmbH
 Fert-O-Mag* American Minerals, Inc.
 Filozal* Violmet S.A.
 Fitopron* L.S. Probelte, S.A.
 Florex* Floridin Co.
 Florex Ag-Dri* Floridin Co.
 Flow-On* Vigoro Industries, Inc.¹

Foliomag* 2 Shield Brite
 Foliarel* Enichem America, Inc.¹
 Foli-Cal* Brandt Consolidated
 Foliert* Super Agrolinz (Austria)
 Foli-Gro* Wilbur-Ellis Co.¹
 Foli-Gro* 434 Wilbur-Ellis Co.¹
 Foli-Gro* Aminofol Wilbur-Ellis Co.¹
 Foli-Gro* Crop Mix Wilbur-Ellis Co.¹
 Foli-Gro* NZN Wilbur-Ellis Co.¹
 Foli-Gro* Rayplex 531 Wilbur-Ellis Co.¹
 Folo K Plus* Plant Health Technologies
 Folo Spray* Plant Health Technologies
 Folo Spray Che-Cop* Plant Health Technologies
 Folo Spray Che-Man* Plant Health Technologies
 Folo Spray Che-Zinc* Plant Health Technologies
 Folo Spray Neutral Zinc* Plant Health Technologies
 Folo Spray Nutra Wet* Plant Health Technologies
 Folo ZnK* Plant Health Technologies
 Folocron* CoRoN Corp.
 Folocron-Plus* CoRoN Corp.
 Foltron* Plus Grupo Bioquímico Mexicano
 Formolene-Plus* Hickson Kerley, Inc.
 Form-U-Sol* Hickson Kerley, Inc.
 Fortify* Horizon Ag-Products
 Fulvore* Product Formulations, Inc.
 Fun* Vigoro Industries, Inc.¹

G
 Gainer High 20* Smith & Ardussi, Inc.
 Gainer High Gro* Smith & Ardussi, Inc.
 Gainer High K* Smith & Ardussi, Inc.
 Gainer High Phos* Smith & Ardussi, Inc.
 Gainer High Yield* Smith & Ardussi, Inc.
 Gainer Humiphos* Smith & Ardussi, Inc.
 Gainer K-B-Z* Smith & Ardussi, Inc.
 Gainer Neu-II* Smith & Ardussi, Inc.
 Gainer N-P-Z* Smith & Ardussi, Inc.
 Gainer P-K-Z* Smith & Ardussi, Inc.
 Galoryl* AT 725 Lobeco Products, Inc.
 Galoryl ATH* Series Lobeco Products, Inc.
 Goëmar* BM 86 Agrimar Corp.
 Goëmar* Folical Agrimar Corp.
 Goëmar* Foliphos Agrimar Corp.
 Goëmar* MZ 63 Agrimar Corp.
 Goëmar* MZO Agrimar Corp.
 Goëmar* Pigmentil Agrimar Corp.
 Goëmar* Seedbooster Agrimar Corp.
 Grain Yield Booster* Albion Laboratories, Inc.
 GRANUBOR* U.S. Borax Inc.
 Granulime Mini* Ampel, Inc.¹
 Granurea* Terra International, Inc.
 Granusol* American Minerals, Inc.
 Granusol* Monterey Chemical Co.
 Green Gro* Moyer & Son, Inc.¹
 Green Top* Violmet S.A.
 Greens & Turf* Humus Products of America, Inc.
 Greenskote* Pursell Industries, Inc.
 Gro-Coat* Product Formulations, Inc.
 Grow More* Grow More Inc.
 Guardian* Conklin Co., Inc.
 Guardian* J & J Agri-Products
 Guardian-DL* Conklin Co., Inc.

H
 HA-16* Humus Products of America, Inc.
 Hamp-ene* Hampshire Chemical Corp.
 Hamp-ene* 100 Monterey Chemical Co.
 Hamp-ene* Calcium Monterey Chemical Co.
 Hamp-ene* Copper Monterey Chemical Co.
 Hamp-ene* Iron Monterey Chemical Co.

Hamp-ene* Magnesium Monterey Chemical Co.
 Hamp-ene* Manganese Monterey Chemical Co.
 Hamp-ene* Zinc Monterey Chemical Co.
 Hamp-ene*/Hamp-ol* Hampshire Chemical Corp.
 Hampex* Hampshire Chemical Corp.
 Hamp-Ex* Iron Monterey Chemical Co.
 Hamp-Iron* 806 Hampshire Chemical Corp.
 Hamp-ol* Hampshire Chemical Corp.
 Hamp-ol* 120 Monterey Chemical Co.
 Hamp-ol* Copper Monterey Chemical Co.
 Hamp-ol* Iron Monterey Chemical Co.
 Hamp-ol* Magnesium Monterey Chemical Co.
 Hamp-ol* Manganese Monterey Chemical Co.
 Hampshire* Hampshire Chemical Corp.
 Hampshire* Monterey Chemical Co.
 Hampshire* Iron Monterey Chemical Co.
 Hampshire* K-Zinc Hampshire Chemical Corp.
 Hampshire* K-Zinc Monterey Chemical Co.
 Hampshire* NTA Zinc Hampshire Chemical Corp.
 Hampshire* Zinc Monterey Chemical Co.
 Hastagro* Medina Agriculture
 Helena* Helena Chemical Co.
 Hepta-Gro* Liquid Calcium Traylor Chemical
 Hepta-Gro* Liquid Citrus Special Traylor Chemical
 Hepta-Gro* Liquid Copper Traylor Chemical
 Hepta-Gro* Liquid Crop Mix Traylor Chemical
 Hepta-Gro* Liquid Iron Traylor Chemical
 Hepta-Gro* Liquid Magnesium Traylor Chemical
 Hepta-Gro* Liquid Manganese Traylor Chemical
 Hepta-Gro* Liquid Molybdenum Traylor Chemical
 Hepta-Gro* Liquid Vegetable Mix Traylor Chemical
 Hepta-Gro* Liquid Zinc Traylor Chemical
 Hepta-Gro* SPC Mix Traylor Chemical
 High N* Grace-Sierra Intl.
 Hiloal* Terra International, Inc.
 Hioromix Proan* L.S. Probelte, S.A.
 Hortazon* Micro Aglukon Spezialdünger GmbH
 HPZN* Western Nutrients Corp.
 Humate* Medina Agriculture
 Humate Ag* Humate International, Inc.
 Humate AS* Humate International, Inc.
 Humate As* Fe Chelate Humate International, Inc.
 Humate Ls* Humate International, Inc.
 Humate Ls* Fe Chelate Humate International, Inc.
 Humate Ls* Fe/Mn Chelate Humate International, Inc.
 Humate Ls* Zn Chelate Humate International, Inc.
 Humate Stress Reliever* Humate International, Inc.
 Humax* JH Biotech, Inc.
 Hume/Bac* J & J Agri-Products
 Humek* SAMPOLK Corp.
 Humi Plus* Western Nutrients Corp.
 Humiplex* Western Nutrients Corp.
 Humiplex* GS Grupo Bioquímico Mexicano
 Humiplex* HP Western Nutrients Corp.
 Humiplex* HP 40 Western Nutrients Corp.
 Humiplex* Plus Grupo Bioquímico Mexicano
 Humiplex* Std Grupo Bioquímico Mexicano
 Humipron* Extra-25 Eurochem, S.A.
 Humitron* Grupo Bioquímico Mexicano
 Humitron* 60WP Grupo Bioquímico Mexicano
 Humotec L* Tecomag SRL
 Humotrel* Violmet S.A.
 Humozal* Basic Violmet S.A.
 Humozal L* Violmet S.A.
 Humus HUK-12 Herbispray* Humus Products of America, Inc.

* - Trade Name R/T/M

1 - Information not updated for 1995

Humus WDG-70* Humus Products of America, Inc.
 Humus WP-80* Humus Products of America, Inc.
 Humus-Gro* Biofix Co.
 Hydroform* Hydro Agri North America, Inc.
 Hydrolene* Hydro Agri North America, Inc.
 Hydro-Pak* Vigoro Industries, Inc.¹
 Hydrophos* 3 Shield Brite
 Hy-Pot* Violmet S.A.

I
 IMC* IMC Global USA
 IMC-Agrico* IMC-Agrico Co.
 Indicate 5* Brandt Consolidated
 Inhance* Brandt Consolidated
 Injecto Feed* The Doggett Corp.
 Inocu-Gro* Biofix Co.
 Inso-U25* Georgia-Pacific Corp.¹
 Inspray 90* Brandt Consolidated
 Instill MSO* Brandt Consolidated
 Intent* Brandt Consolidated
 International* IMC Global USA
 IPI* Boron Imperial Products, Inc.
 IPI* Copper Imperial Products, Inc.
 IPI* Iron Imperial Products, Inc.
 IPI* Magnesium Imperial Products, Inc.
 IPI* Manganese Imperial Products, Inc.
 IPI* Molybdenum Imperial Products, Inc.
 IPI* Zinc Imperial Products, Inc.
 Ill Iron* PRO-SOL
 Iron KE-MIN* Georgia-Pacific Corp.¹

J
 J & J Soil Conditioner* J & J Agri-Products

K
 Kadox 911*, 920*, 930* Zinc Corp. of America
 Kaiser/Estech* Vigoro Industries, Inc.¹
 Kalium* Kalium Chemicals, Ltd.
 Kao-X* Engelhard Corp.
 Keep-On* Amereq, Inc.
 Kelaplex* Iron Crystal Chemical Inter-America
 Kelaplex* Zinc Crystal Chemical Inter-America
 Kelig FS* LignoTech USA, Inc.
 Kenite* Celite Corp./World Minerals Inc.
 Key-Lime* Vigoro Industries, Inc.¹
 Key-Start* Vigoro Industries, Inc.¹
 K-Fol* Grupo Bioquimico Mexicano
 K-Mag* Compacted Western Ag Minerals Co.
 K-Mag* Granular Western Ag Minerals Co.
 K-Power* Cedar Chemical Corp.
 K-Power* Haifa Chemicals Ltd.
 K-Power* Hydro Agri North America, Inc.
 KPS* Hickson Kerley, Inc.
 K-S* Prince Agri Products
 KTS* Hickson Kerley, Inc.

L
 LaRoche* LaRoche industries Inc.
 Lawn-Plex* R.G.B. Laboratories, Inc.¹
 Leaf Life* PureGro Co.¹
 Leaf Life 3* PureGro Co.¹
 Leaf Life 7* PureGro Co.¹
 Leaf Life 8* PureGro Co.¹
 Leaf Life* Boron PureGro Co.¹
 Leaf Life* Citrus PureGro Co.¹
 Leaf Life* Heads-Up PureGro Co.¹
 Leaf Life* Magnesium PureGro Co.¹
 Leaf Life* Powergizer 45 PureGro Co.¹
 Leaf Life* Super Zinc 10 PureGro Co.¹
 LibFer* SP Allied Colloids, Inc.

Librel* Ca Allied Colloids, Inc.
 Librel* Cu Allied Colloids, Inc.
 Librel* Fe-Lo Allied Colloids, Inc.
 Librel* Mg Allied Colloids, Inc.
 Librel* Mn Allied Colloids, Inc.
 Librel* RMX3 Allied Colloids, Inc.
 Librel* RMX4 Allied Colloids, Inc.
 Librel* RMX8 Allied Colloids, Inc.
 Librel* Zn Allied Colloids, Inc.
 Lidoquest* Calcium 9P Lidochem, Inc.
 Lidoquest* Disodium EDTA Lidochem, Inc.
 Lidoquest* EDTA Acid Lidochem, Inc.
 Lidoquest* Iron 13P Lidochem, Inc.
 Lidoquest* Manganese 13P Lidochem, Inc.
 Lidoquest* Tetrasodium EDTA Lidochem, Inc.
 Lidoquest* Zinc 14P Lidochem, Inc.
 Lignosol* LignoTech USA, Inc.
 Limestone-F* W.A. Cleary Chemical Corp.
 Link* 44 Wilbur-Ellis Co.¹
 Link* Calcium Wilbur-Ellis Co.¹
 Link* Ca-Zn Wilbur-Ellis Co.¹
 Link* K-35 Wilbur-Ellis Co.¹
 Link Multi-Mix Wilbur-Ellis Co.¹
 Link* N-25 Wilbur-Ellis Co.¹
 Liqui-Cal* Alpine Plant Foods, Inc.
 Liqui-Zinc* Arcadian Corp.

M
 MACC.N* La Cornubia S.A.
 Macro-Plus* Intl. Humate Fertilizer Co.¹
 Macro-Plus Iron* Intl. Humate Fertilizer Co.¹
 Macro-Plus Zinc* Intl. Humate Fertilizer Co.¹
 Mag-Four* Custom Chemicides
 Magnisal* Haifa Chemicals Ltd.
 Magnisol* Cedar Chemical Corp.
 Man-Gro* American MicroTrace Corp.
 Man-Gro* AS American MicroTrace Corp.
 Mantrac* 4 Shield Brite
 Mantrac* 500 Shield Brite
 Manure/Maximizer* J & J Agri-Products
 Maracarb* LignoTech USA, Inc.
 Marasperse* LignoTech USA, Inc.
 Martin* Martin Resources, Inc.
 Max Bac* Grace-Sierra Intl.
 Maxi-Bor* Monterey Chemical Co.
 Maxi-K* Monterey Chemical Co.
 Maximo* Monterey Chemical Co.
 Maxi-Phos* Monterey Chemical Co.
 Maxi-Pk* Monterey Chemical Co.
 Maxi-Yield* Monterey Chemical Co.
 Maxi-Yield Plus* Monterey Chemical Co.
 MCC* Mississippi Chemical Corp.
 Medina* Plus Medina Agriculture
 Medina* Soil Activator Medina Agriculture
 MegaCal* SAMPOLK Corp.
 MegaFlo* SAMPOLK Corp.
 MegaMag* SAMPOLK Corp.
 MegaZn* SAMPOLK Corp.
 Meister* Helena Chemical Co.
 Metagro* Traylor Chemical
 Metagro* Cai-B Traylor Chemical
 Metagro* Cal-Bor Traylor Chemical
 Metagro* Calcium Traylor Chemical
 Metagro* Calcium/N Traylor Chemical
 Metagro* Corn Mix Traylor Chemical
 Metagro* Cotton/Soybean Mix Traylor Chemical
 Metagro* Crop Mix Traylor Chemical
 Metagro* Magnesium Traylor Chemical
 Metagro* Peanut Mix Traylor Chemical
 Metagro Plus* Copper Traylor Chemical
 Metagro Plus* Corn Mix Traylor Chemical
 Metagro Plus* Iron Traylor Chemical
 Metagro Plus* Liquid Starter Traylor Chemical

Metagro Plus* Magnesium Traylor Chemical
 Metagro Plus* Manganese Traylor Chemical
 Metagro Plus* Peanut/Cotton/Soybean Mix Traylor Chemical
 Metagro Plus* Pop-Up Traylor Chemical
 Metagro Plus* Zinc Traylor Chemical
 Meteor* Chemical & Pigment Co.
 Meteor* Hydro Agri North America, Inc.
 Micro Plus* Western Nutrients Corp.
 Micro-Cel* Celite Corp./World Minerals Inc.
 Microflo* Moyer & Son, Inc.¹
 Microfol* Calcium Fertilizer Corp. of America
 Microfol* Calcium Boron Fertilizer Corp. of America
 Microfol* Cobalt Fertilizer Corp. of America
 Microfol* Copper Fertilizer Corp. of America
 Microfol* Iron Fertilizer Corp. of America
 Microfol* Magnesium Fertilizer Corp. of America
 Microfol* Manganese Fertilizer Corp. of America
 Microfol* Molybdenum Fertilizer Corp. of America
 Microfol* Tree Vine and Vegetable Mix Fertilizer Corp. of America
 Microfol* Western Row Crop Mix Fertilizer Corp. of America
 Microfol* Zinc Fertilizer Corp. of America
 Micromax* Grace-Sierra Intl.
 Micro-Plus* Horizon Ag-Products
 Mineral Research* Mineral Research & Dev., Div. Chemicals Specialties Inc.
 Min-U-Gel* 100 Floridin Co.
 Min-U-Gel* 200 Floridin Co.
 Min-U-Gel* 400 Floridin Co.
 Molytrac* Shield Brite
 Monterey* Monterey Chemical Co.
 Monterey* Boron Monterey Chemical Co.
 Monterey* Calcium Monterey Chemical Co.
 Monterey* Cal-Nite Monterey Chemical Co.
 Monterey* CC Mix Monterey Chemical Co.
 Monterey* CCT & V Mix Monterey Chemical Co.
 Monterey* Citrus Mix 2 Monterey Chemical Co.
 Monterey* Cobalt Monterey Chemical Co.
 Monterey* Copper Monterey Chemical Co.
 Monterey* Copper/Zinc Monterey Chemical Co.
 Monterey* Crop Mix Monterey Chemical Co.
 Monterey* Desert Crop Mix Monterey Chemical Co.
 Monterey* Field Crop Mix Monterey Chemical Co.
 Monterey* HA-12 Monterey Chemical Co.
 Monterey* HA-60FG Monterey Chemical Co.
 Monterey* HA-60G Monterey Chemical Co.
 Monterey* HA-55WD Monterey Chemical Co.
 Monterey* HA-70WS Monterey Chemical Co.
 Monterey* Hawaiian Mix Monterey Chemical Co.
 Monterey* Hi-Phos Monterey Chemical Co.
 Monterey* Hi-PK Monterey Chemical Co.
 Monterey* Iron Monterey Chemical Co.
 Monterey* Lime Monterey Chemical Co.
 Monterey* Magnesium Monterey Chemical Co.
 Monterey* Mag-Nite Monterey Chemical Co.
 Monterey* Manganese Monterey Chemical Co.
 Monterey* Mix Monterey Chemical Co.
 Monterey* Molybdenum Monterey Chemical Co.
 Monterey* Tree & Vine Mix Monterey Chemical Co.
 Monterey* Turf Monterey Chemical Co.
 Monterey* Zinc Monterey Chemical Co.
 Monterey* Zinc-All Monterey Chemical Co.
 Monterey* ZNM Monterey Chemical Co.
 MOP* Cedar Chemical Corp.
 Mora-Leaf* Wilbur-Ellis Co.¹
 Mora-Leaf* HIK Wilbur-Ellis Co.¹

Trade Names

Mora-Leaf* Hi-P..... Wilbur-Ellis Co.†
 Multi KE-MIN*..... Georgia-Pacific Corp.†
 Multi KE-MIN* Z..... Georgia-Pacific Corp.†
 Multicote*..... Cedar Chemical Corp.
 Multicote*..... Haifa Chemicals Ltd.
 Multi-Kelaplex*..... Crystal Chemical Inter-America
 Multiminerall*..... Albion Laboratories, Inc.
 Multi-mix*..... Humus Products of America, Inc.
 Multimix*..... Western Nutrients Corp.
 Murtonik*..... K & N, Ephythiadis S.A.

N

N.R. Ca*..... N.R. Consa
 N.R. Ca Mg*..... N.R. Consa
 N.R. Calcium*..... N.R. Consa
 N.R. Dolomite*..... N.R. Consa
 N.T.A. Zinc*..... Monterey Chemical Co.
 NaChurs*..... Na-Churs Plant Food Co.
 Natural Resource*..... The Doggett Corp.
 Navigator*..... Custom Chemidices
 N-Care* Calcium..... Custom Chemidices
 N-Care* Nitrogen..... Custom Chemidices
 Nervanaid*..... Rhône-Poulenc Chemicals Ltd.
 New Vachs*..... Violmet S.A.
 NFE*..... Arcadian Corp.
 NFE*..... Hickson Kerley, Inc.
 Nu/Cal*..... J & J Agri-Products
 Nitra Zinc*..... Frit Industries
 Nitra-King*..... J.R. Simplot Co., Professional
 Nitro Zinc*..... Custom Chemidices
 Nitro/Max*..... J & J Agri-Products
 Nitroform*..... Aglukon Spezialdünger GmbH
 Nitroform*..... AgrEvo USA Co.
 Nitroform Blue Chip*..... AgrEvo USA Co.
 Nitroform Blue Granular*..... AgrEvo USA Co.
 Nitroform Blue Powder*..... AgrEvo USA Co.
 Nitro-Sul*..... Hickson Kerley, Inc.
 NMG*..... Arcadian Corp.
 NMG*..... Hickson Kerley, Inc.
 No Foam*..... Monterey Chemical Co.
 Norlig*..... LignoTech USA, Inc.
 N-pHuric*..... Unocal Petroleum Products
 N-Safe*..... Amereq, Inc.
 N-Serve* 24, 24E..... DowElanco
 N-Sol*..... Mississippi Chemical Corp.
 N-Sure*..... Brandt Consolidated
 N-Sure*..... Hickson Kerley, Inc.
 Nutra Sorb*..... Grow More Inc.
 Nutra Stimulants*..... Chandler Sales Co.
 Nutra Zinc*..... Custom Chemidices
 Nutra-Biz*..... Custom Chemidices
 Nutra-Boost*..... Custom Chemidices
 Nutra-Burst*..... Custom Chemidices
 Nutra-Feed 60*..... Custom Chemidices
 Nutra-K*..... Custom Chemidices
 Nutralene*..... Aglukon Spezialdünger GmbH
 Nutralene Chip*..... AgrEvo USA Co.
 Nutralene Granular*..... AgrEvo USA Co.
 Nutralene* Green-Keeper..... Aglukon Spezialdünger GmbH
 Nutralene* Premium 40N..... Aglukon Spezialdünger GmbH
 Nutralene* Sports-Master..... Aglukon Spezialdünger GmbH
 Nutralene* Turf-Master..... Aglukon Spezialdünger GmbH
 Nutra-Mip*..... Custom Chemidices
 Nutramix*..... Western Nutrients Corp.
 Nutra-Phos* 3-15..... Shield Brite
 Nutra-Phos* 10..... Shield Brite
 Nutra-Phos* 12..... Shield Brite
 Nutra-Phos* 24..... Shield Brite
 Nutra-Phos* 28..... Shield Brite

Nutra-Phos* 40..... Shield Brite
 Nutra-Phos* Fe..... Shield Brite
 Nutra-Phos* K..... Shield Brite
 Nutra-Phos* Mg..... Shield Brite
 Nutra-Phos* N..... Shield Brite
 Nutra-Phos* Super K..... Shield Brite
 Nutra-Phos* ZMC..... Shield Brite
 Nutraplex* Calcium..... Western Nutrients Corp.
 Nutraplex* Crop Mix..... Western Nutrients Corp.
 Nutraplex* Iron..... Western Nutrients Corp.
 Nutraplex* Manganese..... Western Nutrients Corp.
 Nutraplex* Western Crop Mix..... Western Nutrients Corp.

Nutraplex* Zinc..... Western Nutrients Corp.
 Nutra-Plus*..... Custom Chemidices
 Nutra-Plus Concentrated Humate*..... Custom Chemidices
 Nutra-Plus Harvest Mix*..... Custom Chemidices
 Nutra-Spray* Copophos..... Shield Brite
 Nutra-Spray* Cu25-Zn25..... Shield Brite
 Nutra-Spray* Manganese..... Shield Brite
 Nutra-Spray* Zinc 50..... Shield Brite
 Nutra-Spray* Zinc 50 Zn..... Shield Brite
 Nutra-Spray* Zn17.5-Mn4-Cu4..... Shield Brite
 Nutra-Spray* Zn18.5-Mn7..... Shield Brite
 Nutra-Spray* Zn25-Mn25..... Shield Brite
 Nutra-Zim*..... Custom Chemidices
 Nu-Trex*..... Imperial Products, Inc.
 Nutri-Aid*..... JH Biotech, Inc.
 Nutri-Cal*..... C.S.I. Chemical Corp.
 Nutri-Comp*..... PureGro Co.†
 Nutrient Buffer*..... Monterey Chemical Co.
 Nutrient Buffer*..... Plant Health Technologies
 Nutrifix*..... Chemia S.p.A.
 Nutrifol* 14-8-2..... Fertilizer Corp. of America
 Nutrifol* 5-17-2..... Fertilizer Corp. of America
 Nutrifol* 6-12-6..... Fertilizer Corp. of America
 Nutrifol* K-Plus..... Fertilizer Corp. of America
 Nutrigizer 60 + 2E*..... Diachem S.p.A.
 Nutri-Lease*..... Product Formulations, Inc.
 Nutri-Mag*..... National Magnesia Chemicals
 Nutrimin*..... JH Biotech, Inc.
 Nutrimore* 10-55-10..... Fertilizer Corp. of America
 Nutrimore* 15-15-30..... Fertilizer Corp. of America
 Nutrimore* 15-30-15..... Fertilizer Corp. of America
 Nutrimore* 20-20-20..... Fertilizer Corp. of America
 Nutrimore* 30-10-10..... Fertilizer Corp. of America
 Nuvox 78*..... Zinc Corp. of America
 NZN*..... Arcadian Corp.
 NZN*..... Hickson Kerley, Inc.

O

Once*..... Grace-Sierra Intl.
 Organo-Plex*..... American Colloid Co.
 (The) Original CAN 17*..... Unocal Petroleum Prod.
 Osmocote*..... Grace-Sierra Intl.
 Osmocote* Mini..... Grace-Sierra Intl.
 Osmocote* Nursery Mix..... Grace-Sierra Intl.
 Osmocote* Plus..... Grace-Sierra Intl.
 Osmocote* Plus Tablet..... Grace-Sierra Intl.

P

P-30*..... Monterey Chemical Co.
 Pel-Lime*..... Ampel, Inc.†
 Pel-lime*..... Farmland Industries, Inc.
 Perform* N-P-K..... Humate International, Inc.
 Perform* T.O.G..... Humate International, Inc.
 Perk*..... Product Formulations, Inc.
 Perk + Moly*..... Product Formulations, Inc.
 Perk Plus*..... Product Formulations, Inc.
 Peters* Excel*..... Grace-Sierra Intl.
 Peters* Professional..... Grace-Sierra Intl.

Phyto-Plus*..... N.R. Consa
 Phyto-Plus Alfalfa Mix*..... N.R. Consa
 Phyto-Plus Combo Chelate*..... N.R. Consa
 Phyto-Plus Complete*..... N.R. Consa
 Phyto-Plus Continuum Nutra Gel*..... N.R. Consa
 Phyto-Plus Gene's Green*..... N.R. Consa
 Phyto-Plus Lucky 7, 7 24-7*..... N.R. Consa
 Phyto-Plus Wheatrix*..... N.R. Consa
 PICC*..... Hydro Agri North America, Inc.
 Plant Start*..... Brandt Consolidated
 Plantacote* Depot..... Aglukon Spezialdünger GmbH
 Plantacote* Mix..... Aglukon Spezialdünger GmbH
 Plantacote* Start..... Aglukon Spezialdünger GmbH
 Plantodur*..... Aglukon Spezialdünger GmbH
 Plantosan*..... Aglukon Spezialdünger GmbH
 Plexal*..... Product Formulations, Inc.
 Poliquel* Ca..... Grupo Bioquimico Mexicano
 Poliquel* Fe..... Grupo Bioquimico Mexicano
 Poliquel* Multi..... Grupo Bioquimico Mexicano
 Poliquel* Zn..... Grupo Bioquimico Mexicano
 Poly-N*..... Arcadian Corp.
 POLYON*..... Purseil Industries, Inc.
 Popcorn*..... Unocal Petroleum Products
 Poro-Sul*..... Smith & Arducci, Inc.
 Powergizer 45*..... Mammoth Intl. Chemical Corp.†
 Powergizer 700*..... Mammoth Intl. Chemical Corp.†
 Powertrace* Iron..... Mammoth Intl. Chemical Corp.†
 Powertrace* Zinc..... Mammoth Intl. Chemical Corp.†
 PQ* Epsom Salt..... PQ Corp.
 Product-F*..... Horizon Ag-Products
 Product-H*..... Horizon Ag-Products
 Prolific*..... Terra International, Inc.
 Prolific* Max..... Terra International, Inc.
 Prolong* 4F..... Plant Health Technologies
 PROMAX*..... PRO•SOL
 Promesol*..... C.S.I. Chemical Corp.
 Promot*..... JH Biotech, Inc.
 Propell* Homogenized Plant Food..... Farmland Industries, Inc.
 PRO•SOL Tobacco Transplant*..... PRO•SOL

Q

Quelapron*..... Eurochem, S.A.
 Quick Start*..... Farmland Industries, Inc.

R

Rainbow*..... IMC Global USA
 Raizal*..... Grupo Bioquimico Mexicano
 REAX* 88B..... Westvaco Corp.
 REAX* 100-M..... Westvaco Corp.
 Relax*..... JH Biotech, Inc.
 Replenish*..... Product Formulations, Inc.
 Resi-Grow*..... Georgia-Pacific Corp.†
 Riverside*..... Terra International, Inc.
 Riverside* Citrus Knight..... Terra International, Inc.
 Riverside* Citrus Knight IV..... Terra International, Inc.
 Riverside* Citrus Maker LS..... Terra International, Inc.
 Riverside* Corn Mix..... Terra International, Inc.
 Riverside* Mag Knight..... Terra International, Inc.
 Riverside* Mn, Zn, LS..... Terra International, Inc.
 Riverside* Soybean Mix..... Terra International, Inc.
 Riverside* Vegetable Maker LS..... Terra International, Inc.
 Riverside* White Knight Calcium..... Terra International, Inc.
 Ruffin Redy*..... Ruffin Micronutrients
 Ruffin Tuff*..... Ruffin Micronutrients
 Ruffin-Redy*..... Smith & Arducci, Inc.
 Ruffin-Redy*..... Smith & Arducci, Inc.
 Ruffin-Tuff*..... Smith & Arducci, Inc.
 Ruffin-Tuff* Crop Mix*..... Smith & Arducci, Inc.

* - Trade Name R/T/M

† - Information not updated for 1995

S			
S & A Boro-Cal*	Smith & Ardussi, Inc.	Sea-Born*	SeaBorn/Lane, Inc.
S & A Calcium +*	Smith & Ardussi, Inc.	Seagro*	Barclay Chemicals Mfg. Ltd.
S & A Field Crop Mix*	Smith & Ardussi, Inc.	Seawet*	SeaBorn/Lane, Inc.
S & A IronMan*	Smith & Ardussi, Inc.	Semi-Tropic Mix*	Monterey Chemical Co.
S & A IronMan +*	Smith & Ardussi, Inc.	Seniphos* 5	Shield Brite
S & A Liq-Cu*	Smith & Ardussi, Inc.	Sequelane 5073E*	Diachem S.p.A.
S & A Liq-Fe*	Smith & Ardussi, Inc.	Sequelane 77 E New*	Diachem S.p.A.
S & A Liq-Mn*	Smith & Ardussi, Inc.	Sequelane Combi E*	Diachem S.p.A.
S & A Liqui-Phos*	Smith & Ardussi, Inc.	Sequeiane Fruttiferi*	Diachem S.p.A.
S & A Liq-Zn*	Smith & Ardussi, Inc.	Sequestar*	Monterey Chemical Co.
S & A Nitro Green*	Smith & Ardussi, Inc.	Sequestrene* 138	Ciba Crop Protection
S-25*	Arcadian Corp.	Sequestrene* 330	Ciba Crop Protection
Scotts* Fertilizer Plus Iron	The O.M. Scott & Sons Co.	Sierrablen* Turmlx	Grace-Sierra Intl.
Scotts* Flowable K	The O.M. Scott & Sons Co.	Sierrablen*	Grace-Sierra Intl.
Scotts* Fluid Fertilizer	The O.M. Scott & Sons Co.	Simplot*	J.R. Simplot Co., Minerals ¹
Scotts* Fluid Minors Pk.	The O.M. Scott & Sons Co.	Simplot*	J.R. Simplot Co., Professional ¹
Scotts* HD Fairway	The O.M. Scott & Sons Co.	Sinergipron* 20	Probelte, S.A.
Scotts* HD Fertilizer +	The O.M. Scott & Sons Co.	Sinergipron* Complex	Probelte, S.A.
Scotts* HD Fertilizer w/Minors	The O.M. Scott & Sons Co.	Sinergipron* Fe-3-20	Probelte, S.A.
Scotts* HD Greens	The O.M. Scott & Sons Co.	Sinergipron* Fe-6	Probelte, S.A.
Scotts* HD Hi-Maintenance Turf Fertilizer	The O.M. Scott & Sons Co.	Sinergipron* Fe-6 M.S.	Probelte, S.A.
Scotts* HD Nitrogen/Potassium	The O.M. Scott & Sons Co.	SMCP*	SureCo, Inc.
Scotts* HD NPK Greens	The O.M. Scott & Sons Co.	Soil-Mend*	Best Sulfur Products
Scotts* HD NPK Super Fairway	The O.M. Scott & Sons Co.	Solu/Carb*	J & J Agri-Products
Scotts* HD Super Fairway	The O.M. Scott & Sons Co.	Solubor*	Monterey Chemical Co.
Scotts* HD Super Greens	The O.M. Scott & Sons Co.	Solubor*	Smith & Ardussi, Inc.
Scotts* High K Fertilizer	The O.M. Scott & Sons Co.	Solubor*	Traylor Chemical
Scotts* High K Fertilizer Plus Minors	The O.M. Scott & Sons Co.	SOLUBOR*	U.S. Borax Inc.
Scotts* High K Turf Fertilizer	The O.M. Scott & Sons Co.	Sol-U-N*	Goodpasture, Inc. ¹
Scotts* Hi-Maintenance Plus Minors	The O.M. Scott & Sons Co.	Sol-U-N* 28	Goodpasture, Inc. ¹
Scotts* Iron-S	The O.M. Scott & Sons Co.	Sol-U-N* 32	Goodpasture, Inc. ¹
Scotts* Nitrogen/Potassium Turf Fertilizer	The O.M. Scott & Sons Co.	Sol-U-Phos*	Goodpasture, Inc. ¹
Scotts* NPK Fertilizer	The O.M. Scott & Sons Co.	Solu-Plex*	R.G.B. Laboratories, Inc. ¹
Scotts* NPK Fertilizer Plus Minors	The O.M. Scott & Sons Co.	Sol-U-Spray*	Goodpasture, Inc. ¹
Scotts* NPK Turf Fertilizer	The O.M. Scott & Sons Co.	Solu-Spray* 9-15-32	Shield Brite
Scotts* NPK Turf Fertilizer Plus Minors	The O.M. Scott & Sons Co.	Solu-Spray* 10-45-10	Shield Brite
Scotts* Starter Fertilizer	The O.M. Scott & Sons Co.	Solu-Spray* 10-55-10	Shield Brite
Scotts* Sulfur	The O.M. Scott & Sons Co.	Solu-Spray* 12-26-26	Shield Brite
Scotts* Super K Greens Turf Fertilizer	The O.M. Scott & Sons Co.	Solu-Spray* 15-20-20	Shield Brite
Scotts* Super Turf Fertilizer	The O.M. Scott & Sons Co.	Solu-Spray* 20-20-20	Shield Brite
Scotts* Turf Fertilizer	The O.M. Scott & Sons Co.	Solu-Spray* 7-5-44	Shield Brite
Scotts* Turf Fertilizer Plus Iron	The O.M. Scott & Sons Co.	Sorba-Spray* Ca	Shield Brite
Scotts* Turf Nitrogen	The O.M. Scott & Sons Co.	Sorba-Spray* CaB	Shield Brite
Scotts* Turf Starter	The O.M. Scott & Sons Co.	Sorba-Spray* Cu	Shield Brite
Sea Life*	SeaBorn/Lane, Inc.	Sorba-Spray* Mg	Shield Brite
		Sorba-Spray* MIP	Shield Brite
		Sorba-Spray* Mn	Shield Brite
		Sorba-Spray* ZBK	Shield Brite
		Sorba-Spray* ZIP	Shield Brite
		Sorba-Spray* ZKP	Shield Brite
		Sorba-Spray* ZNP	Shield Brite
		Soy Gro*	Cornbelt Chemical Co.
		Spark*	CCT Corp.
		SpeedFeed*	Burlington Bio-Medical & Scientific Corp.
		Spray-N-Grow*	Spray-N-Grow Inc. ¹
		Spring*	Westbridge Agricultural Products
		Sta-Form 60*	Georgia-Pacific Corp. ¹
		Start Up*	Western Nutrients Corp.
		STEP-Trace Element*	The O.M. Scott & Sons Co.
		Stimox*	Tecomag SRL
		Stopit* 6	Shield Brite
		Suffa 6#*	Monterey Chemical Co.
		Sul-15 Plus*	PRO-SOL
		Sul-Cop*	Smith & Ardussi, Inc.
		Sulf-N 45*	AlliedSignal Inc.
		Sulf-N Liquor*	AlliedSignal Inc.
		Sulfur-F*	W.A. Cleary Chemical Corp.
		Sul-PO-Mag*	SeaBorn/Lane, Inc.
		Sul-PO-Mag* (S.P.M*)	IMC Global USA
		Sul-Preme* Sulfur	Smith & Ardussi, Inc.
		Sultech*	Vigoro Industries, Inc. ¹
		Sunburst* Foliar	Westbridge Agricultural Products
		Sunburst* Soil	Westbridge Agricultural Products
		SunUp*	Westbridge Agricultural Products
		Super Blend Plus*	Cornbelt Chemical Co.
		Super Blu-Min*	Monterey Chemical Co.
		Super Fine Zink*	American MicroTrace Corp.
		Super Iron Plus*	Cornbelt Chemical Co.
		Super N*	IMC-Agrico Co.
		Super N*	Terra Nitrogen Co. L.P.
		Super N* Plus	IMC-Agrico Co.
		Super Rainbow*	IMC Global USA
		Super Sol-Nutri Boost*	PureGro Co. ¹
		Super Sol-U* 60	PureGro Co. ¹
		Super Sol-U* K	PureGro Co. ¹
		Super Sol-U* Phos	PureGro Co. ¹
		Super Starter*	IMC-Agrico Co.
		Super TEL Zn*	American MicroTrace Corp.
		Super U*	IMC-Agrico Co.
		Super-45*	Terra International, Inc.
		Super-49*	Terra International, Inc.
		Superflor* Mn	C.M.I. Ltd.
		Superflor Humi*	C.M.I. Ltd.
		Superprill*	Arcadian Corp.
		Surán*	Arcadian Corp.
		Surge*	Custom Chemicides
		Surphtac*	Unocal Petroleum Products
		Synergizer*	JH Biotech, Inc.
		T	
		Tech-Flo* Alpha	Nutrient Technologies, Inc.
		Tech-Flo* Beta	Nutrient Technologies, Inc.
		Tech-Flo* Cal-Bor	Nutrient Technologies, Inc.
		Tech-Flo* Cal-Bor+Moly	Nutrient Technologies, Inc.
		Tech-Flo* Copocal*	Nutrient Technologies, Inc.
		Tech-Flo* Gamma	Nutrient Technologies, Inc.
		Tech-Flo* Hi-Mag	Nutrient Technologies, Inc.
		Tech-Flo* Phi	Nutrient Technologies, Inc.
		Tech-Flo* Sigma	Nutrient Technologies, Inc.
		Tech-Flo* Zeta	Nutrient Technologies, Inc.
		Tech-Flo* ZMC	Nutrient Technologies, Inc.
		Techmangam*	Hydro Agri North America, Inc.
		Tech-Spray* Cobalt	Nutrient Technologies, Inc.
		Tech-Spray* Copper	Nutrient Technologies, Inc.
		Tech-Spray* Hi-K	Nutrient Technologies, Inc.
		Tech-Spray* IZP	Nutrient Technologies, Inc.
		Tech-Spray* Liquibor*	Nutrient Technologies, Inc.
		Tech-Spray* MG	Nutrient Technologies, Inc.
		Tech-Spray* Moly-Mag	Nutrient Technologies, Inc.
		Tech-Spray* PZn	Nutrient Technologies, Inc.
		Tech-Spray* ZnPK	Nutrient Technologies, Inc.
		TEM* 300B	Traylor Chemical
		TEM* 300G	Traylor Chemical
		Terra*	Terra International, Inc.
		Terra*	Violmet S.A.
		TERRA-GREEN*	Agrisorbents Product Group
		Terran*	Terra International, Inc.
		Terrex*	Terra International, Inc.
		Texasgulf*	Texasgulf Inc.
		Tgreen Solution*	Texasgulf Inc.
		Thio-Sul*	Hickson Kerley, Inc.
		Thiovite*	Goodpasture, Inc. ¹
		Thrust*	Product Formulations, Inc.
		Tom* MG4	Violmet S.A.
		Tracite*	Helena Chemical Co.
		Tracite* Crop Mix	Helena Chemical Co.
		Tracite* Hi-Phos	Helena Chemical Co.

Trade Names

Tracite* ZFM.....Helena Chemical Co.
 Tracite* ZFM Plus.....Helena Chemical Co.
 Tracite* ZM Special.....Helena Chemical Co.
 Traco* Crop Kicker.....Traylor Chemical
 Traco* Liquid Copper 5.....Traylor Chemical
 Traco* Liquid Iron 5.....Traylor Chemical
 Traco* Liquid Manganese 5.....Traylor Chemical
 Traco* Liquid Zinc 10.....Traylor Chemical
 Traco Yield King*.....Traylor Chemical
 Traco-B5*.....Traylor Chemical
 Traylor* Boron.....Traylor Chemical
 Traylor* Copper.....Traylor Chemical
 Traylor* Iron.....Traylor Chemical
 Traylor* Manganese.....Traylor Chemical
 Traylor* Zinc.....Traylor Chemical
 Triangle*.....Phelps Dodge Refining Corp.
 Tri-Basic*.....Boliden Intertrade, Inc.
 TriKote*.....Pursell Industries, Inc.
 Trisert*.....Brandt Consolidated
 Trisert*.....Hickson Kerley, Inc.
 Trisert*-CB.....Hickson Kerley, Inc.
 Trisert*-KS.....Hickson Kerley, Inc.
 Trisert*-KSB.....Hickson Kerley, Inc.
 Trugreen*.....W.A. Cleary Chemical Corp.
 Trugreen*-Pro.....W.A. Cleary Chemical Corp.
 Turflo*.....Moyer & Son, Inc.¹
 Turf-Pro* Iron.....Traylor Chemical
 Turftouch*.....Product Formulations, Inc.

T

TULB Urea*.....Monterey Chemical Co.
 Strasulf*.....Clifton Chemicals, Ltd.¹
 Uniflow* Sulfur.....Shield Brite
 Uniflow* Sulfur CF6.....Shield Brite

Uniflow* Zinc.....Shield Brite
 Unocal*.....Unocal Petroleum Products
 Unocal Plus*.....Unocal Petroleum Products
 Uran*.....Arcadian Corp.
 USG Ben Franklin*.....United States Gypsum Co.¹

V

Vantage*.....Product Formulations, Inc.
 Viking Ship*.....Hydro Agri North America
 Vita Mega fol*.....SAMPOLK Corp.
 Vitatone* Stabilized Iron.....Shield Brite
 Viterra* Agri-gel*.....Amereq, Inc.
 Vitol*.....SAMPOLK Corp.
 Vollkorn*.....Agrolinz (Austria)

W

Water Soluble Fertilizers*.....PRO•SOL
 Western* Mineral Spray.....Western Nutrients Corp.
 WKD*.....Martin Marietta Magnesia
 Wuxal*.....Amereq, Inc.
 Wuxal* Basis N.....Aglukon Spezialdünger GmbH
 Wuxal* Calcium.....Aglukon Spezialdünger GmbH
 Wuxal* Combi B.....Aglukon Spezialdünger GmbH
 Wuxal* Combi Fe.....Aglukon Spezialdünger GmbH
 Wuxal* Combi Mg.....Aglukon Spezialdünger GmbH
 Wuxal* Combi Mn.....Aglukon Spezialdünger GmbH
 Wuxal* Endivo.....Aglukon Spezialdünger GmbH
 Wuxal* Folibor.....Aglukon Spezialdünger GmbH
 Wuxal* Iron.....Aglukon Spezialdünger GmbH
 Wuxal* Macromix.....Aglukon Spezialdünger GmbH
 Wuxal* Magnesium.....Aglukon Spezialdünger GmbH
 Wuxal* Manganese.....Aglukon Spezialdünger GmbH
 Wuxal* Micro Fe-Mn-Zn.....Aglukon Spezialdünger GmbH
 Wuxal* Micro Mn.....Aglukon Spezialdünger GmbH

Wuxal* Micro Mn-Zn.....Aglukon Spezialdünger GmbH
 Wuxal* Micro Zn.....Aglukon Spezialdünger GmbH
 Wuxal* Microplant.....Aglukon Spezialdünger GmbH
 Wuxal* Polymicro.....Aglukon Spezialdünger GmbH
 Wuxal* super.....Aglukon Spezialdünger GmbH
 Wuxal* top K.....Aglukon Spezialdünger GmbH
 Wuxal* top N.....Aglukon Spezialdünger GmbH
 Wuxal* top P.....Aglukon Spezialdünger GmbH

X

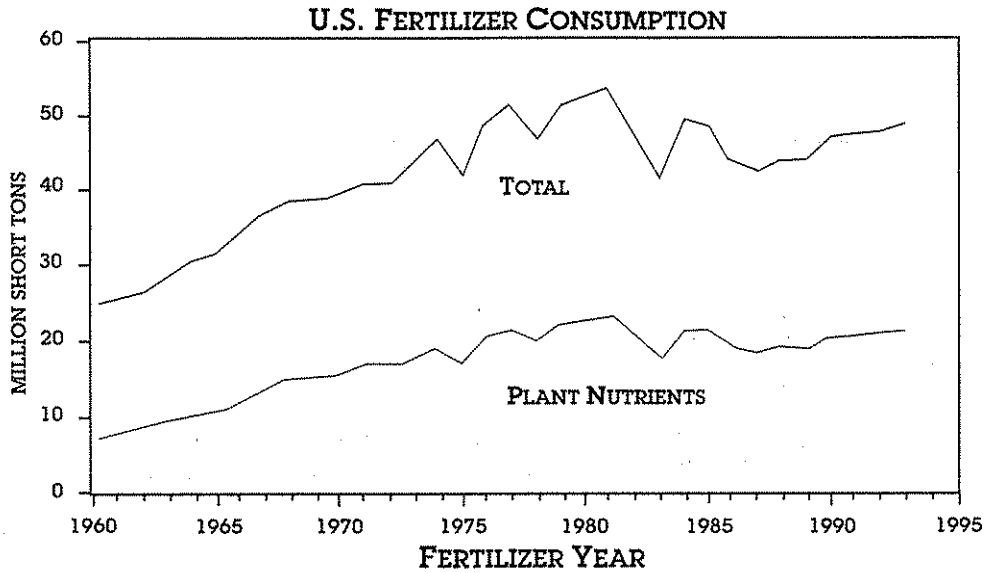
XL-310*.....The Doggett Corp.
 XL-320*.....The Doggett Corp.
 XL-550*.....The Doggett Corp.
 XL-640*.....The Doggett Corp.

Z

Zinc 52*.....Smith & Ardussi, Inc.
 Zinc KE-MIN*.....Georgia-Pacific Corp.¹
 Zinc Multi-Kelaplex*.....Crystal Chemical Inter-America
 Zinc-Manganese Kelaplex*.....Crystal Chemical Inter-America
 Zink-33*.....American MicroTrace Corp.
 Zink-Gro*.....American MicroTrace Corp.
 Zink-Gro* AS.....American MicroTrace Corp.
 Zinphos* 7.....Shield Brite
 Zinquel*.....Crystal Chemical Inter-America
 Zintech*.....Vigoro Industries, Inc.¹
 Zintrac* 8.....Shield Brite
 Z-M-KE-MIN*.....Georgia-Pacific Corp.¹
 ZNM*.....Monterey Chemical Co.
 Zoom*.....Violmet S.A.

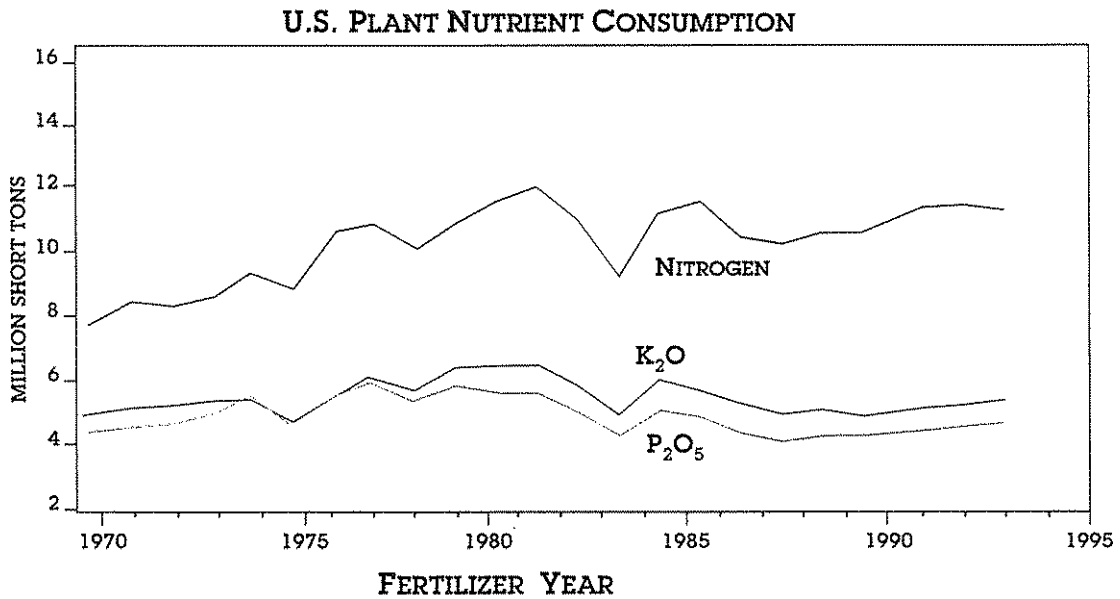
* - Trade Name R/T/M

1 - Information not updated for 1995



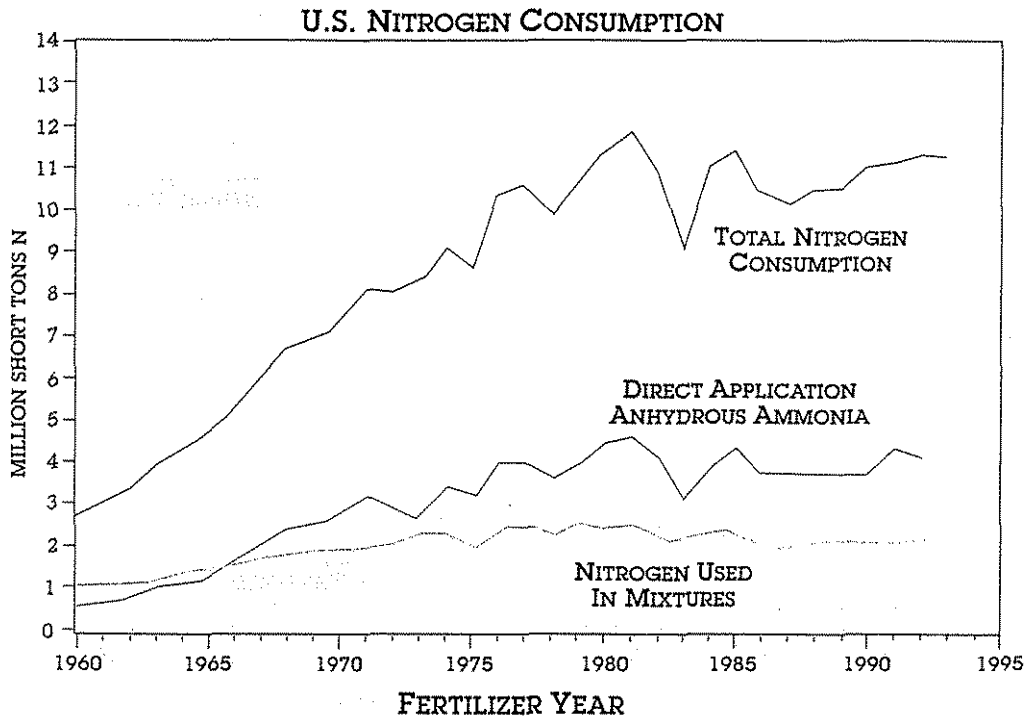
(Chart 1): U.S. fertilizer consumption in 1993 totaled 49.078 million tons, up 1.284 million tons over the previous year. Primary plant nutrients accounted for 20.929 million tons.

SOURCE: Data from "Commercial Fertilizers" Bulletin Y-230, December 1993. "Commercial Fertilizers" is a cooperative project of the Tennessee Valley Authority, The Fertilizer Institute, and the Association of American Plant Food Officials.



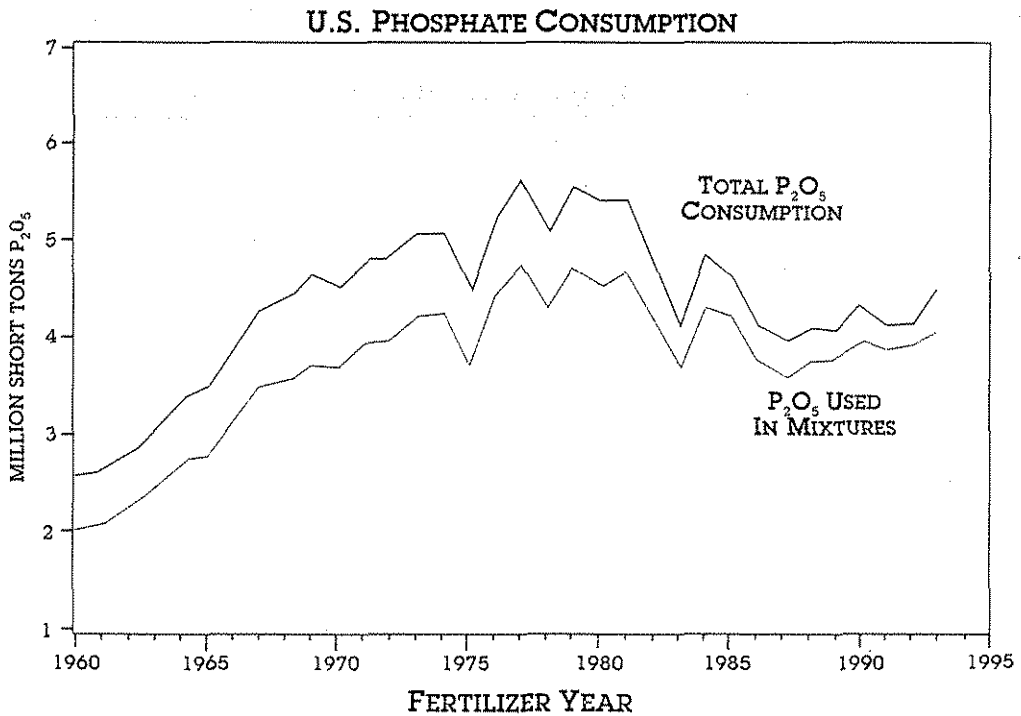
(Chart 2): Plant nutrient consumption in 1993 totaled 20.926 million tons, including 11.358 million tons of N, 4.458 million tons of P_2O_5 , and 5.110 million tons of K_2O .

SOURCE: Data from "Commercial Fertilizers" Bulletin Y-230, December 1993. "Commercial Fertilizers" is a cooperative project of the Tennessee Valley Authority, The Fertilizer Institute, and the Association of American Plant Food Officials.



(Chart 3): In 1993, 11.358 million tons of nitrogen were consumed, 9.035 million tons in straight materials and 2.323 million tons in mixtures.

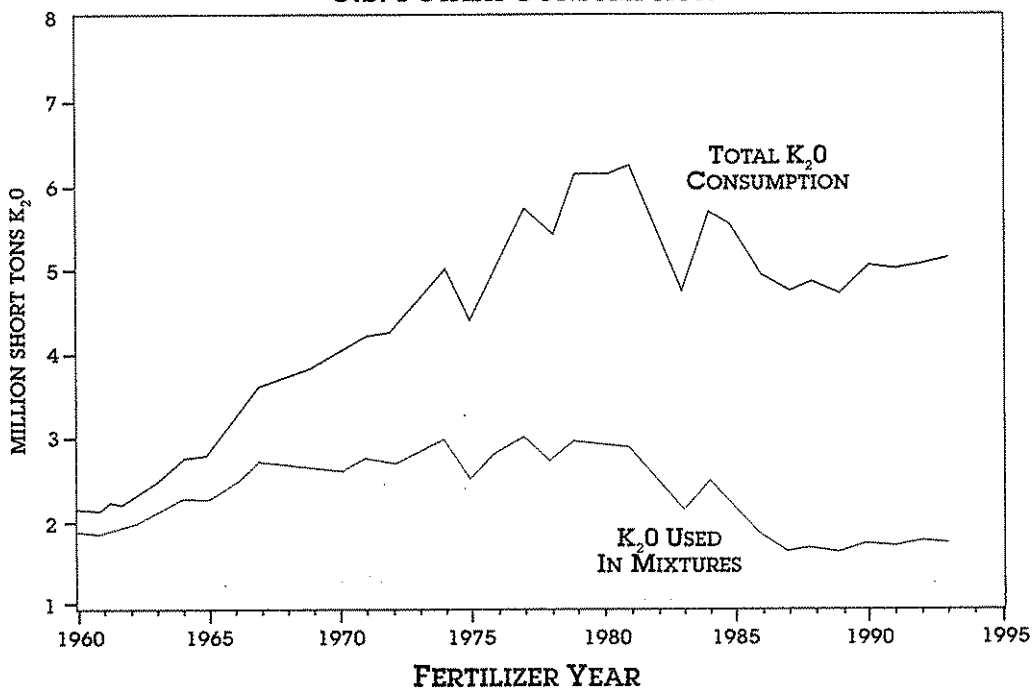
SOURCE: TVA, based on USDA, "Commercial Fertilizers," SpCr 7, Annual Reports 1960-1985; and N.L. Hargett, J.T. Berry, and S.L. McKinney, Commercial Fertilizers, TVA Annual Reports 1987-1993.



(Chart 4): In fiscal 1993 consumption of P₂O₅ in mixtures and direct application materials totaled 4.458 million tons. Of this total, 4.117 million tons were used in mixtures and 0.341 million ton was consumed as straight materials.

SOURCE: TVA, based on USDA, "Commercial Fertilizers," SpCr7, Annual Reports 1960-1985; and N.L. Hargett, J.T. Berry, and S.L. McKinney, Commercial Fertilizers, TVA Annual Reports 1987-1993.

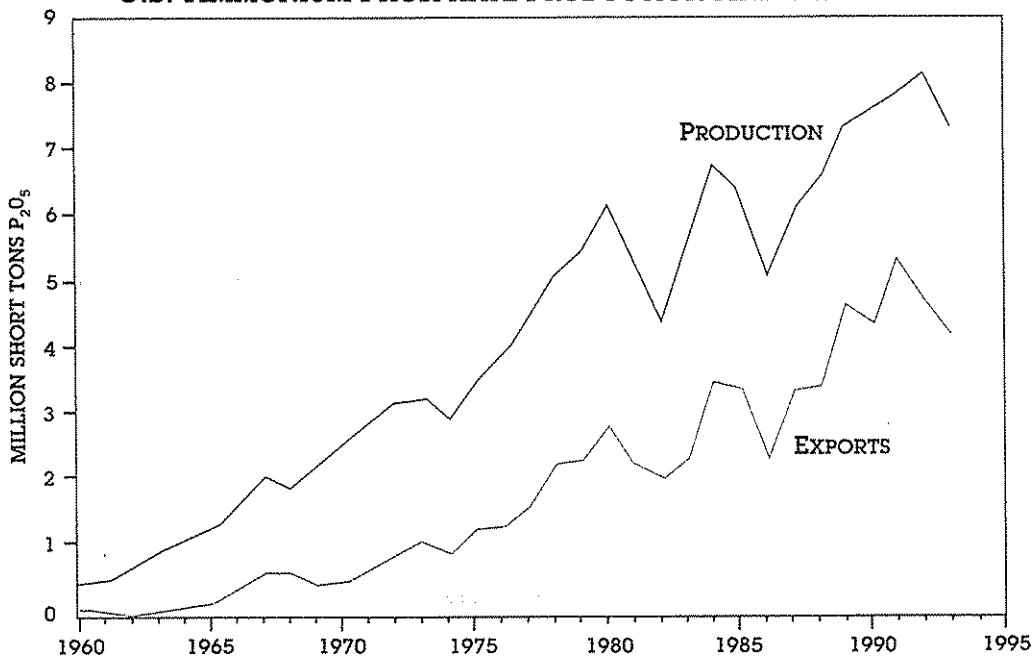
U.S. POTASH CONSUMPTION



(Chart 5): Consumption of K₂O in mixtures and straight materials was 5.110 million tons in fiscal 1993. Of this total, 1.697 million tons were used in mixtures and 3.413 million tons in the form of straight materials.

SOURCE: TVA, based on USDA, "Commercial Fertilizers," SpCr 7, Annual reports 1960-1985; and N.L. Hargett, J.T. Berry, and S.L. McKinney, Commercial Fertilizers, TVA Annual Reports 1987-1993.

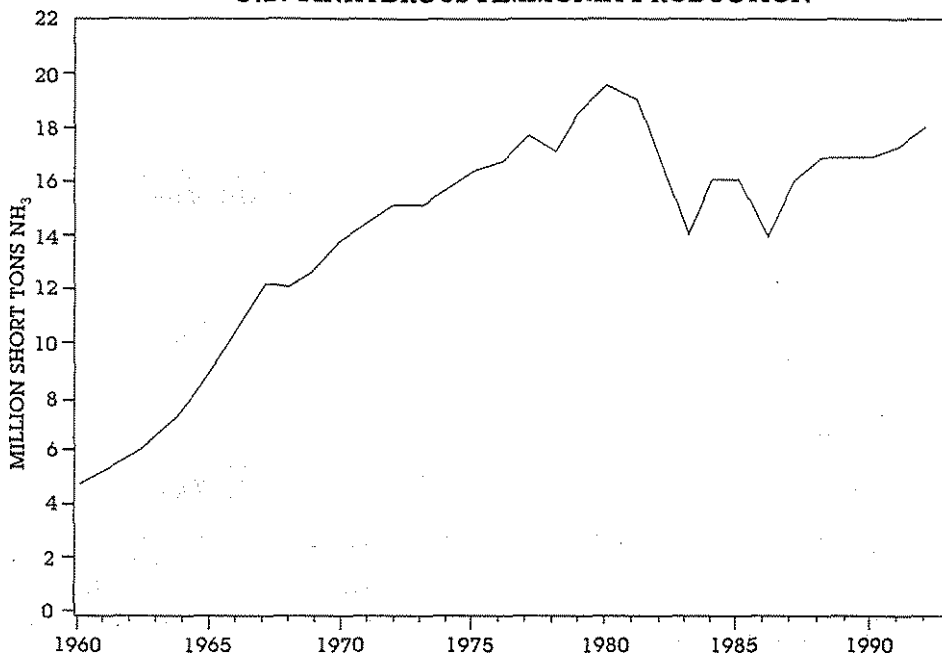
U.S. AMMONIUM PHOSPHATE PRODUCTION AND EXPORTS



(Chart 6): Production of ammonium phosphate decreased from 8.1 million tons in 1992 to 7.34 million tons P₂O₅ in 1993. Exports were 4.28 million tons in 1992.

SOURCE: TVA, based on Current Industrial Reports M28B, Bureau of Census.

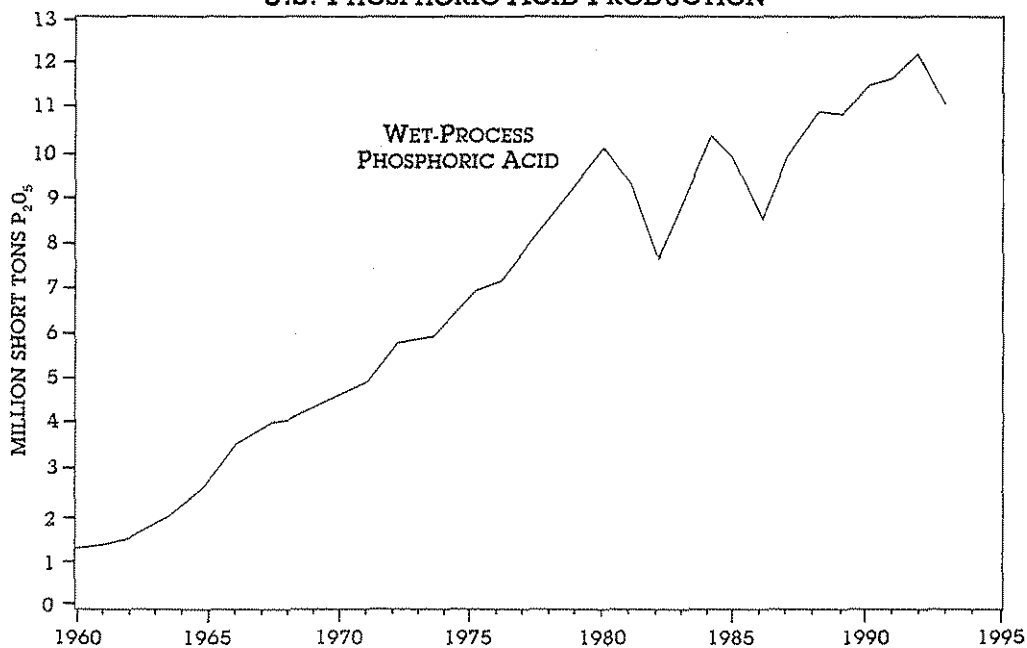
U.S. ANHYDROUS AMMONIA PRODUCTION



(Chart 7): Anhydrous ammonia production by years. In calendar year 1992, production totaled 18.295 million tons.

SOURCE: TVA, based on Current Industrial Reports M28B, Bureau of Census.

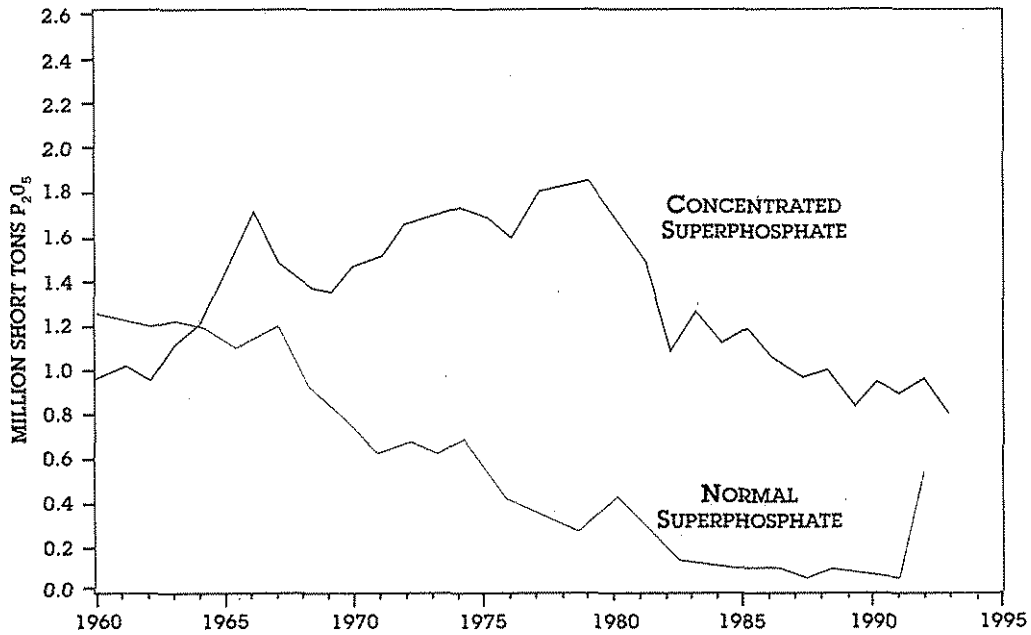
U.S. PHOSPHORIC ACID PRODUCTION



(Chart 8): Production of wet process phosphoric acid (P₂O₅) was 11.20 million tons in calendar year 1993.

SOURCE: TVA, based on Current Industrial Reports M28B, Bureau of Census.

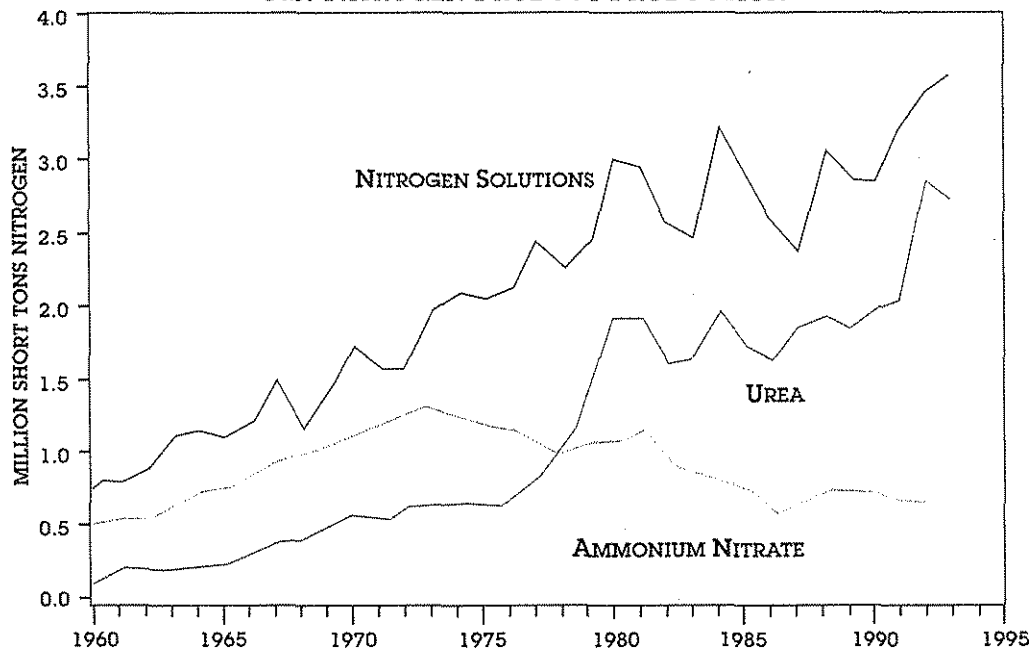
U.S. SUPERPHOSPHATE PRODUCTION



(Chart 9): Production of available phosphoric oxide (P₂O₅) in superphosphates, 1970-1993. In 1993, the production of concentrated superphosphate was 0.766 million ton.

SOURCE: TVA, based on Current Industrial Reports M28B, Bureau of Census, and Blue/Johnson and Associates.

U.S. NITROGEN PRODUCT PRODUCTION

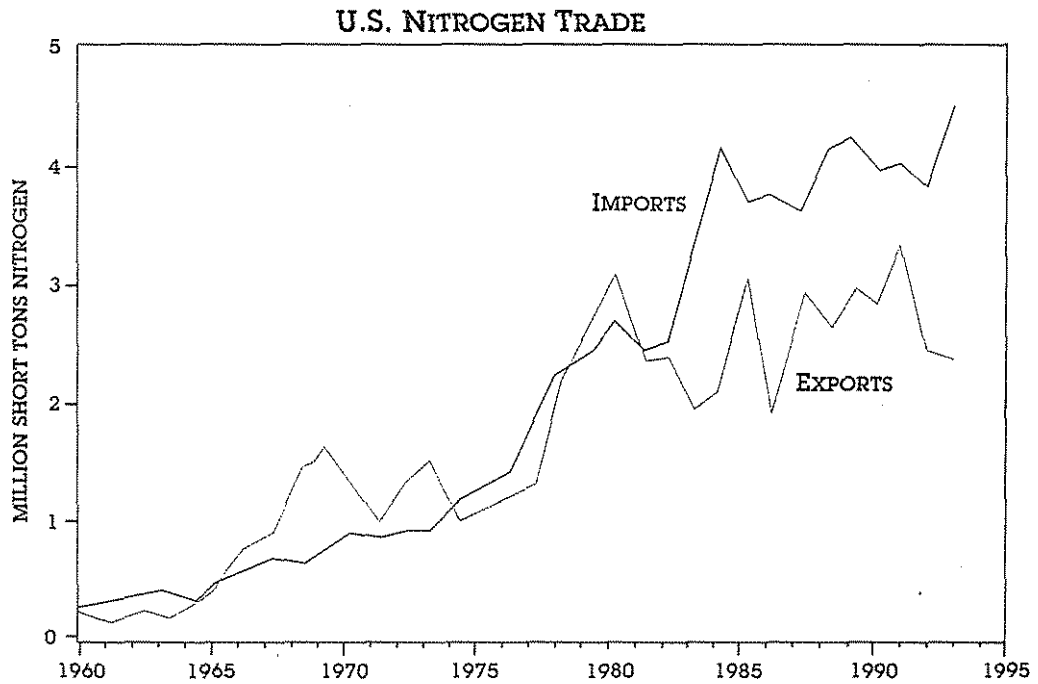


(Chart 10): In calendar year 1993, urea production totaled 2.75 million tons, and nitrogen solutions, 3.66 million tons.

SOURCE: TVA, based on Current Industrial Reports M28B, Bureau of Census.

FERTILIZER DICTIONARY / SECTION 3

Statistics



(Chart 11): In calendar year 1993, U.S. imports of nitrogen totaled 4.51 million tons. Exports were 2.41 million tons.

SOURCE: TVA, based on USDA, "Commercial Fertilizers", SpCr 7, Annual reports 1960-1985; N.L. Hargett, J.T. Berry, and S.L. McKinney, Commercial Fertilizers, TVA Annual Reports 1987-1992; and Bureau of Census.

Notes

SECTION C

PESTICIDE DICTIONARY

The Pesticide Dictionary is a compilation of experimental and commercial products available in the U.S. and around the world. Discontinued products are included for reference information and are so designated. Trade names, common names, and chemical names are cross-referenced whenever possible. Products are generally listed by trade name where there is one basic producer; and by common name where there are multiple producers. Names of basic producers and/or principal formulators are listed under each pesticide. Names of other suppliers can be found in the Buyers' Guide (beginning on page F 1).

The dictionary also includes a separate section, The Biocontrols Dictionary, for biochemical pest control agents, microbial pest control agents, and biological control agents (beneficial organisms). Suppliers of biocontrols can also be found in the Buyers' Guide.

For complete addresses of companies listed in the Pesticide Dictionary or Biocontrols Dictionary, see Section G.

C O N T E N T S

How To Use The Pesticide Dictionary	C 2
Understanding Chemical Structures	C 4
Pesticides & Pesticide-Related Products	C 5
Biocontrols Dictionary	C 405

HOW TO USE THE PESTICIDE DICTIONARY

Referencing A Listing

The following example, a composite listing, illustrates the range of information that may be found in a Pesticide Dictionary listing. Although listings are reviewed by manufacturers and suppliers each year, always refer to product labels for complete, up-to-date information.

1 Glyphosate

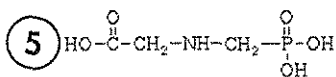
2 BP: Aimco Pesticides Ltd.
Cheminova Agro A/S
Excel Industries Ltd. (Glycel*)
Gilmore, Inc.
Helm AG
Krishi Rasayan
Monsanto Co., The Agricultural Group (Pondmaster*,
Rodeo*, Roundup*)
Pilarquim Corp. (Pillaround*)
Q.E.A.C.A. S.A. (Glifosato Estrella*, Glyphosate 48*)
Rotam Agrochemical Co., Ltd. (Rophosate*)
Tecomag (Tecoglif*)

3 Identification

COMMON NAME: Glyphosate isopropylammonium (ISO, ANSI, JMAF, WSSA).
EXP. CODE NUMBERS: MON-0573 (Monsanto); SC-0224.
OTHER CODE NUMBERS: CAS 1071-83-6; SHA 103601 (glyphosate); CAS 38641-94-0 (isopropylamine salt).
ADDITIONAL TRADE NAMES: Weedoff* (E.P.I.C. Pvt. Ltd.); Pin Up* (Exsin Industries); Rattler* (Helena Chemical Co.); Jury* (Terra International); Glyphosul* (Sulphur Mills Ltd.); Ground-Up* (VAPCO).

4 Chemistry

COMPOSITION: Isopropylamine salt of N-(phosphonomethyl)glycine.
FAMILY: Phosphono amino acid.
PROPERTIES: Glifonox*, Roundup*: Clear, viscous amber-colored solution; pH 4.4 to 4.9; specific gravity (Water = 1), 1.17. Practically odorless to slight amine-like odor. Lider*: Colorless crystals; molecular weight 169.08; melting point 200°C.



Glyphosate

6 Action/Use

ACTION: Nonselective, postemergence herbicide.

USE: Roundup* controls many annual and perennial grasses and broadleaf weeds plus many tree and woody brush species in cropland and noncrop sites.

FORMULATIONS: Aqueous solution, water soluble liquid, soluble liquid, water soluble concentrate.

COMBINATIONS: Fallo-master* and Wallop* (+ dicamba) (both Monsanto).

7 Registration Notes

OUTSIDE U.S.: Glifonox*

8 Environmental Guidelines

HAZARDS: Pondmaster*: Fish LC₅₀ 120 mg/l (trout); 230 mg/l (bluegill).

SOLUBILITY: Glifonox*, Glycel*, Roundup* readily soluble in water.

9 Safety Guidelines

SIGNAL WORD: DANGER (eye).

TOXICITY CLASS: I.

TOXICITY: Glyphosate (Rat): Oral LD₅₀ 5000 mg/kg. (Rabbit): Dermal LD₅₀ >5000 mg/kg. Severely irritating to eyes, non irritating to skin.

Roundup* (Isopropylamine salt) (Rat): Oral LD₅₀ 5000 mg/kg.

Glycel* (Rat): Oral LD₅₀ 4320 mg/kg.

PROTECTIVE CLOTHING: Long-sleeved shirt, long pants, chemical protective gloves. Goggles during mixing/pouring operations in which eye contact is likely to occur.

HANDLING AND STORAGE CAUTIONS: Roundup*: Store above 10° (-12°C) to prevent crystallizing. If allowed to crystallize, place in warm room 68° (20°C) for several days to redissolve; mix well before reuse. Stable up to 5 years under normal conditions.

SPILL CONTROL/CLEANUP: Sweep up any spill and place in a closed container for disposal.

PRODUCT/WASTE DISPOSAL: Dispose in accord with local, state, and federal regulations.

10 Emergency Guidelines

FLASHPOINT: Glifonox*, Roundup*: >200°F (tag closed cup).

FIRE EXTINGUISHING MEDIA: Water spray, foam, dry chemical, CO₂ or any Class B agent.

FIRST AID: Get medical aid. Eyes, flush with plenty of water for 15 minutes. Skin, flush with plenty of water; remove contaminated clothing; wash clothing before reuse. Ingestion, immediately dilute by swallowing milk or water.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

1 Product

Generally, products are listed by trade name when there is a single basic producer. When more than one basic producer exists, listings appear under the common name. Appropriate cross references for trade names and common names guide the reader to the complete listing for any given product.

Trade names of premixes may have their own listings or simply appear in the "combinations" section of individual components. Discontinued trade names have abbreviated listings or cross references that include the product's action (e.g., "Herbicide") and its common name.

2 Basic Producer

To be listed as a **Basic Producer** of the active ingredient (technical material), the following criteria must be met:

- 1) A company must produce the active ingredient in its plant; or
- 2) The company must have the active ingredient produced for it under exclusive contract, and
- 3) If the product is under patent, the company owns the patent or is licensed to produce by the patent holder.

Not included as Basic Producers are: sales agents or distributors under exclusive contract; formulators of active ingre-

dient; producers who purchase active ingredient but NOT under exclusive contract.

3 Identification

COMMON NAMES – Official names recognized by authorities such as ISO (International Organization for Standardization) or ANSI (American National Standards Institute).

TRIVIAL NAMES – Non-official names that may be widely used.

EXPERIMENTAL CODE NUMBERS – Numbers assigned by developing company.

OTHER CODE NUMBERS – May include Chemical Abstracts Service (CAS) Registry Number, Shaughnessy (SHA) Code assigned by U.S. Environmental Protection Agency (EPA), code numbers used by World Health Organization (WHO) with "OMS" prefix, numbers assigned by U.S. Department of Agriculture (USDA) with "ENT" prefix, and EINECS (European Inventory of Existing Commercial Chemical Substances) numbers.

ADDITIONAL TRADE NAMES – Trade names marketed by principal formulators.

DISCONTINUED NAMES – Trade names no longer used in any country. Includes discontinued names of premixes.

4 Chemistry

COMPOSITION – The chemical name of a product. In the case of premixes, usually the common names of the components, identified as IUPAC or CAS.

FAMILY – Chemical family to which the pesticide belongs.

PROPERTIES – Physical and chemical properties of the active ingredient or a specified formulated product.

5 Structure

See page C 4 for information about chemical structures.

6 Action/Use

ACTION – How a chemical acts, i.e., as insecticide, growth regulator, fungicide, etc.

USE – How the chemical is used in crop production, e.g., to control broadleaf weeds in cotton.

FORMULATIONS – Types of formulated products, e.g., wettable powder, emulsifiable concentrate, water-dispersible granule, etc.

COMBINATIONS – Lists names of premixes, the other components they contain, and their basic producers and/or formulators.

7 Registration Notes

Provides information about product registration within and outside the U.S. If a pesticide is classified by U.S. EPA as a Restricted Use Pesticide (RUP), it will be noted here.

8 Environmental Guidelines

A pesticide's impact on the environment includes the following:

HAZARDS – Toxicity data for fish, birds, and bees. Data can also be found on the wildlife toxicity charts in the Environmental and Safety Section (page E 20).

DEGRADATION AND METABOLISM

SOIL PARTICLE ADSORPTION

SOLUBILITY (in water)

9 Safety Guidelines

SIGNAL WORD – Danger, Warning, or Caution. Level of human hazard may vary among formulations, so refer to the product label.

TOXICITY CLASS – Classes range from I through IV, with I being the most toxic. See page C 376 for explanation of toxicity categories.

TOXICITY – May include values for oral, dermal, and inhalation toxicities. See mammalian toxicity charts in the Environmental and Safety Section (page E 12).

CARCINOGENICITY CATEGORY – EPA categories for carcinogen risk assessment. For more information, see page C 74.

PROTECTIVE CLOTHING – Brief description indicates whether special clothing or equipment is needed, but always read product label for details.

HANDLING AND STORAGE CAUTIONS – Special precautions to take when using or storing a product.

SPILL CONTROL/CLEANUP – Brief guidelines in the event of a spill.

PRODUCT/WASTE DISPOSAL – How to dispose of unused material and containers.

10 Emergency Guidelines

The following information is necessary in the event of a medical emergency, spill, or fire. Complete data can be found on a product's Material Safety Data Sheet.

FLASHPOINT

COMBUSTION PRODUCTS

FIRE EXTINGUISHING MEDIA

ANTIDOTE

FIRST AID

EMERGENCY TELEPHONE – Many manufacturers have emergency phone numbers; others direct callers to CHEMTREC, a 24-hour hotline operated by the Chemical Manufacturers Association.

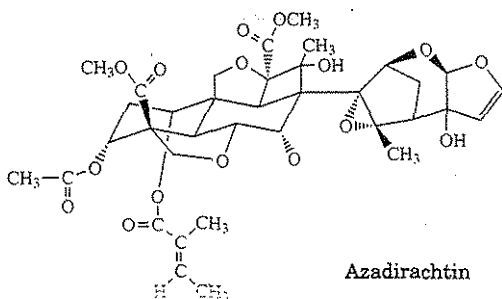
The editors gratefully acknowledge the assistance of Contributing Editor S. Barrie Walker, an agrichemicals consultant whose firm, BARK Information Services, is located in Wokingham, England. Walker reviewed the Pesticide Dictionary and made many invaluable suggestions about its contents.

HOW TO USE THE PESTICIDE DICTIONARY

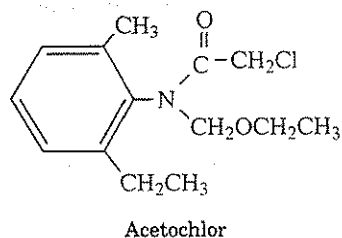
Understanding Chemical Structures

A chemical structure is a device used to show the relative positions of atoms bonded together in a molecule. The chemical structures in this Handbook have been constructed with certain conventions in mind.

It is important to realize that most of the structures in the following pages are intended to be two-dimensional representations of the molecule of interest. In reality, molecules have *three-dimensional* shapes, but it is difficult and confusing to accurately portray 3-D drawings on a 2-D page. Though some of the molecules may have the same 2-D structures drawn in the Handbook, they can actually have different 3-D structures.



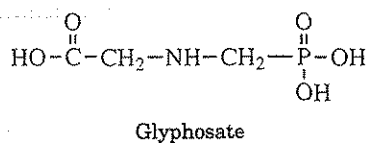
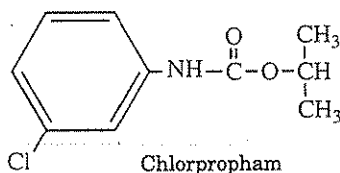
Atoms in molecules are typically represented by one- or two-letter *chemical symbols*: for example, H stands for hydrogen, C for carbon, Cl for chlorine, etc. Bonds between atoms are usually represented by lines. Multiple bonds between atoms are indicated with two or three lines between the same atoms.



Not all chemical bonds are shown explicitly, because the bonding of atoms in molecules follows certain rules. These rules make it simpler to illustrate the structure of complicated molecules.

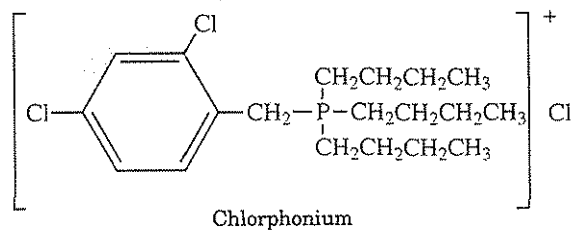
- When lines used to indicate bonds intersect at a point, an atom is found at that point. It is assumed to be a carbon atom unless otherwise specified. Many compounds are composed by linking certain atoms (C, P, O, N, S) into a *chain* or *backbone* of a molecule. H atoms are usually bonded to many of the atoms in the chain.

- Atoms make a characteristic number of bonds to other atoms: H – 1 bond; O – 2 bonds; C – 4 bonds; S – 2 or 6 bonds; P – 3 or 5 bonds; F, Cl, Br, I – 1 bond; N – 3 bonds; etc. Only atoms that can make more than one bond can be part of the backbone.



- All atoms are usually explicitly shown in a diagram, except for H (hydrogen). If the number of bonds about an atom in a structure is not in accordance with the rule immediately above, the bonds not shown are assumed to be made to H atoms. This allows for much simplification of structures.

Some molecules appear to violate the number-of-bonds rule; these species usually have an electric charge associated with them and are called ions. In molecules composed of ions, there must be the same number of positive (+) charges as there are negative (-) charges.



Source: By Dr. David W. Ball, Department of Chemistry, Cleveland State University.

The editors thank Dr. Ball and Gail R. Ball, graduate student in the Department of Materials Science and Engineering, Case Western Reserve University, for their review of structures in the Pesticide Dictionary. Special recognition also goes to Susan Branchick, Supervisor of Corporate Library and Reference Services, Ricerca Inc., and Contributing Editor S. Barrie Walker, for their work in reviewing the structures.

Section C

PESTICIDE DICTIONARY

THE DICTIONARY OF
PESTICIDES AND
PESTICIDE RELATED
PRODUCTS

366 — see BHC.

1080 Compound — see Sodium Fluoroacetate.

1081 — see Fluoroacetamide.

3336* — see Thiophanate-methyl.

41-A*

BP: SANAG (41-A*)

Chemistry

COMPOSITION: Polyacrylamide + polysaccharide.

Action/Use

ACTION: Drift suppressant additive.

USE: Suppress drift caused by fines.

FORMULATIONS: Granular dispersion.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >3980 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in tightly sealed container. Avoid freezing or overheating.

Emergency GuidelinesFIRST AID: **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes.

A-4D — see 2,4-D.

A7 Vapam* (metam-sodium) — Discontinued in 1984 by Proclida.

A13-52713 — see Cyromazine.

A 363 — see Matacil*.

A & V 70 Plus*

BP: A & V, Inc. (A & V 70 Plus*)

Chemistry

COMPOSITION: Triethanolamine complexed copper.

Action/Use

ACTION: Aquatic herbicide.

USE: Controls filamentous, planktonic, and Chara type algae. Water may be used immediately for swimming, fishing, and to irrigate. May be applied to potable water in ponds, lakes, and marshes.

Access Penetrator*

F: Cornbelt Chemical Co. (Access Penetrator*)

Chemistry

COMPOSITION: Dlimonene (citrus peel) oil + emulsifiers.

PROPERTIES: Nonionic, low viscosity oil.

Action/Use

ACTION: Pesticide adjuvant.

USE: For cropland, citrus, forestry, rights-of-way, aquatics (surface, submerged).

Environmental Guidelines

SOLUBILITY: Water soluble, biodegradable.

Safety Guidelines

SIGNAL WORD: CAUTION.

AAPCO — see Association of American Pesticide Control Officials, Inc.

Aaprotect* — see Ziram.

AAstar*

(Discontinued 1992 by American Cyanamid Co.)

Chemistry

COMPOSITION: Flucythrinate + phorate.

PROPERTIES: Soluble in most organic solvents such as acetone and benzene.

Action/Use

ACTION: Soil and systemic insecticide.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

Emergency Guidelines

ANTIDOTE: Atropine.

AAatak* — see Thiram.

Aaterra* — see Etridiazole.

AAtram* (atrazine + propachlor) — Discontinued by Ciba-Geigy.

AAtrex* — see Atrazine.

AAtrex* Nine-O* — see Atrazine.

Aazomate* — see Benzoximate.

ABA — see Abscisic Acid.

Abamectin

BP: Merck & Co., Inc. (Agri-Mek*, Avid*, Zephyr*)

Identification

COMMON NAME: Abamectin (USAN, ANSI, BSI).

EXP. CODE NUMBERS: MK 936 (Merck & Co.).

CODE NUMBERS: CAS 71751-41-2; SHA 0122804.

DISCONTINUED NAME: Affirm* (Merck & Co.).

ChemistryCOMPOSITION: Avermectin B₁; a mixture of avermectins containing >80% avermectin B_{1a} and <20% avermectin B_{1b}.**Action/Use**

ACTION: Miticide, insecticide (Avid*, Agri-Mek*, Zephyr*).

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Affirm* 0.011% fire ant bait (Rat): Oral LD₅₀ >5000 mg/kg.(Rabbit): Dermal LD₅₀ >2000 mg/kg. Non-irritating to primary skin.Avid* EC (Rat): Oral LD₅₀ 650 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

Slight-to-moderate eye irritation, very slight primary skin irritation.

Abate* — see Temephos.

Abathion* — see Temephos.

Abavit* — see Prochloraz.

Abavit*/Prelude* Universal — see Carboxin; Prochloraz.

ABG-6108 — see *Bacillus thuringiensis* var. *israelensis*.

Abol* Aphicide (pirimicarb) — Discontinued by ICI Agrochemicals.

Abolish* 8EC — see Saturn*.

Abcisic Acid**Identification**

OTHER NAME: ABA.

Action/Use

ACTION: Antitranspirant.

Abscission

The natural separation of flowers, fruits, or leaves from plants at a special separation layer.

Abscission Agent

A compound intended to ease release of fruit from tree or plant for easier picking or mechanical harvesting.

Absorption

The passage of one substance into or through another; e.g., an operation in which one or more soluble components of a gas mixture are dissolved in a liquid.

See Adsorption; Oil Absorption; Sorbent.

AC 3422 — see Parathion.

AC 4124 — see Di-captan*.

AC 5223 — see Dodine.

AC 8911 — see Phorate.

AC 12880 — see Dimethoate.

AC 18133 — see Zinophos*.

AC 18737 — see Endothion.

AC 35024 — see Phorate.

AC 52160 — see Temephos.

AC 64475 — see Nem-A-Tak*.

AC 84777 — see Avenge*.

AC 92390

(Discontinued by American Cyanamid Co.)

Identification

CODE NUMBER: CAS 40318-45-4.

Chemistry

COMPOSITION: N-sec-Butyl-2, 6-dinitro-3, 4-xylidine.

Action/Use

ACTION: Herbicide.

AC 92553 — see Prowl*.

AC 217 300 — see Amdro*.

AC 222 293 — see Assert*.

AC 222 705 — see Flucythrinate.

AC 252 214 — see Scepter*.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

AC 263 499 — see Pursuit*.

Acaban* — see Fenpyroximate.

Acaraben* **Acaricide (chlorobenzilate)** — Discontinued 1989 by Ciba-Geigy Ltd..

Acaralate*

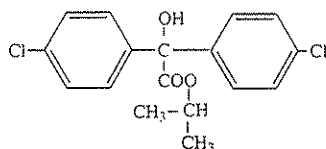
(Discontinued 1978 by Ciba-Geigy Corp.)

Identification

COMMON NAME: Chloropropylate (ISO, ANSI, BSI, ESA, JMAF).

EXP. CODE NUMBER: G 24163 (Ciba-Geigy).

DISCONTINUED NAMES: Chlormite*, Rospin* (Ciba-Geigy Ltd.).



Chloropropylate

Action/Use

ACTION: Acaricide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

Acarelto* — see Dinobuton.

Acarelto Forte* — see Dinobuton; Tetradifon.

Acaricide (Miticide)

A material used primarily in the control of plant-feeding mites (acarids), especially spider mites. Typical acaricides with little insect-killing efficiency are chlorobenzilate, Kelthane*, and Omite*. Some insecticides, especially phosphorus compounds, are effective against mites.

Acariflor* — see Hexythiazox.

Acarin* — see Dicofol.

Acaristop* — see Clofentezine.

Acaritan* — see Fenpyroximate.

Acarimate* — see Benzoximate.

Acarol*

BP: Ciba, Ltd. (Acarol*, Folbex* VA, Neoron*)

Identification

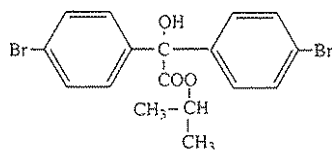
COMMON NAMES: Bromopropylate (ISO, ANSI, BSI, ESA), phenisobromolate (JMAF).

EXP. CODE NUMBER: GS 19851 (Ciba, Ltd.).

Chemistry

COMPOSITION: isopropyl 4,4'-dibromobenzilate.

PROPERTIES: Tech purity (min. 88%), white crystalline solid, melting point 77°C. Readily soluble in most organic solvents.



Bromopropylate

Action/Use

ACTION: Non-systemic contact acaricide.

USE: Controls a wide variety of mite species on deciduous and citrus fruit.

FORMULATIONS: Emulsifiable concentrate.

Registration Notes

(Acarol*): Experimental.

OUTSIDE U.S.: Folbex* VA Smokestrips for use in beehives to control parasite mites.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.35 mg/l (96 h) (rainbow trout); 0.50 mg/l (bluegill); 2.4 mg/l (carp). Bee: Negligible by direct application.

SOLUBILITY: In water <5 ppm at 20°.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >5000 mg/kg; minimal eye irritation.

Acarol* 2E (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >10,200 mg/kg. Extremely moderate eye and skin irritation.

Acaron* Insecticide/Acaricide/Ovicide (chlordimeform) —

Discontinued by Schering AG.

Acarstin* — see Cyhexatin.

Accelerate* — see Endothall.

Accent* — see Nicosulfuron.

Accent* SP — see Nicosulfuron.

Access*

BP: DowElanco

Identification

CODE NUMBERS: CAS 026952-20-5 (picloram), 064700-56-7 (triclopyr).

Chemistry

COMPOSITION: Picloram ester + triclopyr ester.

PROPERTIES: Dark brown liquid with kerosene odor. Boiling point 340°F.

Action/Use

ACTION: Herbicide.

USE: Controls unwanted woody plants in forests, rights-of-way and noncrop areas including industrial manufacturing, storage sites, and fence rows.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOIL PARTICLE ADSORPTION: Picloram has the ability to seep or leach. Users advised not to apply where soils have a rapid-to-very-rapid permeability and the water table of an underlying aquifer is shallow.

SOLUBILITY: Emulsifies in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): LD₅₀ 3383 mg/kg (male); 2525 mg/kg (female). Inhalation: Excessive exposure may cause irritation to upper respiratory tract.

PROTECTIVE CLOTHING: Impervious gloves, safety glasses.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Keep away from heat or open flame.

Emergency Guidelines

FLASHPOINT: 154°F (TCC).

FIRE EXTINGUISHING MEDIA: Water fog, foam, CO₂, and dry chemical.

FIRST AID: Get medical aid. Eyes, Skin, flush with plenty of water. Remove and wash contaminated clothing before reuse. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting.

Acclaim* — see Fenoxaprop-ethyl.

Acconem* — see Nem-A-Tak*.

Accotab* — see Prowl*.

Accothion* Insecticide (fenitrothion) — Discontinued 1989 by American Cyanamid Co.

Aceber PS* — see Acephate.

Acefate* 75 — see Acephate.

Acefato Fersol* — see Acephate.

Acenaphthylene

Identification

CODE NUMBER: CAS 208-96-8.

Chemistry

COMPOSITION: Peri-ethylene naphthalene.

PROPERTIES: Derived from coal tar.

Action/Use

ACTION: Fungicide, insecticide.

Acenit* — see Acetochlor.

Acephate

BP: All India Medical Corp. (Aimthane*, Ortran*)

Fersol Indústria E Comércio Ltda. (Acefato Fersol*,

Acefato* 750PS)

Forward International Ltd.

HELM AG

Hubei Sanonda Co., Ltd. (Saphate*)

Jin Hung Fine Chemicals Co., Ltd. (Kitron*)

Pilarquim Corp. (Pilarthene*)

Productos OSA S.A.C.I.F.I.A. (Vital*)

Rallis India Ltd. (Asataf*)

Rotam Group (Racet*)

Shinung Corp.

Sundat (S) Pte. Ltd.

Tomen Corp. (Orthene*)

Valent U.S.A. Corp. (Orthene*, Payload*)

Identification

COMMON NAME: Acephate (ISO, ANSI, BSI, JMAF).

EXP. CODE NUMBER: Ortho 12420 (Chevron Chemical Co.).

OTHER CODE NUMBERS: CAS 30560-19-1; SHA 103301.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

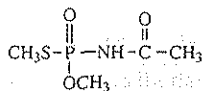
ADDITIONAL TRADE NAMES: Orcephate* (Agsin Pte. Ltd.); Aceber PS* (Diachem S.P.A.); Khatau Acephate* (Khatau Junker Ltd.); Acefate* 75 (Lupin Agrochemicals (I) Ltd.); Acesul* (Sulphur Mills Ltd.); Orthene* (Vinexport S.A.).

Chemistry

COMPOSITION: O,S-Dimethyl acetylphosphoramidothioate.

CHEMICAL FAMILY: Organophosphate.

PROPERTIES: Tech: Strong, pungent, mercaptan-type odor, white solid, melting point 81-91°C. Solubility at room temperature: <5% soluble in aromatic solvents; >10% soluble in acetone or ethanol.



Acephate

Action/Use

ACTION: Contact and systemic insecticide.

USE: Effective against alfalfa looper, aphids, armyworm, bagworm, bean leaf beetle, bean leafroller, blackgrass bugs, bollworm, budworm, cabbage looper, cankerworm, corn earworm, cranberry blossomworm, cutworms, diamondback moth, European corn borer, fireworms, flea-hopper, grasshoppers, green cloverworm, gypsy moth, hornworm, imported cabbageworm, imported fire ants, lace bugs, leafminers, leafhoppers, leafrollers, lygus, Mexican bean beetle, Mormon crickets, oak moth, saltmarsh caterpillar, soybean looper, spanworms, sparganthis, stinkbugs, tent caterpillars, three-cornered alfalfa hopper, thrips, tobacco hornworm, velvetbean caterpillar, webworms, and whiteflies. For bell and non-bell peppers, Brussel sprouts, cauliflower, celery, cotton, cranberries, dry beans, head lettuce, mint, peanuts and succulent beans. Cockroach control (spot treatment only) in residential and industrial buildings and insect control in forests, tobacco, and on ornamentals.

FORMULATIONS: Soluble powder, granules.

Registration Notes

U.S.: Orthene* marketed by Valent U.S.A.

OUTSIDE U.S.: Orthene* marketed by Tomen Corp. Asataf*, Orthene SP* for green and brown leafhopper on rice. Asataf* also for brown planthopper on rice; white aphid on chili, sesamum and cotton.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >1000 ppm (rainbow trout, bluegill). Bee: LC₅₀ 1.2 µg/bee. Bird: LD₅₀ 350 mg/kg (mallard); LD₅₀ 140 mg/kg (pheasant).

SOIL PARTICLE ADSORPTION: Acephate dissipates rapidly with half-lives of <3 and 6 days in aerobic and anaerobic soils, respectively. Major metabolite was CO₂ in both soil types. TLC and soil column studies indicate acephate is mobile in most soils but that aged residues (excluding acephate and its degradate methamidophos) are immobile in sandy loam soil. Apparently most of the applied acephate and degradate methamidophos degrade to immobile compounds in 20 days.

SOLUBILITY: At room temperature about 65% in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 1447 mg/kg (male); 1030 mg/kg (female). (Rabbit): Dermal LD₅₀ >10,250 mg/kg. (Rat): Inhalation >61.7 mg/kg.

PROTECTIVE CLOTHING: Waterproof gloves, long-sleeved shirt, long-legged pants.

HANDLING AND STORAGE CAUTIONS: Keep container closed when not in use. Store in cool, dry place away from feed and foodstuffs. Keep out of reach of children. Avoid contact with mouth, skin, and eyes.

Emergency Guidelines

ANTIDOTE: Atropine, 2-PAM may also be used in conjunction with atropine but should NOT be used alone.

FIRST AID: Ingestion, get medical aid. Induce vomiting. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air.

Acephate-met — see Methamidophos.

Acert* — see Diuron; Trifluralin.

Acesul* — see Acephate.

Acetate

Acetate is a salt. Guazatine is an example of a compound which forms such a salt.

See Guazatine.

Acétate de Phénylmercure — see PMA.

Acethion

Chemistry

COMPOSITION: O,O-Diethyl S-carboethoxymethyl phosphorodithioate.

Action/Use

ACTION: Insecticide.

See related compounds: Acetoxon, Azethion, Propoxon, Prothion.

Acetic Acid

Identification

CODE NUMBERS: CAS 64-19-7; SHA 44001.

Chemistry

PROPERTIES: Principal acid in vinegar.

Action/Use

ACTION: Preservative.

USE: For food and grain. Formerly used against damping-off of ever-green seedlings.

Acetochlor

BP: Chemol Trading Ltd. Co. (Sacemid*)

Monsanto Co., The Agricultural Group (Harness*)

Nitrokémia Ltd. (Acentit*)

ZENECA Ag Products (Surpass*, Trophy*)

Identification

COMMON NAMES: Acetochlor (ISO, ANSI, BSI, WSSA); acétochlor (ISO-F).

EXP. CODE NUMBER: MON 8404, MON 8407 (Monsanto Co.).

OTHER CODE NUMBER: CAS 34256-82-1.

DISCONTINUED NAME: Harness* Plus (Monsanto Co.)

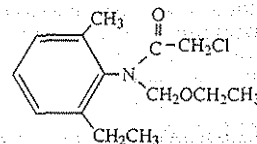
Chemistry

COMPOSITION: 2-chloro-N-ethoxymethyl-6'-ethylacet-o-toluidide (IUPAC).

FAMILY: Chloro acetamide.

PROPERTIES: Colorless thick liquid, aromatic odor. Soluble in acetone, benzene, chloroform, ethanol, ethylacetate. Harness*: blue to purple liquid; pH 5.3 (1% solution in 50:50 dioxane: 0.1 M NaCl); specific gravity 1.127.

CORROSIVENESS: Compatible with equipment and containers.



Acetochlor

Action/Use

ACTION: Selective preplant incorporated and preemergence herbicide.

USE: For annual grasses, broadleaf weeds in cabbage, citrus, coffee, green peas, maize, onion, orchards, soybeans, sugarbeet, sunflower, vineyards.

FORMULATIONS: Emulsifiable concentrate.

COMBINATIONS: Harness* Xtra (+ atrazine) (Monsanto Co., The Agricultural Group); Erunit* (+ atrazine) (Nitrokémia Ltd.); Surpass* 100 (+ atrazine) (ZENECA Ag Products).

Registration Notes

U.S.: Conditional registration in 1994 to Acetochlor Registration Partnership (ARP) composed of Monsanto Co., The Agricultural Group and ZENECA Ag Products. The registration allows for automatic cancellation if use of several alternative corn herbicides is not reduced by a specified amount. Groundwater contamination may also be grounds for cancellation.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Moderately toxic.

SOLUBILITY: In water 23 mg/l at 25°C.

Safety Guidelines

TOXICITY CLASS: I; I (eye), II (skin) (Harness*).

TOXICITY: Formulation: (Rat): Oral LD₅₀ 1.3096 ml/kg (male).

Tech: (Rat): Oral LD₅₀ 1.5537 ml/kg (female).

Harness*: (Rat): Oral LD₅₀ 1700 mg/kg (female). Dermal LD₅₀ >5000 mg/kg. Inhalation LC₅₀ 1.5 mg/l (4 h). (Rabbit): Eye irritation substantial but temporary; skin irritation severe. Positive in guinea pig sensitization study.

PROTECTIVE CLOTHING: Coveralls over short-sleeved shirt and short pants, waterproof gloves, chemical-resistant footwear plus socks, protective eyewear, chemical-resistant headgear for overhead exposure and chemical-resistant apron when cleaning equipment, mixing or loading.

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin contact, in-

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/T/M BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

halation, or spillage, leakage. Wash thoroughly and change clothing after use. Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water spray, foam, dry chemical, CO₂ or other Class B extinguishing agent.

FIRST AID: **Eyes,** rinse with abundant amount of water for at least 15 minutes. Get medical attention. **Skin,** wash thoroughly with soap, water. **Inhalation,** relocate to fresh air. **Ingestion,** do NOT induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention.

Acétochlore — See Acetochlor.

Acetoxon**Chemistry**

COMPOSITION: O,O-Diethyl S-carboethoxymethyl phosphorothioate.

Action/Use

ACTION: Insecticide.

See related compounds: Acethion, Azethion, Propoxon, Prothion.

Acetoxy-Triphenylstannane — see Triphenyltin Acetate.

Achieve* — see Grasp*.

Aciban* 50EC — see Chlorpyrifos.

Acibate* 50EC — see Temephos.

Acid Deposition

A complex chemical and atmospheric phenomenon that occurs when emissions of sulfur and nitrogen compounds and other substances are transformed by chemical processes in the atmosphere, often far from the original sources, and then deposited on earth in either a wet or dry form. The wet forms, popularly called "acid rain," can fall as rain, snow or fog. The dry forms are acidic gases or particulates.

Acid Equivalent

That proportion of a compound or formulation, as in the case of a 2,4-D ester, that theoretically could be converted back to the corresponding acid. For instance, the acid equivalent of the isooctyl ester of 2,4-D is 66.325% of the ester.

Acid Lead Arsenate — see Lead Arsenate.

Acid Rain — see Acid Deposition.

Acidazim* — see Carbendazim.

Acide Gibbèrellique — see Gibberellic Acid.

Acide Naphthylacétique — see 1-Naphthaleneacetic Acid.

Acide Trichlorobenzoïque — see Trichlorobenzoic Acid.

Acifluorfen — see Scepter* (combinations).

Acifluorfen-sodium — see Blazer*.

Acifluorène-sodium — see Blazer*.

Acifon* — see Azinphos-methyl.

Acifon E* — see Azinphos-ethyl.

Acimal* — see Malathion.

Acimite* — see Tetradifon.

Acimone* — see Alpha-naphthylacetic Acid.

Acinate* — see Methomyl.

Acioate* — see Dimethoate.

Aciray* 50 — see Lanray*.

Acirice* 30 — see Anilofos.

Aciron* 50F — see Isoproturon.

Aciron* L — see Isoproturon; Lanray*.

Acithion* — see Ethion.

Acitox* — see Lindane.

Acivap* — see DDVP.

Acizal* 60F — see Sulfur.

Acizol* — see Bayleton*.

Aclonifen

— BP: Rhône-Poulenc Ag Co. (Challenge*)

Identification

COMMON NAMES: Aclonifen (ISO-E draft, BSI); aclonifène (draft ISO-F).

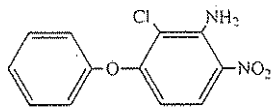
EXP. CODE NUMBERS: CME 127 (Rhône-Poulenc Ag Co.); KUB 3359.

ADDITIONAL TRADE NAMES: Bandur* (Rhône-Poulenc Ag Co.).

Chemistry

COMPOSITION: 2-chloro-6-nitro-3-phenoxyaniline.

PROPERTIES: Moderately soluble in organic solvents.



Aclonifen

Action/Use

ACTION: Preemergent soil herbicide.

USE: Apply after planting without incorporation to control grass and broadleaved weed species in carrots, corn, field beans, peas, potatoes, sown tomatoes, sunflowers, winter wheat, lentils, parsley, onions, tobacco, parsnips and eggplant.

Registration Notes

OUTSIDE U.S.: Registered in France, Netherlands, and Belgium.

Environmental Guidelines

HAZARDS: Moderately toxic to fish, but low toxicity to birds, bees.

SOLUBILITY: In water 2.5 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >6500 mg/kg.

Aclonifène — See Aclonifen.

Acme* Industrial Brush Killer Herbicide (2,4-D + mecoprop +

cambax) — Discontinued by PBI/Gordon Corp.

ACN — see Mogeton G*.

ACNQ — see Mogeton G*.

ACP 322 — see Naptalam.

ACPA

The Agricultural Crop Protection Association, formerly the National Agricultural Chemicals Association (NACA). ACPA, national trade association of manufacturers of pest control products, is a member of GIFAP. See GIFAP.

Acquinite* — see Chloropicrin.

Acre

A measure of land area common to English-speaking countries: One acre is equivalent to 43,560 square feet, 160 square rods, or 0.4047 hectare (metric system).

Acrex* Fungicide (dinobuton) — Discontinued 1989 by KenoGard AB.

Acricid* Fungicide (binapacryl) — Discontinued 1987 by Hoechst AG.

Acrinathrin — see Rufast*.

Acrinathrine — see Rufast*.

Acritet* Fumigant (acrylonitrile) — Discontinued by Stauffer Chemical Co.

Acrizane* Fungicide/Bactericide (phenacridane chloride) —

Discontinued by Abbott Laboratories.

Acrobat* — see Dimethomorph.

Acrolein — see Magnacide* H.

Acrylaldehyde — see Aqualin*.

Acrylates Copolymer* — see Polytrap*.

Acrylofume* Fumigant (acrylonitrile) — Discontinued 1970 by

Great Lakes Chemical Corp.

Acrylon* Fumigant (acrylonitrile + carbon tetrachloride) —

Discontinued by American Cyanamid Co.

Acrylonitrile**Identification**

CODE NUMBER: CAS 107-13-1.

DISCONTINUED NAMES: Acrylon* and Carbacryl* (+ carbon tetra-

chloride) (American Cyanamid Co.); Acrylofume* (Great Lakes Chem-

ical); Acritet* (Stauffer Chemical Co.).

Action/Use

ACTION: Fumigant.

Actamaster* — see Ammonium Sulfate.

Actellic* — see Pirimiphos-methyl.

Actellifog* — see Pirimiphos-methyl.

Acti-Aid*

(Discontinued 1985 by NOR-AM Chemical Co.).

Identification

COMMON NAME: Cycloheximide (ISO, BSI).

CODE NUMBER: CAS 66-81-9 (Cycloheximide).

Chemistry

COMPOSITION: 3-[2-(3,5-dimethyl-2-oxocyclohexyl)2-hydroxyethyl]-

glutarimide.

Action/Use

ACTION: Growth regulator, abscission agent.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Acti-dione*

(Discontinued 1987 by NOR-AM Chemical Co.)

Identification

COMMON NAMES: Cycloheximide, naramycin.

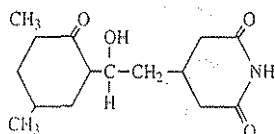
CODE NUMBER: CAS 66-81-9 (Cycloheximide).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

ADDITIONAL TRADE NAMES: Actispray* (FMC Corp.), Hizarocin*

Chemistry

COMPOSITION: 4-[(2R)-2-[(1S,3S,5S)-(3,5-dimethyl-2-oxocyclohexyl)-2-hydroxyethyl]piperidine-2,6-dione.



Cycloheximide

Action/Use

ACTION: Antibiotic fungicide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Action Levels

Regulatory levels recommended by EPA for enforcement by FDA and USDA when pesticide residues occur in food or feed commodities for reasons other than direct application of a pesticide. As opposed to "tolerances" which are established for residues occurring as a direct result of proper usage, action levels are set for inadvertent residues resulting from previous legal use or accidental contamination.

In the Superfund program the existence of a contaminant concentration in the environment high enough to warrant action or trigger a response under SARA and the National Oil and Hazardous Substances Contingency Plan. The term can be used similarly in other regulatory programs.

Actispray* — see Acti-dione*

Activate* 3

F: Shield-Brite, Div. Pace International LP (Activate* 3)

Chemistry

PROPERTIES: Contains anti-foam system.

Action/Use

ACTION: Spreader, spray adjuvant, surfactant.

USE: Use with herbicides, insecticides, acaricides, fungicides and growth regulators.

Safety Guidelines

TOXICITY: Nontoxic.

HANDLING AND STORAGE CAUTIONS: Store at 40°F or above.

Activate* 9-0

(Discontinued 1993 by Uniroyal Chemical Co., Inc.)

Action/Use

ACTION: Spreader, wetting agent.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Emergency Guidelines

FIRST AID: **Eyes**, immediately flush with water for at least 15 minutes. If irritation persists get medical aid.

Activate* Plus Adjuvant — Discontinued 1989 by Leffingwell, Uniroyal Chemical Co., Inc.

Activator

A substance that accelerates the effect or increases the total effect of a pesticide.

See Adjuvant; Synergist.

Active Ingredient

In any pesticide product, the component which kills, or otherwise controls, target pests. Pesticides are regulated primarily on the basis of active ingredients.

Activol* — see Gibberellic Acid.

Actor* Herbicide (diquat dibromide + paraquat) — Discontinued 1985 by ICI Agrochemicals.

Actosin C* — see Chlorophacinone.

Actril* — see Ioxynil.

Actril 3* — see Dichlorprop; Ioxynil; MCPA.

Actril DS* — see 2,4-D; Ioxynil.

Actril S* — see Bromoxynil; Dichlorprop; Ioxynil; MCPA.

Actrilawn* — see Ioxynil.

Acumen* — see Bentazone; MCPA, MCPB.

Acute Exposure

A single exposure to a toxic substance which results in severe biological harm or death. Acute exposures are usually characterized as lasting no longer than a day.

Acute Toxicity

Ability of a substance to cause poisonous effects resulting in severe biological harm or death soon after a single exposure or dose. Also, any

severe poisonous effect resulting from a single short-term exposure to a toxic substance.

See Chronic Toxicity; Toxicity.

Acyclic

Refers to an organic chemical with an open chain structure; not a ring formation.

Acylon* — see Metalaxyl.

Addition-Plus*

BP: Drexel Chemical Co.

Chemistry

COMPOSITION: Liquid nitrogen fertilizer + crop oil blend.

PROPERTIES: Clear liquid, slight odor. Boiling point 212°F.

Action/Use

ACTION: Adjuvant.

USE: With most postemergent herbicides.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water, fog, chemical foam, dry chemical, or carbon dioxide.

Additive 80*

BP: Brewer International Inc.

Chemistry

COMPOSITION: Alkylaryl/polyether alcohols + silicone emulsion.

PROPERTIES: Nonionic blend.

Action/Use

ACTION: Defoamer, deposition aid, spreader, surfactant.

USE: With fungicides for preplant, preemergent or emergent weed control. With liquid fertilizers to wet, spread, and reduce foaming.

Emergency Guidelines

EMERGENCY TELEPHONE: 800 255-3924 (Chem Tel).

Adenine**Chemistry**

COMPOSITION: 6-Aminopurine.

PROPERTIES: White needles, odorless, sharp salt taste. Slightly soluble in alcohol. Soluble in acids, alkalies. Insoluble in chloroform, ether.

Action/Use

ACTION: Plant growth regulator.

Environmental Guidelines

SOLUBILITY: Slightly soluble in cold water.

Ad-Here* — see Spreader; Sticker.

Adherence

The property of a substance to stick to a given surface.

Adhesive

A material included in a formulation to increase its sticking power or adhesiveness. Also known as a sticker.

See Sticker.

Adion* — see Permethrin.

Adios* — see Carbaryl.

Ad-It — see Isopropyl Amine.

Adizon* — see Diazinon.

Adjumec*

BP: PBI/Gordon Corp.

Identification

ADDITIONAL TRADE NAME: Agri-Oil Plus*.

Chemistry

COMPOSITION: A blend of 16% surfactant + 83% of an agricultural spray oil designed for use with herbicidal sprays (1% inerts). Surfactant consists of 94% polyoxyethylene sorbitan fatty ester and 6% inerts. Oil is a paraffinic oil with specific gravity of 0.8591 at 60°F.

Action/Use

ACTION: Surfactant.

USE: Emulsifying, wetting, and penetrating properties over a broad range of water hardness and temperature.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Emergency Guidelines

FLASHPOINT: 390°F.

Adjuvan T* — Discontinued by Ciba-Geigy.

Adjuvant

An adjuvant is used in a formulation to aid the operation or improve the effectiveness of the pesticide. The term includes such materials as wetting agents, spreaders, emulsifiers, dispersing agents, foaming adjuvants, foam suppressants, penetrants, and correctives. A spray adjuvant may contain one or more surfactants, solvents, solubilizers, buffering agents, and stickers needed to formulate a specific type adjuvant. By using the proper adjuvant it is often possible to use certain chemical pesticides in a tank mixture that otherwise would present compatibility problems.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

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Admire* — see Imidacloprid.

Adol* — see Lenacil.

Adret* — see Amidosulfuron.

Adrop Polvere* — see alpha-naphthylacetic acid; beta-naphthol.

Adrop Polvere* Plant Growth Regulator (naphthaleneacetamide + naphthaleneacetic acid) — Discontinued by Diachem S.P.A.

ADS — see Alloxidim Sodium.

Adsee*

BP: AQ Group (Adsee* 775)

Witco Corp., Oleo Surfactants Group

Action/Use

ACTION: Series of adjuvants.

USE: Multipurpose spreading, penetrating, and retention agents for agricultural formulations.

See Penetrant.

Adsorption

The process by which a pesticide or other chemical is held or bound to a surface by physical or chemical attraction. Clay and high organic soils tend to adsorb pesticides in many instances.

See Absorption, Oil Adsorption, Sorbent.

Ad-Spray 101*

BP: Helena Chemical Co. (Ad-Spray 101*)

Chemistry

COMPOSITION: Alkyl aryl polyalkoxylated alcohols.

Action/Use

ACTION: Wetting agent, soil penetrant, irrigation aid.

Safety Guidelines

TOXICITY: Nontoxic.

See Penetrant.

Adulterated Pesticide

A pesticide that does not conform to the professed standard or quality as documented on its label or labeling.

See Federal Legislation.

A-Dust* Fumigant (calcium cyanide) — Discontinued 1992 by Detia Degesch GmbH.

Advantage* — see Carbosulfan.

Ad-Wet* — see Spreader; Sticker.

Aero* Cyanamid — Discontinued by American Cyanamid Co.

Aero* Cyanate Herbicide/Fertilizer (potassium cyanate) — Discontinued 1968 by American Cyanamid Co.

Aerosil* — see Fumed silica.

Aerosol

A system of particles dispersed in a gas. Liquid particles make up a fog and solid particles form a smoke. The term usually refers to liquids in the case of pesticidal aerosols. For liquefied-gas aerosols, the toxicant is dissolved in a low-boiling liquid such as dichlorodifluoromethane (Freon 12), methyl chloride, etc., and held under pressure in a metal container. When a valve is opened, a fine mist is ejected, the propellant (low-boiling liquid) is quickly vaporized and the other ingredients remain suspended in the air.

Aerosol*

BP: American Cyanamid Co.

Trade name of a surfactant series.

Aerothene TT* (trichloroethane) — Discontinued by Dow Chemical Co.

Afalon* — see Linuron.

Afesin* Herbicide (monolinuron) — Discontinued 1986 by Hoechst Ag.

Affirm* Insecticide (abamectin) — Discontinued by Merck & Co., Inc.

Aficida* — see Pirimor.

Afilene* — see Butocarboxim.

Aflatoxin

A toxin that develops in improperly stored grain.

Aflix* Insecticide/Acaricide (formothion) — Discontinued by Sandoz Ltd.

Afos* — see Mecarbam.

Afugan*

BP: Hoechst Schering AgrEvo GmbH (Afugan*, Curamil*, Missile*, Siganex*)

Identification

COMMON NAME: Pyrazophos (ISO, BSI).

EXP. CODE NUMBER: Hoe 002873.

OTHER CODE NUMBERS: CAS 13457-18-6; SHA 447500.

DISCONTINUED NAMES: Furesan*, Masolon* (Hoechst AG).

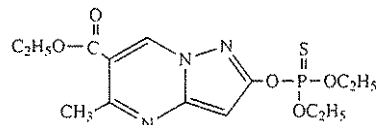
Chemistry

COMPOSITION: Ethyl-2-diethoxythiophosphoryloxy-5-methyl-pyra-

zolo(1,5-a)pyrimidine-6-carboxylate (IUPAC).

FAMILY: Phosphoric acid ester.

PROPERTIES: Olive brown to dark green crystalline solid, melting point 48-51°C. Soluble in most organic solvents.



Pyrazophos

Action/Use

ACTION: Systemic fungicide.

USE: For powdery mildew on apple, cereals, cucumber, grape, melon, ornamentals, pumpkin, squash, strawberry, watermelon. Also for control of Sigatoka diseases in bananas and Helminthosporium diseases in cereal.

FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

HAZARDS: Fish: Very toxic. Bee: Hazardous.

SOLUBILITY: In water 4.2 mg/l at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 151-778 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine followed by toxogonine.

EMERGENCY TELEPHONE: 49-69-305-6418 (Hoechst Schering AgroEvo GmbH).

Agallo Forte* — see MEMC.

Agallol* Fungicide (MEMC) — Discontinued 1984 by Bayer AG.

Ag-Chem Activator* Spreader/Sticker — Discontinued 1992 by Cumberland International.

Ag-Dri* — see Attapulgate Clay.

Agent AT-723* Emulsifier — Discontinued by GAF Chemicals Corp.

Agent Orange

A toxic herbicide and defoliant which was used in the Vietnam conflict. It contains 2,4,5 trichlorophenoxyacetic acid (2,4,5-T) and 2,4 dichlorophenoxyacetic acid (2,4-D) with trace amounts of dioxin.

Agga* — see Gibberellic Acid.

Agicide* Activator

(Discontinued 1992 by HACO, Inc.)

Chemistry

COMPOSITION: Paraffinic oil + emulsifier.

Action/Use

ACTION: Spray tank adjuvant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Agitation

Process of keeping a pesticide stirred in the spray tank in order to keep it from settling or separating out of suspension.

Aglypt

Chemistry

COMPOSITION: 4-amino-3-methylthio-6-phenyl-1,2,4-triazine-5-one.

Action/Use

ACTION: Herbicide, algicide.

USE: Controls Dowson or agar media in glasshouses.

Agral 90*

F: ZENECA Agrochemicals

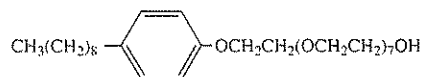
Identification

ADDITIONAL TRADE NAMES: Lissapol NX*, Synperonic NX*.

Chemistry

COMPOSITION: Nonylphenolethylene oxide condensate.

PROPERTIES: Light brown liquid containing 92% w/w synthetic non-ionic wetting and spreading agent. Boiling at approx. 80°C.



Agral 90*

Action/Use

ACTION: Nonionic wetting, spreading agent.

USE: Improves wetting, spreading properties of crop protection sprays. Compatible with all "PI" sprays.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

FORMULATIONS: Liquid.
 COMBINATIONS: Compatible with all recognized sprays and combination sprays.
Environmental Guidelines
 SOLUBILITY: Miscible with water.
Safety Guidelines
 TOXICITY: (Rat): Oral LD₅₀ 4000 mg/kg.
HANDLING AND STORAGE CAUTIONS: Noncorrosive, stable for at least two years under normal storage conditions in unopened container.
Emergency Guidelines
 FLASHPOINT: 23°C.
Agreen* — see Pyrazosulfuron-ethyl.
AgRHO* DR — see Drift Control Agents.
AgRHO* EM — see Crop Oil Concentrate/Surfactant.
AgRHO* FM — see Foam Marking Agent.
AgRHO* SA — see Dispersant.
Agribrom*

BP: Great Lakes Chemical Corp.
Chemistry
 COMPOSITION: 1-Bromo-3-chloro-5,5-dimethyl-2,4-imidazolidinedione.
PROPERTIES: White to off-white solid containing bromine and chlorine. Concentrated aqueous solutions >100 ppm have a faint halogen odor. Dilute aqueous solutions <10 ppm have no characteristic odor.
Action/Use
 ACTION: Microbial biocide.
 USE: For control of microbial slimes and fouling caused by algae, bacteria and fungi in recirculating cooling water, irrigation and automatic water distribution systems in greenhouses and agricultural premises.
 FORMULATIONS: Granules, powder, tablets.

Environmental Guidelines
 SOLUBILITY: In water 0.15 g/100 g at 25°C.
Safety Guidelines
 SIGNAL WORD: DANGER.
 TOXICITY CLASS: III.
 TOXICITY: (Rat): Oral LD₅₀ 1390 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg. Irritating to skin, eyes; dilute solution of 0.1% or less, non-irritating.

PROTECTIVE CLOTHING: Goggles or face shield, rubber gloves when handling. When entering areas during fog or mist treatment, wear a chemical cartridge respirator with NIOSH TC23C-47 cartridges or equivalent.
HANDLING AND STORAGE CAUTIONS: Strong oxidizing agent. Mix only with water. Use clean, dry utensils and equipment. Do not add this product to any dispensing device containing remnants of any other product. In case of contamination or decomposition, do not reseal container. If possible, isolate container in open air or well-ventilated area. If necessary flood with large volumes of water. Store dry in tightly closed container in cool, dry, well-ventilated area away from heat, open flames, organic chemicals and sunlight. Do not contaminate water, food, or feed by storage or disposal.

Emergency Guidelines
 FIRST AID: Get medical aid. **Eyes,** flush with cold water for at least 15 minutes. **Skin,** brush off excess chemical and flush skin with cold water for at least 15 minutes. **Ingestion,** feed bread soaked in milk, followed by olive oil or cooking oil.
 EMERGENCY TELEPHONE: 501-862-5141.

Agribusiness
 A word referring to the full scale of operations related to the business of agriculture. It connotes the inter-relationships of farming, farm services, soil science, agronomy, land grant colleges, county extension services, state and federal experiment stations, soil and water conservation services, plant and animal nutrition, plant and animal protection, transportation, finance and marketing. Agribusiness involves farm machinery manufacturers and a major portion of the chemical industry as a supplier of nutrients for crops and animals, soil amendments, and a host of insecticides, fungicides, and herbicides for crop and animal protection.

Agrichemicals
 A term frequently used to designate chemical materials used in agriculture. It is sometimes used erroneously to emphasize a supposed difference between "chemical materials" and "natural materials." However, all "natural" materials are also "chemical."

Agri-Dex*
 BP: Helena Chemical Co. (Agri-Dex*, Agri-Dex* Xtra)
Chemistry
 COMPOSITION: Heavy-range paraffin base petroleum oil polyol fatty acid esters, polyethoxylated derivatives. Agri-Dex* Xtra has a buffering agent.

Action/Use
 ACTION: Crop oil concentrate, penetrant, buffering agent (Agri-Dex* Xtra).
 USE: With pesticides where an oil based concentrate adjuvant is recommended.
Safety Guidelines
 TOXICITY: Nontoxic.
Agri-Dex* Xtra — see Agri-Dex*.
Agri-Mek* — see Abamectin.

Agrimer*
 BP: International Specialty Products
Chemistry
 COMPOSITION: (C₆H₈NO)_x.
 FAMILY: Polyvinylpyrrolidone polymers with molecular weights ranging from 8,000-3,000,000. The XL types are crosslinked disintegrants.
Action/Use
 ACTION: Polymer.
 USE: Dispersion stabilizer binders, disintegrants, seed coatings, controlled release, soluble actives, flowables.
 FORMULATIONS: Tablets and granules.

Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: IV.
 TOXICITY: (Rat): Oral LD₅₀ >100,000 mg/kg. Refer to specific label.
PROTECTIVE CLOTHING: Safety glasses or goggles.
HANDLING AND STORAGE CAUTIONS: Avoid breathing dust. Store in cool, dry, well-ventilated, secure area out of reach of children and animals.
Emergency Guidelines
 FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** drink one or two glasses of water and induce vomiting.
 EMERGENCY TELEPHONE: 800-228-5685.

Agrimer* AL
 BP: International Specialty Products
Identification
 COMMON NAME: Alkylated polyvinylpyrrolidone polymers.
Chemistry
 COMPOSITION: C₆, C₁₀, and C₂₀ alkylated polyvinylpyrrolidones.

Action/Use
 USE: Both oil and water dispersion stabilizers, granulation excipients emulsion stabilizers, and spreader-sticker adjuvants.
Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: IV.
 TOXICITY: (Rat): Oral LD₅₀ >16,000 mg/kg. Refer to specific label.
PROTECTIVE CLOTHING: Safety glasses or goggles.
HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines
 FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** drink one or two glasses of water and induce vomiting.
 EMERGENCY TELEPHONE: 800-228-5685.

Agrimer* DA
 BP: International Specialty Products
Identification
 COMMON NAME: Vinylpyrrolidone/dimethylaminoethylmethacrylate copolymer.

Chemistry
 COMPOSITION: (C₆H₈NO)_x. (C₆H₈NO)_x.
 FAMILY: Vinylpyrrolidone/Dimethylaminoethylmethacrylate copolymers with molecular weights from 0.1 to 1.0 million.
Action/Use
 USE: Slow release, volatility reduction, adhesion to leaves, emulsion stabilization.
Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: IV.
 TOXICITY: (Rat): Oral LD₅₀ >5000. Dermal: Mild irritation. Refer to specific label.
PROTECTIVE CLOTHING: Safety glasses or goggles, impervious gloves.
HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes and skin. Wash thoroughly after handling. Keep container and vapors

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

away from heat, sparks, and flame. Store in cool, dry well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FLASHPOINT: 55°F.

FIRE EXTINGUISHING MEDIA: Water spray, foam, dry chemical, carbon dioxide.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water and induce vomiting.

EMERGENCY TELEPHONE: 800-228-5635.

Agrimer* MAPTAC

(Discontinued by International Specialty Products)

Identification

COMMON NAME: Vinylpyrrolidone/methacrylamidopropyltrimethylammonium chloride.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water and induce vomiting.

EMERGENCY TELEPHONE: 800-228-5635.

Agrimer* ST

BP: International Specialty Products

Identification

COMMON NAME: Vinylpyrrolidone/styrene copolymer.

Action/Use

USE: Dispersion stabilizer, soil amendment.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >40,000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Wash thoroughly after handling.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water and induce vomiting.

EMERGENCY TELEPHONE: 800-228-5635.

Agrimer* VA

BP: International Specialty Products

Identification

COMMON NAME: Vinylpyrrolidone/vinylacetate copolymer.

Chemistry

COMPOSITION: (C₄HNO, C₄H₅O₂)_x.

FAMILY: A group of polymers with a variety of ratios of vinylpyrrolidone to vinylacetate.

Action/Use

USE: Seed coatings, granule/tablet binders, antiflocculants and foliage adhesives.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Mild skin and moderate-severe eye irritation.

PROTECTIVE CLOTHING: Safety glasses or goggles.

HANDLING & STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Keep container away from heat and flame. Wash thoroughly after handling.

Emergency Guidelines

FLASHPOINT: 50-55°F.

FIRE EXTINGUISHING MEDIA: Alcohol foam, dry chemical, carbon dioxide.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water for 15 minutes. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water and induce vomiting.

EMERGENCY TELEPHONE: 800-228-5635.

Agrimer* VEMA

BP: International Specialty Products

Identification

COMMON NAME: Polymethylvinylether/maleic anhydride copoly-

mers with molecular weights from 216,000 to 2.5 million—as anhydrides (AN), hydrolyzed to acids (H) or esterified with lower alkyls (ES).

Chemistry

FAMILY: Polymethylvinylether/maleic anhydride copolymer.

Action/Use

USE: Dispersants, encapsulants, protective colloids, thickeners and stabilizers.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >6450 mg/kg. Minimal eye irritation.

PROTECTIVE CLOTHING: Safety glasses or goggles.

HANDLING & STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Wash thoroughly after handling.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water and induce vomiting.

EMERGENCY TELEPHONE: 800-228-5635.

Agrimet* Insecticide (phorate) — Discontinued 1992 by American Cyanamid.

Agrimul*

BP: Henkel Corp.

Action/Use

ACTION: Wetting agent, emulsifier.

Agri-Mycin* 17 — see Streptomycin.

Agrinate* — see Methomyl.

Agri-Oil Plus* — see Adjumec*.

Agri-SC* — see Ammonium Laureth Sulfate.

Agrisil* Insecticide (trichloronate) — Discontinued 1985 by Bayer AG.

Agrismazina* — see Simazine.

Agrispon*

BP: ATL, Appropriate Technology Ltd.

Identification

ADDITIONAL TRADE NAMES: Hortispon*.

DISCONTINUED NAMES: Respond*, Reward* (United Agri Products).

Chemistry

PROPERTIES: Specific gravity .996 at 25°C.

Action/Use

ACTION: Biostimulant for soils and plant roots.

USE: Spray application to foliage and soils. Increases indigenous microorganisms that promote nutrient availability and growth.

Registration Notes

OUTSIDE U.S.: Registered in France, Algeria, Tunisia, Indonesia, Malaysia, Philippines, Singapore, Australia and various South American and Middle Eastern countries.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bird: Nontoxic. Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat) Oral LD₅₀ >30,000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store away from direct sunlight.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water and induce vomiting.

EMERGENCY TELEPHONE: 800-274-8930 (Appropriate Technology Ltd.).

Agri-Strep* Bactericide (streptomycin) — Discontinued 1994 by MSD Agvet.

Agrisynth*

BP: International Specialty Products

Action/Use

ACTION: Intermediates.

USE: Synthetic Intermediates.

Safety Guidelines

SIGNAL WORD: WARNING (Agrisynth* B₃D). CAUTION (Agrisynth* B₁D, Agrisynth* B₂D, Agrisynth* BLO, Agrisynth* MVE, Agrisynth* THF, Agrisynth* EVE, Agrisynth* N-BVE).

TOXICITY CLASS: II (Agrisynth* B₃D). III (Agrisynth* B₁D, Agrisynth* B₂D, Agrisynth* BLO, Agrisynth* MVE, Agrisynth* THF). IV (Agrisynth* EVE, Agrisynth* N-BVE).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

TOXICITY: (Agrisynth* B,D) (Rat): Oral LD₅₀ 1550 mg/kg. (Agrisynth* B,D) (Rat): Oral LD₅₀ 1250 mg/kg. (Agrisynth* B,D) (Rat): Oral LD₅₀ 125 mg/kg. (Agrisynth* BLO) (Rat): Oral LD₅₀ 1580 mg/kg. (Guinea Pig): Dermal LD₅₀ >5000 mg/kg. (Rabbit): Strong eye irritant. (Agrisynth* EVE) (Rat): Oral LD₅₀ 6153 mg/kg. Dermal >20 ml/kg. Inhalation 64,000 ppm. Mild skin irritant. (Agrisynth* MVE) (Rat): Oral LD₅₀ 4900 mg/kg. Dermal >8000 mg/kg. (Agrisynth* N-BVE) (Rat): Oral LD₅₀ 10,000 mg/kg; Inhalation LC₅₀ 3000. (Rabbit): Dermal 4240 mg/kg. (Agrisynth* PA) (Rabbit): Dermal 88 mg/kg. (Agrisynth* THF) (Rat): Oral LD₅₀ 1650 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles.

HANDLING AND STORAGE CAUTIONS: Do not get in eyes or on skin. Wash thoroughly after handling. Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Keep away from heat, sparks and flame.

Emergency Guidelines

FLASHPOINT: (Agrisynth* B,D): 282°F.

(Agrisynth* B,D): 146°F.

(Agrisynth* B,D): 315°F.

(Agrisynth* BLO): 200°F.

(Agrisynth* EVE): <50°F.

(Agrisynth* MVE): 69°F.

(Agrisynth* N-BVE): 26°F.

(Agrisynth* PA): 95°F.

(Agrisynth* THF): 60°F.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** drink one or two glasses of water and induce vomiting. Do NOT induce vomiting for Agrisynth* THF.

EMERGENCY TELEPHONE: 800-228-5685.

Agritol* Insecticide (Bacillus thuringiensis var. kurstaki) — Discontinued by Merck & Co., Inc.

Agritox* Insecticide (trichloronate) — Discontinued by Bayer AG.

Agriwet*
BP: Henkel Corp.

Action/Use

ACTION: Wetting agent, compatibility aid.

Agrizeb* — see Mancozeb.

Agrobac* — see *Bacillus thuringiensis* var. *kurstaki*.

Agrocide 6C*

Chemistry

COMPOSITION: Gamma-BHC.

Action/Use

ACTION: Insecticide.

USE: Controls stem borers (except pink stem borer) and whorl maggot in lowland rice.

FORMULATIONS: Granule.

Registration Notes

OUTSIDE U.S.: Philippines.

Agrocit* Fungicide (benomyl) — Discontinued by Chemol Trading Ltd. Co.

Agrodrin* — see Monocrotophos.

Agro-Gel S*

BP: American Colloid Co.

Identification

COMMON NAME: Montmorillonite clay.

CODE NUMBER: CAS 1302-78-9.

Chemistry

COMPOSITION: A high viscosity sodium bentonite exhibiting variable dry particle size.

PROPERTIES: Specific gravity 2.7; pH 8.5-10.5 in 5% water suspension.

Action/Use

ACTION: Colloidal suspending agent. Clay binder.

USE: Fertilizer suspension for herbicide and insecticide carriers.

FORMULATIONS: Dry powder, granular.

Agrol Plus* — see Refined Petroleum Distillate.

Agrol Plus S* — see Refined Petroleum Distillate.

Agromethrin* — see Cypermethrin.

Agronaa* — see Alpha-Naphthylacetic Acid.

Agronexit* Insecticide (lindane) — Discontinued by Shell International Chemical Co.

Agropon* — see Refined Petroleum Distillate.

Agroram* — see Copper Oxochloride.

Agrosan* — see PMA.

Agrosol* Flowable — see Captan; Thiabendazole.

Agrosol* Fungicide — see Captan; Thiabendazole.

Agrosol* Plant Growth Regulator

F: Ingenieria Industrial, S.A. de C.V.

Chemistry

COMPOSITION: Gibberellins + auxins + cytokinins + vitamins.

Action/Use

ACTION: Plant growth regulator.

Agrosol* Plus — see Thiabendazole; Thiram.

Agrosol* Pour-On — see Thiabendazole; Thiram.

Agrosol* S Fungicide (maneb + captan) — Discontinued 1984 by Chipman Chemicals.

Agrosol* T — see Thiabendazole; Thiram.

Agrotect* Herbicide (2,4-D) — Discontinued by Miller Chemical & Fertilizer Corp.

Agrothion* Insecticide (fenitrothion) — Discontinued 1989 by ICI Agrochemicals.

Agrox* (phenylmercury urea) — Discontinued 1969 by Chipman Chemicals.

Agrox* D-L Plus — see Captan; Diazinon; Lindane.

Agrox* S Fungicide/Insecticide (captan + lindane) — Discontinued 1969 by Chipman Chemicals.

Agrox Strep* Bactericide/Insecticide/Fungicide — Discontinued 1969 by Chipman Chemicals.

Agrox* 2-Way — see Captan; Diazinon.

Agrox* 3-Way Fungicide/Insecticide (captan + lindane + diazinon) — Discontinued 1985 by Chipman Chemicals.

Agroxone* Herbicide (MCPA) — Discontinued 1989 by ICI Agrochemicals.

AGSCO 400* — see 2,4-D.

AGSCO MXL* — see MCPA.

AgsoEx*

BP: International Specialty Products

Identification

Range of Alkylpyrrolidone solvents.

Action/Use

ACTION: Solvents.

USE: Solvents for emulsifiable concentrates and solvent-based flowables based on butyrolactone and substituted pyrrolidones.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (AgsoEx* 1) (Rat): Oral LD₅₀ 4200. (Rabbit): Dermal 8000 mg/kg.

(AgsoEx* 8) (Rat): Oral LD₅₀ 2050; Dermal 2000 mg/kg. Minimal skin, extreme eye irritation.

(AgsoEx* 12) (Rat): Oral LD₅₀ >5000. (Rabbit): Dermal >2000 mg/kg. Slight skin, mild eye irritation.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof gloves, long-sleeved shirt, long pants and hat.

Emergency Guidelines

FLASHPOINT: (AgsoEx* 1): 199°F.

(AgsoEx* 8): 246°F.

(AgsoEx* 12): 240°F.

FIRE EXTINGUISHING MEDIA: Water, foam, dry chemical, carbon dioxide.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** drink one or two glasses of water and induce vomiting.

EMERGENCY TELEPHONE: 800-228-5635

AgsoEx* — see Attapulgite Clay; Bentonite; Clay; Fuller's Earth.

Agtoxin* — see Aluminum Phosphate.

Agtragro* — see Mepiquat Chloride.

Agtro Plus* — see Refined Petroleum Distillates.

Agtro Plus S* — see Refined Petroleum Distillates.

Agzinphos* — see Zinc Phosphide.

a.i. — see Active Ingredient.

AI 3-52713 — see Cyromazine.

AIB* Grain Preservative (propionic acid) — Discontinued by W.R. Grace & Co.

AIM* Drift Control Adjuvant — Discontinued 1987 by Helena Chemical Co.

Aimchlor* — see Butachlor.

Aimcocyper* — see Cypermethrin.

Aimcosystox* — see Oxydemeton-methyl.

Aimcozeb* — see Mancozeb.

Aimcozim* — see Carbendazim.

Aimocron* — see Monocrotophos.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Aimsan* — see Phenthoate.

Aimthane* — see Acephate.

Air Drop*

F: Knapp Manufacturing (Air Drop*)

Chemistry

PROPERTIES: White odorless liquid. Viscoelastic thickener.

Action/Use

ACTION: Drift control additive.

USE: With water soluble, emulsifiable concentrates, wettable powder pesticides, desiccants, and defoliant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Nontoxic.

PROTECTIVE CLOTHING: Eye protection and rubber gloves.

FIRST AID: Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Ingestion, drink one or two glasses of water and induce vomiting.

Emergency Guidelines

FLASHPOINT: 300°F.

FIRE EXTINGUISHING MEDIA: Dry chemical or foam.

Air-Fio Green* — see Cupric Meta-Arsenite.

Airone* — see Propineb.

Akar* (chlorobenzilate) — Discontinued by Ciba-Geigy Ltd.

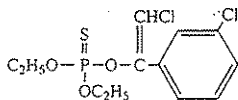
Aktikon* Herbicide (atrazine) — Discontinued by Chemol Trading Ltd. Co.

Akton*

(Discontinued by Shell International Chemical Co. Ltd.)

Identification

ADDITIONAL TRADE NAME: Axiom*.



Active Ingredient of Akton*

Action/Use

ACTION: Nonsystemic soil insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

Alachlor

BP: Comiets Chemical Industrial Co., Ltd.

Crystal Chemical Inter-America (Alanox*)

Krishi Rasayan

Makhteshim-Agan (Alagam*, Alagan*, Alanex*)

Monsanto Co., The Agricultural Group (Cropstar*, Lasso*,

Micro-Tech*, Partner*)

Pilarquim Corp. (Pilarzo*)

Rallis India Ltd. (Ralchlor*)

Sanachem (Pty) Ltd. (Sanachlor*)

Shen Hong Chemical Corp.

Shinung Corp.

Sundat (S) Pte. Ltd.

Identification

COMMON NAMES: Alachlor (ANSI, BSI, ISO, MAF, WSSA); Alachlore (ISO-F).

EXP. CODE NUMBER: CP 50144.

OTHER CODE NUMBERS: CAS 15972-60-8; SHA 090501.

ADDITIONAL TRADE NAMES: Chimiclor* (Diachem S.P.A.).

DISCONTINUED NAMES: Satochlor* (Chemol Trading Ltd. Co.);

Cannon* (+ trifluralin) (Monsanto Co.); Alatox* 480 (Pyosa).

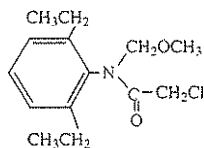
Chemistry

COMPOSITION: 2-Chloro-2',6'-diethyl-N-(methoxymethyl)-acetanilide.

FAMILY: Acetanilide.

PROPERTIES: Tech: Colorless crystals, molecular weight 269.77.

Melting point 39.5-41.5°C; specific gravity 1.133 at 25°/15.6°C. Soluble in ethyl acetate.



Alachlor

Action/Use

ACTION: Preemergence herbicide.

USE: Controls most annual grasses and certain broadleaf weeds in corn, dry beans, peanuts, soybeans. Leaves no carryover residue in soil. Can be broadcast or banded, applied by ground or aerial equipment, in water or sprayable fluid fertilizers, preplant incorporated or preemergence.

FORMULATIONS: Emulsifiable concentrate, granules, microencapsulated.

COMBINATIONS: Lance* (+ trifluralin) (Herbitécnica Defensivos Agrícolas Ltda.); Alazine* (+ atrazine) (Makhteshim-Agan); Bullet* and Lariat* (+ atrazine), Freedom* (+ trifluralin) (Monsanto Co., The Agricultural Group); Rastra* (+ atrazine) (Pyosa); Nudor Extra* (+ atrazine).

Registration Notes

U.S.: RUP.

OUTSIDE U.S.: Alanox* (Crystal Chemical Inter-America).

Environmental Guidelines

SOLUBILITY: In water 242 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 930-1350 mg/kg.

PROTECTIVE CLOTHING: Cropstar*, Lasso*: Long sleeved shirt, long pants, chemical resistant gloves, socks and chemical resistant footwear, and protective eyewear. Micro-Tech*, Partner*: Long sleeved shirt, long pants, waterproof gloves, socks and chemical resistant footwear and protective eyewear. Discard, and do not reuse clothing and other absorbent materials that have been drenched or heavily contaminated with product concentrate.

HANDLING AND STORAGE CAUTIONS: Avoid prolonged or repeated contact with skin. Wash all parts with plenty of soap and water after handling; keep away from children. Store in original container only. Do not contaminate water, seed, or feed by storage or disposal.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, Skin, flush with water. Ingestion, induce vomiting as directed by medical personnel.

EMERGENCY TELEPHONE: 314-694-4000 (Monsanto Co.).

Alagam* — see Alachlor.

Alagan* — see Alachlor.

Alamo* — see Propiconazole.

Alanap*-L — see Naptalam.

Alanex* — see Alachlor.

Alanox* — see Alachlor.

Alanycarb — see Onic*.

Alar* Growth Retardant (daminozide) — Discontinued by Uniroyal Chemical Co., Inc.

Alatox* 480 Herbicide (alachlor) — Discontinued by Pyosa.

Alazine* — see Alachlor; Atrazine.

Alboieum* Insecticide — Discontinued by ICI Agrochemicals.

Albolineum* AK Insecticide — Discontinued by ICI Agrochemicals.

Albolineum* Mineral Oils — Discontinued by ICI Agrochemicals.

Alcohol

Although in ordinary conversation ethyl alcohol (C₂H₅OH) is generally referred to merely as "alcohol," that term is applied technically to a long series of hydroxy organic compounds beginning with the one-carbon compound methanol, or methyl alcohol (CH₃OH).

Methyl alcohol, ethyl alcohol, and isopropyl alcohol are common solvents, frequently used in formulating pesticidal mixtures.

Aldéhyde Formique — see Formaldehyde.

Aldicarb

BP: Rhone-Poulenc Ag Co. (Temik*)

Sanachem (Pty) Ltd. (Sanacarb*)

Identification

COMMON NAMES: Aldicarb (ANSI, BSI, ESA, ISO); aldicarbe (ISO-F).

EXP. CODE NUMBERS: UC21149 (Union Carbide Corp).

OTHER CODE NUMBERS: CAS 116-06-3; SHA 098301, OMS 771 (WHO), A13-27093.

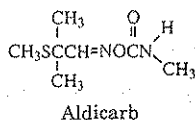
Chemistry

COMPOSITION: 2-methyl-2-(methylthio) propionaldehyde O-(methylcarbamoyl)oxime.

FAMILY: Carbamate.

PROPERTIES: Analytical: White, crystalline solid; specific gravity 1.1950 (25/20°C). Vapor pressure 2.9 × 10⁻⁵ mm/Hg (25°C). Noncorrosive to common metals and plastics.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

**Action/Use**

ACTION: Systemic insecticide, acaricide, nematocide.

USE: Only as soil application to control certain insects, mites, and nematodes on citrus (grapefruit, lemons, limes, oranges only), cotton, dry beans, ornamentals, peanuts, sorghum, soybeans, sugar beets, sweet potatoes. Pecans (Southeast and state labels in AZ, NM, TX); sugarcane (Louisiana only); tobacco (North Carolina and Virginia only).

FORMULATIONS: Granules only, because of toxicity of the parent compound, thus significantly reducing handling hazards.

Registration Notes

U.S.: Some or all applications may be classified as RUP.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 1.5 mg/l (98 h) (bluegill). Bee: Nontoxic.

SOIL PARTICLE ADSORPTION: Mobile in fine-to-coarse soils.

SOLUBILITY: In water 0.6% at 25°C.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Analytical Grade Aldicarb (Rat): Oral LD₅₀ 1 mg/kg. (Rabbit): Dermal 20 mg/kg.

Temik* 15G (Rabbit): Oral 5 mg/kg. Dermal >2000 mg/kg.

PROTECTIVE CLOTHING: Wear long-sleeved clothing and protective gloves when handling. Bathe at the end of work day, washing entire body and hair with soap and water. Store in a clean, dry and well-ventilated area.

HANDLING AND STORAGE CAUTIONS: Do not mix Temik* granules with water or the resultant solution may be seriously hazardous. Do not use applicators that will grind the granules. Wash hands and face before eating or smoking. Bathe at the end of work day, washing entire body and hair with soap and water. Store in a clean, dry and well-ventilated area.

See also Cholinesterase-Inhibiting Pesticides.

Emergency Guidelines

ANTIDOTE: Atropine sulfate. Narcotics, other sedatives should NOT be used. Drugs such as 2 PAM are NOT recommended unless organophosphate intoxication is also suggested.

Aldicarb Sulfone — see Aldoxycarb.

Aldoxycarb

BP: Rhone-Poulenc Ag Co. (Standak*)

Identification

COMMON NAMES: Aldoxycarb (ANSI, BSI, ISO-E, ESA); aldoxy-carbe (ISO-F); aldicarb sulfone; sulfocarb.

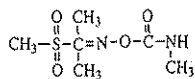
EXP. CODE NUMBERS: AI3-29261, UC-21865 (Rhone-Poulenc Ag Co.).

OTHER CODE NUMBERS: CAS 1646-88-4; SHA 110801.

Chemistry

COMPOSITION: 2-methyl-2-(methylsulfonyl)propionaldehyde 0-methylcarbanoyloxime.

FAMILY: Carbamate.



Aldoxycarb

Action/Use

ACTION: Nematicide, systemic insecticide.

Registration Notes

U.S.: Standak* has a technical registration.

Environmental Guidelines

HAZARDS: Tech: Fish: 53.0 ppm (bluegill); 42.0 ppm (rainbow trout). Bird: (Oral) 33.5 mg/kg (mallard). Dietary: >10,000 ppm (mallard); 3,706 ppm (bobwhite).

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ 25 mg/kg. (Rabbit): Dermal LD₅₀ 200 mg/kg (in corn oil).

Aldoxycarb — see Aldoxycarb.

Aldrex* Insecticide (aldrin) — Discontinued by Shell International Chemical Co. Ltd.

Aldrin**Identification**

COMMON NAMES: Aldrin (BSI, ISO, MAF), aldrine (France), HHDN (Gr. Britain).

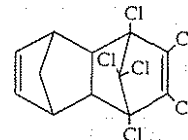
CODE NUMBERS: CAS 309-00-2; SHA 045101; EINECS 206-215-8. **DISCONTINUED NAMES:** Altox* (All India Medical Corp.); Seedrin* Liquid (Rhone-Poulenc Ag Co.); Aldrex, Aldrite* (Shell International Chemical Co. Ltd.).

Chemistry

COMPOSITION: (1R,4S,4aS,5S,8R,8aR)-1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-dimethanonaphthalene, not <95%.

FAMILY: Chlorinated cyclodiene.

PROPERTIES: Solubility: Moderate in aromatics, esters, halogenated solvents, ketones, and paraffins; sparingly in alcohols.



Active Ingredient of Aldrin

Action/Use

ACTION: Contact, stomach and fumigant insecticide with initial kill.

USE: Used primarily to control soil insects. Professional pest control uses include termites around buildings.

FORMULATIONS: Dust, dust concentrates, emulsifiable concentrate, oil solutions, seed dressings, wettable powder. Canadian aldrin, pure compound; U.S. aldrin material not <95% HHDN.

Registration Notes

U.S.: All aldrin uses cancelled.

Environmental Guidelines

HAZARDS: Fish: 5 ppb (largemouth bass); 53 ppb (channel catfish); 2.6 ppb (rainbow trout); 8.2 ppb (Chinook salmon). Bird: (Oral) 6.59 mg/kg (bobwhite); 52 mg/kg (mallard). Dietary: 34 ppm (Japanese quail); 155 ppm (mallard).

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 38-67 mg/kg. Dermal LD₅₀ 98 mg/kg. No phytotoxicity with proper formulation. No harmful effects noted on soil microorganisms; no off-flavor in plants grown on soils treated with recommended dosages of aldrin.

PROTECTIVE CLOTHING: When opening containers, mixing, or applying the product, wear protective rubber or PVC gloves, rubber boots, and clean overalls. Wear dust mask when handling dust concentrates.

HANDLING AND STORAGE CAUTIONS: Although aldrin can be absorbed by ingestion or by inhalation, the greatest occupational hazard is skin absorption. ICC shipping regulations for Class B poisons must be followed with solids (>85% aldrin) or liquids (>60% aldrin).

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry powder, CO₂, alcohol-resistant foam.

ANTIDOTE: None. Serious intoxication can lead to convulsions which should be treated with Diazepam and Phenobarbitone.

FIRST AID: Get medical aid if poison symptoms (headache, dizziness, nausea) occur, particularly if there is known contamination or gross exposure. **Eyes:** flush well with water. **Skin:** remove contaminated clothing. Wash skin with soap and water. **Ingestion:** do NOT induce vomiting. If conscious, give a large amount of activated charcoal powder with water, do NOT give oils or milk.

Aldrine — see Aldrin.

Aldrite* Insecticide (aldrin) — Discontinued by Shell International Chemical Co. Ltd.

Alfa* — see Sulfur.

Alfa-4* — see Chloralose.

Alfaron* — see Azamethiphos.

Alfamaf* — see Chloralose.

Alfamethrin — see Alpha-cypermethrin.

Alfa-tox* Insecticide (diazinon + methoxychlor) — Discontinued 1986 by Ciba-Geigy Corp.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Alfa-Z* — see Chloralose.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Alficon* — see Azamethiphos.

Algae

Simple rootless plants that grow in sunlit waters in relative proportion to the amounts of nutrients available. They can affect water quality adversely by lowering the dissolved oxygen in the water. They are food for fish and small aquatic animals.

Algae-Rhap CU 7*

BP: Agtrol Chemical Products

Chemistry

COMPOSITION: Copper-triethanolamine complex.

Action/Use

ACTION: Algicide.

USE: Surface spray for filamentous and planktonic forms of algae.

Used in potable water reservoirs, irrigation water storage and supply systems, farm, fish and fire ponds, lakes, swimming pools, and fish hatcheries. Treated water may be used immediately.

FORMULATIONS: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Relatively low toxicity.

Algaetrol* 76 Herbicide/Algicide (copper) — Discontinued by TH Agriculture & Nutrition.

Algicide

A chemical intended for the control of algae in ponds and lakes, marshes, irrigation and drainage canals, also in water that is stored or is being used industrially.

Algimycin PLL-C*

F: Great Lakes Biochemical Co., Inc.

Chemistry

COMPOSITION: Copper in the form of chelates of citrate and gluconate.

Action/Use

ACTION: Algicide.

USE: Destroys most strains of algae commonly found in lakes, reservoirs, ponds, and irrigation canals. Liquid sprayed on the water surface with most spraying equipment, or injected under the surface of the water. Tablet formulation scattered on the bottom of the body of water to be treated to control branch and attached algae, especially Chara and Nitella.

FORMULATIONS: Liquid, tablet.

Environmental Guidelines

HAZARDS: Fish: Low to most fresh-water species. Birds: Low to most. SOLUBILITY: Remains soluble over a wide range of pH at use levels, especially in hard water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Alginic Acid — see Mozanon*.

Alibi* FL Herbicide (bifenox + linuron) — Discontinued by Farm Protection Ltd., Sub. of ICI PLC.

Allicep* Herbicide (chlorbutam + pyrazon) — Discontinued by BASF AG.

Alidochlore — see Randox*.

Aliette* WDG — see Fosetyl-Aluminum.

Alipur* Herbicide (chlorbutam + cycluron) — Discontinued by BASF AG.

Align* — see Azatin*.

Alirox* — see EPTC.

Alistell* Herbicide (linuron + 2,4-DB + MCPA) — Discontinued by Farm Protection Ltd.

Aljaden* — see Sethoxydim.

Alkaloid

A physiologically active, usually naturally occurring, nitrogenous compound, alkaline in reaction. Many are characteristic of specific plants, e.g., nicotine in tobacco. Alkaloids are usually crystalline; nicotine is an exception in being liquid.

Alkamuls SMO* — see Penetrant.

Alkron* — see Parathion.

Alkyl

Refers to a univalent organic radical (group of atoms).

Allelopathic Substances

Secondary chemical compounds produced by plants that inhibit the growth of some other species of plants, including microorganisms.

Alleron* — see Parathion.

Allethrin — see Pynamin*.

d-Allethrin — see Pynamin-Forte*.

d-trans Allethrin

BP: McLaughlin Gormley King Co. (Bioallethrin*)

Identification

COMMON NAMES: d-trans allethrin (ESA); bioallethrin (BSI, New Zealand); depallethrin (France).

CODE NUMBERS: CAS 584-79-2; SHA 004003.

Chemistry

COMPOSITION: di-2-Allyl-4-hydroxy-3-methyl-2-cyclopenten-1-one ester of d-trans chrysanthemum monocarboxylic acid (CAS 8CI); also referred to as allyl homolog of cinerin I. In S-Bioallethrin both alcohol and acid forming the ester are dextrorotatory (d).

PROPERTIES: Amber colored viscous liquid, slight aromatic odor. Specific gravity of MGK's D-Trans* Conc. 90% is typically 0.997 at 20°C. Stable under normal conditions of storage and use. Avoid highly acidic or alkaline situations. Miscible with acetone, benzene, ethanol, hexane, methylene chloride, and refined kerosene.

Action/Use

ACTION: Insecticide.

USE: For crawling insects. Approx. twice as effective as racemic allethrin against flying insects.

FORMULATIONS: Aerosols, sprays, usually with synergists, for use in homes, restaurants, etc.

COMBINATIONS: With synergists piperonyl butoxide and N-octyl bicycloheptene dicarboximide (MGK* 264) for indoor/outdoor flying and crawling insect control. In combination with synergists and/or d-phenothrin in liquid or pressurized sprays.

Environmental Guidelines

HAZARDS: Fish: Highly toxic. Bee: Outdoor application rates N/AP.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING (tech 90% or more). CAUTION (form.).

TOXICITY CLASS: II (Tech). III (form.).

TOXICITY: (Rat): Oral LD₅₀ 860 mg/kg. No tolerances exist for: food additives in food processing or warehousing situations; on milk and meat animals; on crops.

PROTECTIVE CLOTHING: Goggles, gloves, and respirator when handling tech. N/AP for handling home, industry formulations.

HANDLING AND STORAGE CAUTIONS: Ordinary good manufacturing practices and sanitation. Ventilate well. Store in closed drum in cool, dry place.

Allethrin Stereoisomers

Synthetic pyrethroid insecticides. They are synthetic duplicates of a component of pyrethrum which is extracted from chrysanthemum flowers. Introduced in 1949, allethrin was the first synthetic pyrethroid. Bioallethrin and S-bioallethrin were introduced in 1969 and 1972 respectively.

Alleviate* (allethrin + piperonyl butoxide) — Discontinued 1986 by Fairfield American Corp.

Alliance* — see Fosetyl Al.

Allidochlor — see Randox*.

Allie* — see Metsulfuron-methyl.

Allied Arcadian Sodium TCA* — Discontinued by Arcadian Corp.

Allied GC-6516 — see HA-1200.

Allisan* — see DCNA.

Allomone

A chemical or mixture of chemicals produced by one organism that induces a response in an individual of another species that is favorable to the emitter. Many plants produce secondary substances that repulse insects and prevent them from feeding, so these are classified as allomones.

Alloxydim Sodium

BP: Nippon Soda Co., Ltd. (ADS*, Kusagard*)

Identification

COMMON NAME: Alloxydim sodium (BSI, ISO).

EXP. CODE NUMBERS: NP-48, NP-48Na (Nippon Soda Co., Ltd.).

OTHER CODE NUMBERS: CAS 66003-55-2; SHA 112601; EINECS 2597331.

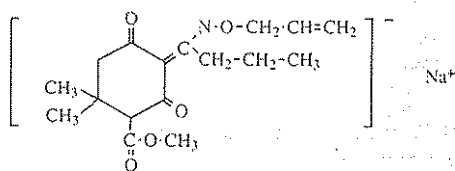
ADDITIONAL TRADE NAMES: Fervin* (Hoechst Schering AgrEvo GmbH); Clout* (Rhône-Poulenc Ag Co.); Grasip*, Grasipan* (S.I.P.C.A.M.).

Chemistry

COMPOSITION: Sodium salt of methyl 2,2-dimethyl-4,6-dioxo-5-[1-(2-propenyloxy)amino]butylidene]cyclohexanecarboxylate.

PROPERTIES: White crystals, melting point 185.5°C with decomposition. Solubility: In Dimethylformamide: 100 g/100 ml; Methanol: 61.9 g/100 ml; Cyclohexanone: 0.3 g/100 ml; Xylene: 0.002 g/100.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.



Alloxydim-Sodium

Action/Use
ACTION: Selective postemergence herbicide.
USE: Controls annual grass weeds and suppresses perennial grasses in all broadleaved crops.
FORMULATIONS: Soluble powder.
Registration Notes
OUTSIDE U.S.: ADS* registered in Europe and Australia on sugar beets, rapeseed, potatoes, and vegetables.
Environmental Guidelines
HAZARDS: Fish: LC₅₀ 2.6 (96 h) (carp); 2.0 g/l (trout). Bee: Nontoxic.
SOLUBILITY: In water >200 g/100 ml at 30°F.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 2322 mg/kg; Inhalation LC₅₀ (4h) >4.3 mg/l. (Rabbit): Dermal LD₅₀ >2000 mg/kg.
HANDLING AND STORAGE CAUTIONS: Keep in a dry, cool, ventilated place. Handle with caution, avoid contact with skin, eyes.
PROTECTIVE CLOTHING: Wear protective gloves, face shield when handling concentrate; suitable eye protection for spray solution.
FIRST AID: Symptomatic treatment.

Allyl* — see Metsulfuron-methyl.

Allyl Alcohol

(Discontinued by Dow Chemical Co.)

Identification

COMMON NAME: Allyl alcohol.
CODE NUMBERS: CAS 107-18-6; SHA 068401.

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

Allylcarb — see Hydrol*.

Allylcarbe — see Hydrol*.

Alodan* Insecticide (chlorbicyclen) — Discontinued by Hoechst AG.

Alon* — see Isoproturon.

Alopex*

(Discontinued 1981 by Hoechst AG)

Identification

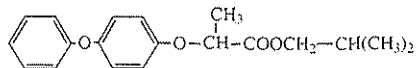
COMMON NAME: Clofop-isobutyl (BSI, ISO, WSSA).

EXP. CODE NUMBER: Hoe 22870.

OTHER CODE NUMBER: CAS 51337-71-4

Chemistry

COMPOSITION: Isobutyl-2-[4-(4-chlorophenoxy)propionate].



Clofop-isobutyl

Action/Use

ACTION: Selective systemic herbicide.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 723 mg/kg (female).

Alpha-cypermethrin

BP: American Cyanamid (Fastac*)

FMC Corp. (Bala*, Bestox*, Bonusl*, Dominex*, Efitax*)

Gharda Chemicals Ltd. (Alphaguard*)

Hubei Sanonda Co., Ltd.

Kuo Ching Chemical Co., Ltd.

Lucky Ltd.

Identification

COMMON NAMES: Alpha-cypermethrin (ISO-E draft, BSI); alpha-cypermethrine (ISO-F draft); alfamethrin (rejected).

EXP. CODE NUMBERS: FMC 65318, FMC 39391 (FMC Corp.); WL 85871 (Shell International).

OTHER CODE NUMBERS: CAS 67375-30-8; OMS-3004 (WHO).

ADDITIONAL TRADE NAME: Concord*.

Chemistry

COMPOSITION: A racemate containing (S)-α-Cyano-3-phenoxybenzyl (1R)-cis-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopanecarboxylate and (R)-α-cyano-3-phenoxybenzyl (1S)-cis-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopanecarboxylate.

PROPERTIES: Crystalline powder. Soluble in chloroform, methylene chloride, toluene, xylene and acetone. Slightly soluble in petroleum ether, hexane and methanol.

Action/Use

ACTION: Insecticide.

USE: For Coleopterous, Hemipterous, and Lepidopterous foliar and fruit pests of cereals, coffee, cotton, fruit, rape, rice, soybeans, and vegetables. Cutworm control in all row crops.

FORMULATIONS: Emulsifiable concentrates, flowables, ULV (concentration varies by country). Other formulations may be developed for specific local use.

Registration Notes

U.S.: Currently not registered.

Environmental Guidelines

HAZARDS: Fish: Toxic.

Fastac*: Fish: Low hazard. Bee: Low hazard. Bird: Low hazard.

SOLUBILITY: In water <1 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 79 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

Fastac*: (Rat): Oral LD₅₀ 79-400 mg/kg. Low order of percutaneous toxicity to mammals.

PROTECTIVE CLOTHING: Wear protective gloves, clothes, and goggles or face shield.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes, skin or mouth. Do not eat, drink or smoke when handling. Avoid breathing spray mist. Keep product away from children and unauthorized persons. Wash hands and exposed skin with soap and water after use. Remove and thoroughly wash heavily contaminated clothing immediately, especially insides of gloves. Do not apply when weather conditions favor drift, or where runoff is likely to occur. Keep out of lakes, streams, ponds, tidal marshes and estuaries.

Emergency Guidelines

FLASHPOINT: >80°C (closed cup).

FIRE EXTINGUISHING MEDIA: Foam, carbon dioxide, or dry chemical.

FIRST AID: Get medical aid. **Eyes,** flush with water for at least 15 minutes. **Skin,** remove contaminated clothing and wash immediately with soap and water. **Ingestion,** keep patient quiet. Only professional medical personnel should induce vomiting.

Alpha-cypermethrine — See Alpha-cypermethrin; Fastac*.

Alphaguard* — see Alpha-cypermethrin.

Alpha-naphthylacetic Acid

BP: Agri-Pharm International Inc.

All India Medical Corp.

Aries Agro-Vet Industries Pvt., Ltd. (Agronaa*)

Inchema, Inc.

Paushak Ltd. (Vardhak*)

Identification

COMMON NAME: Alpha-naphthylacetic acid.

TRIVIAL NAME: NAA.

ADDITIONAL TRADE NAMES: Adrop Polvere* (Diachem S.P.A.);

Acimone* (Devidayal (Sales) Pvt. Ltd.).

DISCONTINUED NAME: Phymone* (ICI Agrochemicals).

Chemistry

PROPERTIES: Off-white slightly hygroscopic solid.

Action/Use

ACTION: Plant growth regulator.

USE: Agronaa* prevents flower, fruit, boll drop in apple, berry, brinjal, chilies, citrus, cotton, groundnut, guava, jackfruit, litchi, mango, peas, pears, oranges, sweet cherry, and tomato. Increases number and size of pods in groundnut. Improves seed quality, prevents shedding of grains in paddy and wheat. Increases fruit size, induces flowering, uniform growth in pineapple. Increases berry size and weight in grapes.

FORMULATIONS: Water-soluble powder.

Environmental Guidelines

SOLUBILITY: In water 5% (420 mg/l water).

Safety Guidelines 0.05%

SIGNAL WORD: DANGER (Agronaa*).

TOXICITY CLASS: III.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

TOXICITY: (Rat): Oral LD₅₀ 1000 mg/kg.

Agronaa* (Rat): Oral LD₅₀ 1275 mg/kg.

HANDLING AND STORAGE CAUTIONS: Wash concentrate from skin or eyes immediately. Wash hands after handling and before eating. Do not contaminate ponds, waterways, or ditches with chemical or used container. Empty container completely and dispose of safely. Stable for at least 2 years under normal storage conditions in unopened containers. Once opened, should be used immediately or stored in dark.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion,** induce vomiting by drinking one or two glasses of warm water containing 2 teaspoonfuls of common salt.

See 1-naphthaleneacetic acid.

Alphos* — see Aluminum Phosphide.

Alrodynes* — Discontinued by Ciba-Geigy Ltd.

Also*

(Discontinued by Ciba-Geigy, Ltd.)

Identification

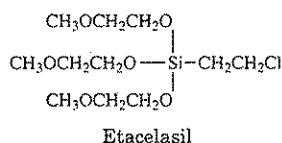
COMMON NAME: Etacelasil (BSI).

EXP. CODE NUMBER: CGA 13586.

OTHER NUMBER: CAS 37894-46-5.

Chemistry

COMPOSITION: 2-chloroethyl-tris(2-methoxyethoxy)silane.



Action/Use

ACTION: Plant growth regulator.

Environmental Guidelines

SOLUBILITY: In water, 2.5% at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Alsystin*

BP: Bayer AG (Alsystin*)

Identification

COMMON NAMES: Triflumuron (ISO, BSI).

EXP. CODE NUMBER: BAY SIR 8514 (Bayer AG).

OTHER CODE NUMBERS: CAS 64628-44-0 (triflumuron); OMS-2015 (WHO); EINECS 264-980-3.

ADDITIONAL TRADE NAMES: Baycidal*, Starycide* (Bayer AG).

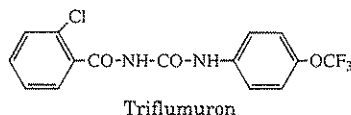
DISCONTINUED NAME: Mascot* (Miles trade name reassigned 1989 to non-ag product).

Chemistry

COMPOSITION: 2-chloro-N-[[4-(trifluoromethoxy)phenyl]amino]carbonylbenzamide (CAS).

FAMILY: Benzoylurea.

PROPERTIES: Colorless powder. Melting point 195°C. Vapor pressure 40 nPa at 20°C. Soluble in dichloromethane, barely soluble in 2-propanol, toluene and n-hexane. Stable to hydrolysis in neutral media and acids, hydrolysed by alkali.



Action/Use

ACTION: Insecticide (chitin synthesis inhibitor).

USE: Controls biting insect larvae, especially leafminers, tortrix and codling moths, cabbage moths, sawflies, corn borers, Andes potato weevil, and apple and pear suckers in pome fruit, citrus, vegetables, potatoes, cotton, forestry, oil, palm, maize, coffee, tea and other crops.

FORMULATIONS: Emulsifiable concentrate, suspension concentrate, oil-miscible flowable concentrate, wettable powder.

COMBINATIONS: Bolstar* Combi (+ sulprofos), Tamaron Combi* (+ methamidophos) (Bayer AG).

Registration Notes

Alsystin*: Former trade name of Mobay Corp.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96 h) >320 mg/l (rainbow trout). Bird: LD₅₀ 561

mg/kg b.w. (bobwhite quail). Bee: Toxic.

SOLUBILITY: In water, 0.025 mg/l at 20°C.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral/Dermal LD₅₀ >5000 mg/kg/ b.w.

Altanone* WP — see Polyoxin B.

Altima* — see Fluazinam.

Alto* — see Cyproconazole.

Alto* 100 SL Fungicide (cyproconazole) — Discontinued by Sandoz Agro Ltd.

Altorick*

(Discontinued by Zeecon Corp.)

Identification

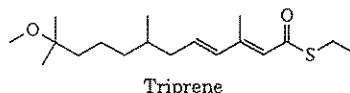
COMMON NAME: Triprene (ISO, ANSI, BSI, ESA).

EXP. CODE NUMBER: ZR-619 (Zeecon).

OTHER CODE NUMBER: CAS 40596-80-3.

Chemistry

COMPOSITION: S-Ethyl (E,E)-(RS)-11-methoxy-3,7,11-trimethyl-dodeca-2,4-dienethioate (IUPAC).



Action/Use

ACTION: Insect growth regulator.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral L₅₀ >10,000 mg/kg. (Rabbit): Dermal >9000 mg/kg.

Altosid* — see Methoprene.

Altosid* Briquets — see Methoprene.

Altosid* SR-10 — see Methoprene.

Altos* Insecticide (aldrin) — Discontinued 1993 by All India Medical Corp.

Altosar* Insect Growth Regulator (Hydroprene) — Discontinued 1979 by Zeecon Corp.

Atigan* Insecticide (bromocyclen) — Discontinued 1988 by Hoechst AG.

Aluminum Phosphide

BP: Ag Pesticides (Pvt.) Ltd. (Agtoxin*)

All India Medical Corp. (Alphos*)

Bernardo Chemicals Ltd., Inc. (Gastoxin*, Phostek*)

Degesch America, Inc. (Degesch Phostoxin*)

Degesch de Chile Ltd. (Degesch Phostoxin*)

Degesch de Mexico, S.A. (Degesch Phostoxin*)

Degesch So. Africa (Pty.) Ltd. (Degesch Phostoxin*)

Detia Degesch GmbH (Degesch Phostoxin*)

Excel Industries Ltd. (Celphide*, Celphine*, Celphos*, L'Fume*)

Fersol Indústria E Comércio Ltda. (Fertoxin* BR)

HELM AG

Inchema, Inc.

Pestcon Systems, Inc. (Fumitoxin*)

Sanex Inc. (Sanifume*)

United Phosphorus Ltd. (Quickphos*, Quikfume*)

Young IL Chemical Co., Ltd. (Epifume*)

Identification

COMMON NAME: Aluminum phosphide.

CODE NUMBERS: CAS 20859-73-8; SHA 66501.

DISCONTINUED NAMES: Delicia*, Delicia Gastoxin* (Delicia GmbH).

Chemistry

COMPOSITION: Aluminum phosphide (AlP).

FAMILY: Inorganic phosphides.

PROPERTIES: Colorless gas with odor of carbide, boiling at 87.3°C. Soluble in carbon disulfide.

Action/Use

ACTION: Insecticidal fumigant.

USE: Moisture releases hydrogen phosphide (phosphine, PH₃). For animal feed, bulk grain, cottonseed, peanuts, processed food, leaf tobacco stores. Space fumigant for flour mills, railcars, warehouses. For outdoor use only to control burrowing rodents.

FORMULATIONS: Pellets, tablets, sachets, ropes, strips.

Registration Notes

U.S.: Some or all applications may be classified RUP.

Environmental Guidelines

SOLUBILITY: In water very slight (26 cc/100 ml at 17°C).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Hydrogen phosphide threshold limit value time weighted average: 0.3 ppm; threshold limit value short-term exposure limit: 1.0 ppm; immediately dangerous to life or health level: 2.0 ppm. No chronic poisoning known in man.

PROTECTIVE CLOTHING: Not necessary for prepacs or ropes. Dry gloves for handling tablets, pellets or dust. Wash hands thoroughly after use. Aerate gloves and other contaminated clothing in well-ventilated area prior to laundering.

HANDLING AND STORAGE CAUTIONS: Store only in a cool, dry, locked, and ventilated room out of the reach of children or animals. Open containers outdoors only and never in flammable atmosphere. Storage life unlimited as long as flasks remain intact. Protect from moisture, open flames, and heat. Shelf life virtually unlimited if containers kept tightly sealed.

Emergency Guidelines

FLASHPOINT: 212°F.

COMBUSTION PRODUCTS: Contact with liquid may cause spontaneous combustion.

FIRE EXTINGUISHING MEDIA: CO₂ dry chemical extinguisher. Do NOT use water.

ANTIDOTE: Inject hypertonic 50% glucose or isotonic salt (Ringers salt) solutions intravenously for nausea and vomiting. Steroid therapy may help. (some physicians may discourage use of saline emesis).

FIRST AID: Ingestion, induce vomiting. In severe cases, get immediate medical aid, oxygen and/or artificial respiration may be needed. Inhalation, remove to fresh air.

EMERGENCY TELEPHONE: 703-234-9281 (Degesch America); 562-811-1575 (Degesch de Chile); 525-888-1417 (Degesch de Mexico); 2711-974-2338 (Degesch So. Africa (Pty.) Ltd.); 49-6201-7080 (Detia Degesch GmbH).

Alvit* Insecticide (dieldrin) — Discontinued 1979 by Shell Chemical Co. Ltd.

AMA — see Amine Methanearsonate; Ammonium Methanearsonate.

AMA Plus 2,4-D* Herbicide (amine methanearsonates + 2,4-D) — Discontinued by W.A. Cleary Chemical Corp.

Amasil P* Fungicide (calcium formiate + calcium propionate) — Discontinued 1988 by BASF AG.

Amaze* — see Isofenphos.

Amber*

BP: Ciba (Amber*)
Ciba, Ltd. (Logran*)

Identification

COMMON NAME: Triasulfuron (ISO-draft, BSD).

EXP. CODE NUMBER: CGA-131036 (Ciba-Geigy).

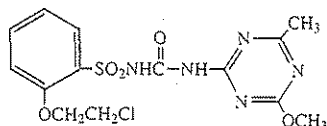
CODE NUMBER: CAS 82097-50-5.

DISCONTINUED NAMES: Exa* (+ methabenzthiazuron) (Bayer AG).

Chemistry

COMPOSITION: 2-(2-chloroethoxy)-N-[[[4-methoxy-6-methyl-1,3,5-triazin-2-yl]amino]carbonyl]benzenesulfonamide.

PROPERTIES: Light brown granules; odorless. Melting point 186°C.



Triasulfuron

Action/Use

ACTION: Selective herbicide.

USE: Preemergence in wheat to control many broadleaf and grassy weeds; postemergence in wheat, barley and fallow to control many broadleaf weeds.

FORMULATIONS: Wettable granules.

COMBINATIONS: Graminon* Forte (+ isoproturon) (Ciba Ltd.).

Registration Notes

U.S.: Registered in February 1992.

OUTSIDE U.S.: Sold commercially in Europe.

Environmental Guidelines

SOIL PARTICLE ADSORPTION: Adsorption to clay or soil colloids is relatively low, and thus leaching can occur. Further studies underway.

SOLUBILITY: In water 1500 ppm at 20°C and pH 7.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >5050 mg/kg; Inhalation LC₅₀ >2.32 (4h) mg/l air. (Rabbit): Dermal LD₅₀ >2000 mg/kg. Minimally irritating to eyes; non-irritating to skin.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, and clothing. Do not inhale dust, vapor or mist. Do not contaminate food or feed. Wash thoroughly after handling. Store in well-ventilated, secure area out of reach of children and domestic animals.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemical, foam, carbon dioxide, water.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Apply artificial respiration, if necessary. Ingestion, drink one or two glasses of water and induce vomiting.

Ambithion* Insecticide (fenitrothion + malathion) — Discontinued by American Cyanamid Co.

Ambox* Acaricide/Fungicide (binapacryl) — Discontinued 1987 by Hoechst AG.

Ambush* — see Permethrin.

Amchem 2,4,5-TP* Herbicide (silvex) — Discontinued 1984 by Union Carbide Corp.

Amcide* — see Ammate*.

Amdon* Herbicide (picloram) — Discontinued 1985 by Union Carbide Corp.

Amdro*

BP: American Cyanamid Co. (Amdro*)

Identification

COMMON NAMES: Hydramethylnon (ISO-E draft, ANSI, BSD); hydramethylnone (ISO-F draft).

EXP. CODE NUMBERS: AC 217,300; CL-217300.

OTHER CODE NUMBERS: CAS 67485-29-4, SHA 228401.

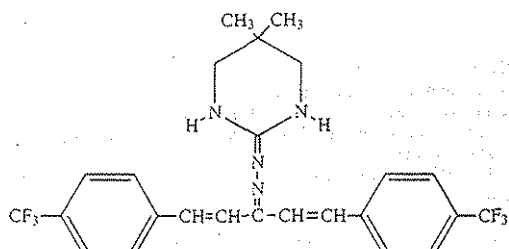
DISCONTINUED NAME: Maxforce*.

Chemistry

COMPOSITION: Tetrahydro-5,5-dimethyl-2(1H)-pyrimidinone [8-[4-(trifluoromethyl)phenyl]-1-[2-[4-(trifluoromethyl)phenyl]ethenyl]-2-propenylidene]hydrazone (CAS).

FAMILY: Amidinohydrazone.

PROPERTIES: Yellow-tan, free-flowing granules with an odor characteristic of vegetable oil.



Hydramethylnon

Action/Use

ACTION: Slow-acting insecticide.

USE: Ants (big headed, fire, harvester).

FORMULATIONS: Oil bait.

Environmental Guidelines

HAZARDS: Bird: Oral LD₅₀ >2510 mg/kg (mallard duck). Oral LD₅₀ 1828 mg/kg (bobwhite quail). Fish: LC₅₀ 0.16 mg/l (96h) (rainbow trout). LC₅₀ 0.10 mg/l (96h) (channel catfish). 1.70 mg/l (96h) (bluegill sunfish).

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg; non-irritating to eye, mildly to skin.

Tech (Rat): Oral LD₅₀ 1131 mg/kg (male); 1300 mg/kg (female). (Rabbit): Dermal LD₅₀ >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Wash thoroughly after handling. Do not contaminate water, food, or feed by storage or disposal. Store in a cool, dry, secure place and keep container tightly closed. Use product within 3 months after opening for best results.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

SPILL CONTROL/CLEANUP: Sweep up any spill and place in a closed container for disposal.

PRODUCT/WASTE DISPOSAL: Dispose in accord with local, state, and federal regulations.

Emergency Guidelines

FLASHPOINT: Setofflash (closed cup) >220°F.

FIRE EXTINGUISHING MEDIA: Water, foam, carbon dioxide, or dry chemical.

ANTIDOTE: No specific antidote. Treatment should be directed at the control of symptoms and clinical condition.

FIRST AID: **Eyes,** wash with plenty of water. **Skin,** wash with plenty of soap and water. **Inhalation,** remove to fresh air. **Ingestion,** drink two glasses of water, induce vomiting. Get medical attention.

EMERGENCY TELEPHONE: 201-835-3100 - call collect (American Cyanamid).

Amerol* — see Amitrole.

Amethopterin* — see Methotrexate.

Ametrex* — see Ametryn.

Ametrex Extra* — see Ametryn; Simazine.

Ametron* — see Ametryn; Diuron.

Ametryn

BP: Ciba (Evik*)
Ciba, Ltd. (Gesapax*)
Makhteshim-Agan (Ametrex*)
OXON Italia S.p.A.
Sanachem (Pty) Ltd. (Sancopax*)

Identification

COMMON NAMES: Ametryn (ISO, MAF, BSI, WSSA); ametryne (ISO-F).

EXP. CODE NUMBER: G-34162 (Ciba-Geigy).

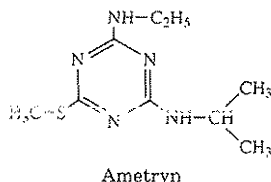
OTHER CODE NUMBER: CAS 834-12-8.

ADDITIONAL TRADE NAMES: X-sipax* (Agsin Pte. Ltd.); Herbi-pak* (Herbitécnica Defensivos Agrícolas Ltda.).

Chemistry

COMPOSITION: 2-ethylamino-4-isopropylamino-6-methylthio-s-triazine.

PROPERTIES: Colorless crystals, melting point 84-85°C. Readily soluble in organic solvents.



Action/Use

ACTION: Selective herbicide.

USE: Controls most annual broadleaf, grassy weeds in banana (directed basal spray, or any time thereafter), pineapple (broadcast or inter-space spray), and sugarcane (broadcast or interline spray). Post-directed spray in corn.

FORMULATIONS: Emulsifiable concentrate, flowable wettable, wettable powder.

COMBINATIONS: Crisazina-Crisatrina Kombi* (+ atrazine) (Crystal Chemical Inter-America); Ametron* and Bimetron* (+ diuron) (Herbitécnica Defensivos Agrícolas Ltda.); Ametrex Extra* (+ simazine), Amigan* (+ terbutylazine), Atranex Combi* (+ atrazine) (Makhteshim-Agan); Trinatox-D* (+ 2,4-D) (Pyosa).

Registration Notes

U.S.: Evik* may be applied alone (Florida, Texas) on grapefruit and orange. With Princep* (Florida only) for common bermudagrass and annual grasses and broadleaf weeds including balsam-apple, Florida pusley, milkweed vine, and spanishneedles. Tank mixture (Hawaii) with Karmex* for sugarcane.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 8.8 (96 h) (rainbow trout); 4.1 (bluegill); 14.1 mg/l (goldfish). Bee: Low toxicity.

SOLUBILITY: In water to 185 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 1950 mg/kg.

Evik* 80W (Rat): Oral LD₅₀ 1750 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid eye and skin contact. Do not inhale spray mists or drift. Store product in original container only.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. If not breathing, give artificial respiration. **Ingestion,** drink one or two glasses of water and induce vomiting.

Ametryne — see Ametryn; Atrazine.

Amex* — see Butralin.

Amiben*

(Discontinued 1994 by Rhone-Poulenc Ag Co.)

Identification

COMMON NAMES: Chloramben (ANSI), chlorambene (France).

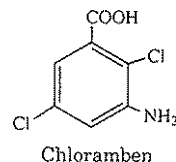
CODE NUMBERS: CAS 133-90-4; SHA 029906.

DISCONTINUED NAMES: Amilon* WP (+ linuron), Dynoram* (+ dinoseb), Ornamental Weeder* 4G, Vegiben* (all Union Carbide Corp.).

Chemistry

COMPOSITION: 3-Amino-2,5-dichlorobenzoic acid.

PROPERTIES: Melting point 201°C. Soluble in alcohol and acetone.



Action/Use

ACTION: Herbicide.

USE: Preplant incorporated or preemergence weed control. Applied at planting of corn, dry beans, lima beans, peanuts, pumpkins, seedling asparagus, soybeans (postemergence), squash, sunflowers, established tomatoes and peppers, cucumbers, cantaloupes, snapbeans, and sweet potatoes.

FORMULATIONS: Dry soluble, granule, liquid.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

SOLUBILITY: In water 700 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Free Acid (Rat): Oral LD₅₀ 5620 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid skin and eye contact, inhalation of spray mists, and drifting.

Emergency Guidelines

FIRST AID: Symptomatic treatment.

Amidithion

Identification

COMMON NAMES: Amidithion (ISO, BSI, ESA, abandoned ANSI); anidiphos (France).

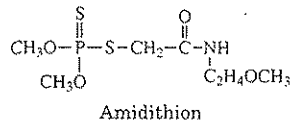
EXP. CODE NUMBER: C 2446.

OTHER CODE NUMBERS: CAS 919-76-6; SHA 059601.

DISCONTINUED NAME: Thiocron* (Ciba-Geigy Ltd.).

Chemistry

COMPOSITION: S-2-methoxyethylcarbamoylmethyl O,O-dimethylphosphorodithioate.



Action/Use

ACTION: Systemic insecticide-acaricide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 600-660 mg/kg; Dermal LD₅₀ 1600 mg/kg.

Amidochlor — see Limit*.

Amidosulfuron

BP: Hoechst Schering AgrEvo GmbH (Grodyll*, Hoestar*, Eagle*.)

Identification

COMMON NAME: Amidosulfuron (proposed).

EXP. CODE NUMBER: Hoe 075032 (Hoechst).

OTHER CODE NUMBER: CAS: 120923-37-7.

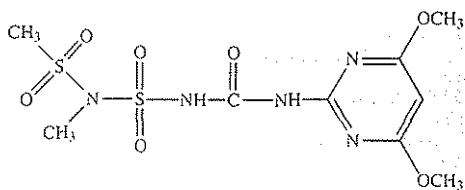
ADDITIONAL TRADE NAMES: Gratil*, Adret*.

Chemistry

COMPOSITION: 3-(4,6-dimethoxyimidin-2-yl)-1-(N-methyl-N-methylsulfonyl-aminosulfonyl)-urea (IUPAC).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

PROPERTIES: Fine, white powder. Density approx. 1.5 g/cm³. Melting point 160-163°C.



Amidosulfuron

Action/Use

ACTION: Selective postemergence herbicide.
USE: Controls broadleaf weeds such as Galium, Capsella, Sinapis in cereals.

FORMULATIONS: Water dispersible granules, 75% WDG.

Environmental Guidelines

SOLUBILITY: In water 9 mg/l (pH 5.8) at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat) Oral LD₅₀ >5000 mg/kg. Dermal LD₅₀ >5000 mg/kg.
EMERGENCY TELEPHONE: 49-69-305-6418 (Hoechst Schering AgrEvo GmbH).

Amidox* Herbicide (2,4-D) — Discontinued by Union Carbide Corp.

Amid-Thin W* — see Naphthaleneacetamide.

Amigan* — see Ametryn; Terbutylazine.

Amilon*-WP Herbicide (chloramben + linuron) — Discontinued by Union Carbide Corp.

Amine

A compound derived by the replacement of one or more of the three hydrogen atoms of ammonia by one or more hydrocarbon groups.

Amine 400 2,4-D Weedkiller — see 2,4-D.

Amine Methanearsonate

Identification

OTHER NAME: AMA.

DISCONTINUED NAMES: AMA Plus 2,4-D* (+ 2,4-D), Super Methar* (W.A. Cleary Chemical Corp.); Super Crab-E-Rad*, Super Dal-E-Rad* (Vineland Chemical).

Chemistry

COMPOSITION: Dodecylammonium methanearsonate + octylammonium methanearsonate.

FAMILY: Organic arsenical.

PROPERTIES: Colorless, amine odor. Boiling point, 105°C.

Action/Use

ACTION: Herbicide.

USE: Crabgrass control except on St. Augustine or Centipede grass.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: AMA Plus 2,4-D*, Super Methar*: Harmful if swallowed. Avoid contact with skin, eyes or clothing. Avoid inhalation of spray mist. Do not contaminate water used for irrigation or domestic purposes. Do not store near fertilizers, seeds, insecticides, or fungicides. Keep livestock and domestic animals off treated area. Do not use same spray equipment for other purposes. Avoid spray drift to susceptible plants; may injure beans, bentgrass, cotton, grapes, ornamentals, peas, etc. Coarse sprays are less likely to drift.

Emergency Guidelines

FLASHPOINT: Nonflammable.

FIRST AID: **Eyes,** flush with plenty of clear water. **Skin,** wash immediately with warm water and soap. **Ingestion,** induce vomiting. Get immediate medical aid.

Amine* 2,4,5-T — see 2,4,5-T.

Amino Triazole Weedkiller 90* (amitrole) — Discontinued 1987 by American Cyanamid Co.

Aminocarb — see Matacil*.

Aminofol*

BP: Aminco S.r.l. (Aminofol*)

Chemistry

COMPOSITION: N-acetylthiazolidin-4-carboxylic acid (ATCA) (5.0%), folic acid (0.1%) in stabilized buffered solution.

Action/Use

ACTION: Biostimulant; plant growth regulator.

USE: Seed dressing and foliar applications at various stages of plant growth.

COMBINATIONS: May be applied in combination with foliar fertilizers and micronutrients. Compatible with all non-alkaline pesticides.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Store in sealed original containers in well-aired, fresh, dry storehouses. Shelf-life: Biological activity remains unvaried for 2 years under environmental conditions, provided handling and storage cautions are followed.

Aminol 806* — see 2,4-D.

Aminopyridine — see Avitrol*.

Amino-triazole — see Amitrole.

Aminozone — see Daminozide.

Amiphos*

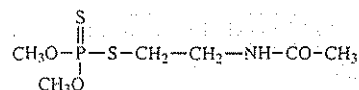
(Discontinued by Nippon Soda Co., Ltd.)

Identification

COMMON NAME: DAEP (JMAF).

Chemistry

COMPOSITION: N-(2-dimethoxyphosphinothioylthioethyl)acetamide.



DAEP

Action/Use

ACTION: Insecticide.

Amiprofos — see NTN 5006.

Amiral* — see Bayleton*.

Amiton* — see Tetram*.

Amitraz

BP: AgrEvo USA Co. (Mitac*, Ovasyn*)
Defensa Indústria de Defensivos Agrícolas S.A.
Fersol Indústria E Comércio Ltda.
Gilmore, Inc.
HELM AG
Hoechst-Roussel Agri-Vet Co. (Taktic*)
Hoechst Schering AgrEvo GmbH (Danicut*, Mitac*)
Hoechst Veterinär GmbH (Ectodex*, Taktic*)
Hubei Sanonda Co., Ltd.
Q.E.A.C.A. S.A. (Amitraz Estrella*, Azadieno*)
Rotam Group (Rotraz*)

Identification

COMMON NAMES: Amitraz (ANSI, BAN, BSI, ESA, ISO, MAF, US-AN); amitraze (ISO-F).

EXP. CODE NUMBER: BTS 27419 (FBC Ltd.).

OTHER CODE NUMBERS: CAS 33089-61-1; SHA 106201; OMS 1820.

ADDITIONAL TRADE NAME: Vapcozin* (VAPCO).

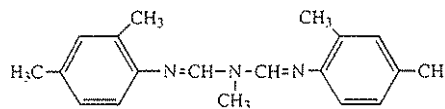
DISCONTINUED NAMES: Baam* (NOR-AM); Cytac* (Schering).

Chemistry

COMPOSITION: N-(2,4-dimethylphenyl)-N-[[[(2,4-dimethylphenyl)imino]methyl]-N-methylmethanimidamide, or N-methylbis(2,4-xylyliminomethyl)amine.

FAMILY: Triazapentadiene.

PROPERTIES: White crystalline solid, melting point 86-87°C. Soluble in common organic solvents.



Amitraz

Action/Use

ACTION: Insecticide, acaricide, synergist to other insecticides.

USE: Controls pear psylla on pears, whitefly on cotton; tetranychid and eriophyid mites on fruit, citrus, ornamental, and other agronomic and horticultural crops. Controls eggs and neonate larvae of cotton bollworm and tobacco budworm. Ticks, mange mites, lice.

FORMULATIONS: Emulsifiable concentrates, wettable powder.

COMBINATIONS: Mitac* E (+ endosulfan); Cytac* (+ cypermethrin); Zipak (+ bifenthrin).

Registration Notes

OUTSIDE U.S.: Azadieno*, Ectodex*.

Environmental Guidelines

HAZARDS: Tech: Fish: LC₅₀ 0.74 ppm (rainbow trout); 0.5 ppm (bluegill). Bee: Relatively nontoxic. Bird: Oral LD₅₀ 788 mg/kg (bobwhite). Dietary: 7000 ppm (mallard).

SOLUBILITY: Slightly soluble in water.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 650 mg/kg. Dermal LD₅₀ >1600 mg/kg. (Rabbit): Dermal LD₅₀ >200 mg/kg.

PROTECTIVE CLOTHING: Tightly woven long-sleeve shirt and long pants, rubber gloves, boots, face shield. Wear clean clothing each day, launder before reusing. Remove contaminated clothing immediately. Wash eyes with water. Wash other affected parts of body with soap and water. If the extent of contamination is unknown, bathe entire body thoroughly, change clothing.

HANDLING AND STORAGE CAUTIONS: Do not store at temperatures below 0°C. Do not get in eyes, or on skin or clothing. Do not breathe mist, keep container closed. Wash thoroughly after handling. Do not contaminate food or feed products.

Emergency GuidelinesFIRE EXTINGUISHING MEDIA: Water, foam, dry powder, CO₂.FIRST AID: Get medical aid. **Eyes**, flush with water for at least 15 minutes. **Skin**, remove contaminated clothing and wash affected area with soap and water. **Inhalation**, remove to fresh air. **Ingestion**, rinse mouth with water. Keep patient at rest.

EMERGENCY TELEPHONE: Day: 302-892-3000 (AgrEvo USA Co.); Night: 800-424-9300 (CHEMTREC).

Amitraz Estrella* — see Amitraz.

Amitraze — See Amitraz.

AmitroleBP: CPPI (Kytrol*, Mizol*, Superzol*, Weedazol TL*)
Helm AG
Makhteshim-Agan (Azolan*, Weedazol TL*)
Rhône-Poulenc Ag Co. (Amitrol T*, Amizol*, Weedazol*)**Identification**

COMMON NAMES: Amitrole (ANSI, BSI, ISO, WSSA), amino-triazole (France, Great Britain, New Zealand, USSR), ATA (MAF).

CODE NUMBERS: CAS 61-82-5; SHA 004401.

ADDITIONAL TRADE NAMES: Amerol*, Azole*, Cytrol*.

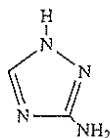
DISCONTINUED NAMES: Amino Triazole Weedkiller 90*, Cytrol Amitrole-T* (American Cyanamid); Ustilan* GW (+ ethidimuron) (Bayer AG); AT*-Liquid and AT*-90 (Custom Chemicides); Amizine* (+ simazine), Herbixol* (+ diuron), Kleer-Lot* (+ linuron), Weedazol* T (Rhône-Poulenc Ag Co.); Herbizole*.

Chemistry

CHEMICAL NAME: 1H-1,2,4-triazole-3-amine.

FAMILY: Triazole.

PROPERTIES: Tech: off-white, powder. Melting point 147-159°C. Sparingly soluble in ethyl acetate. Insoluble in oils, ether and acetone.



Amitrole

Action/Use

ACTION: Nonselective postemergence systemic herbicide.

USE: Noncropland for annual grasses, broadleaf weeds, perennial broadleaf weeds, poison ivy; some aquatic weeds in marshes, drainage ditches.

FORMULATIONS: Soluble powder, soluble concentrate, suspension concentrate, water dispersible granules, liquid solutions, wettable powder or flakes.

COMBINATIONS: Kill-Net* (+ diuron) (Chimac-Agriphar S.A.); Diurol* (+ diuron), Simazol* (+ simazine) (Makhteshim-Agan); Weedazol TL*, Mizol* (+ ammonium thiocyanate); Kytrol*; Farmco Amizine-AA Flowable* (+ atrazine); Ustinex* in various combinations (Bayer AG).

Registration Notes

U.S.: RUP.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic. Bird: Nontoxic.

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg. Dermal LD₅₀ >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed. Avoid contact with skin, eyes, clothing. Herbizole* has indefinite shelf-life and should be stored at room temperature.

Amitrol T* — see Amitrole.

Amizine* Herbicide (amitrole + simazine) — Discontinued by Rhône-Poulenc Ag Co.

Amizol* — see Amitrole.

Amlure**Identification**

COMMON NAME: Amlure.

CODE NUMBER: CAS 24902-02-1.

Chemistry

COMPOSITION: Propyl 1,4-benzodioxan-2-carboxylate.

Action/Use

ACTION: Insect attractant.

Ammate*

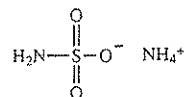
(Discontinued 1988 by Du Pont Agricultural Products)

Identification

COMMON NAMES: AMS (WSSA), ammonium sulfamate (ISO).

CODE NUMBERS: CAS 7773-06-2; SHA 005601

ADDITIONAL TRADE NAMES: Amcide*, Ikurin*, Sulfamate*.



Ammonium sulfamate

Action/Use

ACTION: Contact, translocated herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Ammo* — see Cypermethrin.

Ammonia**Identification**

CODE NUMBER: CAS 7664-41-7.

ChemistryCOMPOSITION: NH₃.**Action/Use**

ACTION: Preharvest cotton defoliant.

USE: Controls fungal growth during warehousing for grapefruit, lemons, and oranges.

FORMULATIONS: Pressurized liquefied gas.

Registration Notes

U.S.: USDA has requested that ammonia used as a preservative in high moisture corn be exempted from tolerance requirement. This permits farmers to store and dry corn without resorting to propane or natural gas drying, thus saving energy.

Ammoniacal Copper Arsenite — see Chemonite*.

Ammoniacal Copper Sulfate — see Copac* E.

Ammonium Chloride**Identification**

COMMON NAME: Ammonium Chloride

CODE NUMBER: CAS 12125-02-9.

OTHER NAME: Sal Ammoniac

ChemistryCOMPOSITION: NH₄Cl.

PROPERTIES: White, crystalline, odorless. Soluble in carbon disulfide.

Action/Use

USE: Has been used in cotton desiccation.

Environmental Guideline

HAZARDS: Ammonium chloride vaporizes at 653°F (335°C); fumes are toxic.

Ammonium Fluosilicate — see Dri-Die*.

Ammonium Laureth Sulfate

BP: Four Star Services, Inc. (Agri-SC*, Pene-Tur*, Perk*)

Chemistry

PROPERTIES: Viscous, amber liquid containing surfactants with soil amending properties. Biodegradable. Near neutral pH.

Action/Use

ACTION: Surfactant base with soil amending properties.

USE: Used with many fertilizers, pesticides. Do not use with any chemical known to be injurious to seedling.

FORMULATIONS: Water soluble liquid.

Environmental Guidelines

SOLUBILITY: Completely soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: May cause skin or eye irritation. Freezing temperatures will not affect performance, but recommended storage above 32°F. In case of spillage, rinse with water.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Emergency Guidelines

FLASHPOINT: Nonflammable.
 FIRST AID: Get medical aid. Eyes or Skin, flush with water. Ingestion, give milk or water to drink. Product contains synthetic detergents.

Ammonium Methanearsonate

Identification

COMMON NAME: AMA.
 DISCONTINUED NAMES: Ansar® 157; Super Crab-E-Rad A.M.A.* (Wineland Chemical).

Action/Use

ACTION: Selective turf herbicide.

Ammonium Nitrate

Identification

CODE NUMBER: CAS 6484-52-2.

Chemistry

COMPOSITION: NH₄NO₃.

Action/Use

ACTION: Cotton desiccant.

COMBINATIONS: With ammonium chloride or ammonium thiosulfate.

Ammonium Polysulfide

Identification

CODE NUMBER: CAS 9080-17-5.

Action/Use

ACTION: Fungicide, soil conditioner.

Ammonium Sulfamate — see Ammate*; Vegabate* I.

Ammonium Sulfate

Identification:

CODE NUMBER: CAS 7783-20-2.
 ADDITIONAL TRADE NAME: Actamaster* (Platte Chemical); Cayuse*, Cayuse* Plus (Wilbur-Ellis Co.).

Chemistry

COMPOSITION: Phosphate ester of polyglycoethers + ammoniated salts.

PROPERTIES: Amber liquid with a mild odor, specific gravity 1.23; vapor pressure >1.

Action/Use

ACTION: Adjuvant, absorption activator.

USE: Used with herbicides.

FORMULATIONS: Liquid, soluble crystal.

Environmental Guidelines

SOLUBILITY: Water soluble.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2840 mg/kg.

HANDLING AND STORAGE CAUTIONS: May cause eye, skin irritation. Store liquid above 30°F. Liquid and crystal should be kept from prolonged high temperatures. Keep away from chlorine, hypochlorites and strong oxidizers such as nitrates.

PROTECTIVE CLOTHING: Long sleeved coveralls, chemical goggles, and rubber or neoprene gloves.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: CO₂, dry chemical, foam, water fog.

FIRST AID: Get prompt medical attention. Ingested, give several glasses of water. Do NOT induce vomiting. Skin, remove contaminated clothing and wash with soap and water. Eyes, irrigate eyes for a minimum of 15 minutes with water. Inhalation, remove victim to fresh air and administer CPR if necessary.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Ammonium Thiocyanate

Identification

CODE NUMBER: CAS 1762-95-4.
 DISCONTINUED NAMES: Trans-Aid* (Union Carbide Corp.).

Chemistry

PROPERTIES: Soluble in alcohol, and acetone.

Action/Use

ACTION: Contact herbicide, soil sterilant.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

TOXICITY: Poisonous to warm-blooded animals; treated foliage usually avoided by livestock.

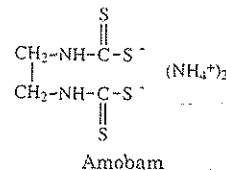
Amobam

Identification

COMMON NAME: Amobam (MAF).
 DISCONTINUED NAME: Chem-O-Bam* (Atomergic Chemetals Corp.).

Chemistry

COMPOSITION: Diammonium ethylene bisdithiocarbamate.



Action/Use

ACTION: Fungicide.
 USE: Tank mix with zinc sulfate to form zineb.

Amorphous Silica — see Fumed silica.

Amoxone* — see 2,4-D.

Ampelomyces Quisqualis — see AQ:10*.

Amphoteric

An amphoteric compound has the capacity of behaving either as an acid or base. An amphoteric surface active compound is capable of anionic or cationic behavior depending on whether it is in an acidic or a basic system.

AMS — see Ammate*.

Amsol* — see 2,4-D.

Amsul*

Chemistry

COMPOSITION: Ammonium ethylene bisdisulfide + manganese sulfate.

Action/Use

ACTION: Fungicide.

AN-119 — see Dispersant.

Anabasine

Identification

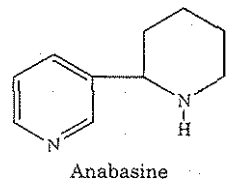
CODE NUMBER: CAS 494-52-0.

HISTORY: Small quantities were shipped to the U.S. many years ago. This alkaloid occurs in certain tobacco species in this country.

Chemistry

COMPOSITION: (S)-3-(piperidin-2-yl) pyridine.

PROPERTIES: A liquid alkaloid closely related chemically to nicotine. Anabasine sulfate (40% alkaloid equivalent) has been prepared in Russia from the wild weed Anabasis aphylla (Chenopodiaceae). Neonicotine is a name given to a synthetic anabasine (the di isomer) produced and tested in the U.S. by the Department of Agriculture.



Anchor*

BP: Pure Gro Co.

Chemistry

COMPOSITION: Cotton seed oil, alkylphenoxy polyethoxy ethanols and IPA.

Action/Use

ACTION: Sticker spreader.

USE: Nonionic surface acting wetting agent to increase efficiency of various chemicals.

FORMULATION: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Ancrack* Herbicide (naptalam) — Discontinued 1989 by Drexel Chemical Co.

Ancymidol — see A-Rest*.

Ancymidole — see A-Rest*.

Anelda* Plus — see Butylate.

Aneldazin* — see Atrazine; Butylate.

Anelirox* — see Butylate; EPTC.

Anethol

Identification

CODE NUMBER: CAS 104-46-1.

Chemistry

COMPOSITION: p-Propenylanisole.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Insect attractant.

Angelica Seed Oil

Chemistry

COMPOSITION: Oil imported from Europe for use in bait traps, now supplanted by synthetic attractants.

Action/Use

ACTION: Insect attractant.

USE: For Mediterranean fruit fly.

Anhydride

A compound derived from another by removal of the elements of water.

Anidiphos — See Amidithion.

Anilazine — see Dyrene®.

Anilino Cadmium Dilactate — see Phenylaminocadmium Di-lactate.

Anilofos

BP: Gharda Chemicals Ltd. (Aniloguard*)

Hoechst India Ltd.

Identification

COMMON NAME: Anilofos (ISO, BSI).

CODE NUMBER: CAS 64249-01-0.

ADDITIONAL TRADE NAMES: Acirice* 30 (Agro Chemicals Industries Ltd.); Arozim*, Rico* (Hoechst India Ltd.); Anilon* (Sulphur Mills Ltd.).

DISCONTINUED NAME: Khatau Chakra* (Khatau Junker Ltd.).

Chemistry

COMPOSITION: S-4-chloro-N-isopropylcarbaniloylmethyl O,O-dimethyl phosphorodithioate.

PROPERTIES: Tech, white-to-brown solid or semisolid. Melting point of pure is 50.5-52.5°C. Solubility: 1 kg/l in acetone, chloroform, toluene; 200 g/l in benzene, dichloromethane, ethanol, ethyl acetate; 12 g/l in hexane.

Action/Use

ACTION: Herbicide.

USE: Postemergence for Echinochloa crusgalli, Echinochloa colonum, Cyperus difformis, Cyperus iria, Fimbristylis spp., Eclipta alba, Marsilia quadrifoliata in transplanted paddy rice and direct sown rice.

FORMULATIONS: Emulsifiable concentrate (30 EC).

COMBINATIONS: Compatible with 2,4-D ethyl ester.

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

HAZARDS: Bee: 0.3 µm/bee. Bird: MLD 500 mg/kg (pigeon); 1480 mg/kg (rooster); 1640 mg/kg (hen).

SOLUBILITY: In water 13.6 mg/l at 20°C.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1000 mg/kg (male); 400 mg/kg (female).

(Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Clothing, goggles.

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin, clothing contact; spray inhalation. Keep away from children, unauthorized persons, domestic animals.

Emergency Guidelines

ANTIDOTE: Atropine, 2-PAM.

FIRST AID: Eyes, flush with water for at least 15 minutes. Skin, remove contaminated clothing, wash skin with soap, water. Ingestion, gastric lavage with 5% sodium bicarbonate.

Aniloguard* — see Anilofos.

Anilon* — see Anilofos.

Animal Oil

Whale oil and certain fish oils, as menhaden and herring, have been used in insecticide preparations either directly or as soaps derived from them.

See Fish Oil.

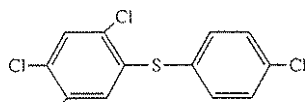
Animert V-101*

(Discontinued 1985 by Duphar B.V.)

Identification

COMMON NAME: Tetrasul (ISO, BSI, ESA).

CODE NUMBERS: CAS 2227-13-6; SHA 079201; OMS 755 (WHO).



Tetrasul

Action/Use

ACTION: Acaricide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

Anionic

An ion having a negative charge is an anion. When the surface active portion of a surfactant molecule possesses a negative charge it is termed an anionic surface active agent.

Contrast with Cationic.

Anisomycin*

Chemistry

PROPERTIES: Antibiotic from Streptomyces griseolus.

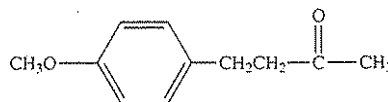
Action/Use

ACTION: Fungicide.

Anisylacetone

Chemistry

COMPOSITION: 4-(p-Methoxyphenyl)-2-butanone.



Anisylacetone

Action/Use

ACTION: Insect attractant.

Anitemex* — see Pyridate.

Aniten*

BP: American Cyanamid Co. (Aniten*, Anitop*)

Identification

COMMON NAMES: Flurenol-butyl (ISO, BSI).

TRIVIAL NAME: Flurecol.

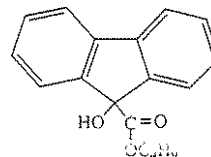
EXP. CODE NUMBER: IT-3233.

OTHER CODE NUMBERS: CAS 2314-09-2; SHA 230300.

Chemistry

COMPOSITION: Butyl 9-hydroxyfluorene-9-carboxylate.

PROPERTIES: Colorless crystals melting point 71°C. Solubility high in alcohols, benzene, carbon tetrachloride.



Flurenol-n-butylester

Action/Use

ACTION: Systemic herbicide.

USE: Used as n-butyl ester or dimethyl amine salt along with phenoxyacetic herbicides sometimes in combination with other herbicides (e.g. ioxynil).

COMBINATIONS: Synergistic mixtures: Aniten D* (+ 2,4-D isooctyl ester); Aniten M* (+ MCPA isooctyl ester); Anitop* (+ ioxynil + MCPA + dichlorprop; all as esters); Aniten P* (+ MCPA tech + MCPP tech as amine salt solution).

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: Fish: Low. Bee: Nontoxic.

SOLUBILITY: Slight in water.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg. Dermal >10,000 mg/kg.

PROTECTIVE CLOTHING: Overalls, PVC or neoprene gloves.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling and before eating or smoking. Avoid breathing spray mist. Remove contaminated clothing and wash before reuse. Store under cool, dry conditions.

Emergency Guidelines

ANTIDOTE: Unknown. Poisoning unlikely.

Anitop* — see Aniten*.

Aniverse* — see MTT-732.

Annual Weed

A weed which develops from a seed, blooms, produces seed and dies all in the same year. Examples are common chickweed and crabgrass.

See Biennial Weed; Perennial Weed.

Anocron* — see Monocrotophos.

Anofex* — see DDT.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Ansar* 6.6 — see MSMA.
ANSI

Designates the American National Standards Institute.
See Common Name.

Antagonism

Interaction of two chemicals having an opposing or neutralizing effect on each other, or — given some specific biological effect — a chemical interaction that appears to have an opposing or neutralizing effect on what might otherwise be expected.

Antak* — see n-Decanol.

Antarox* — see Rhodacal* Dispersant.

Antene* Fungicide (ziram) — Discontinued by Rumianca S.p.A.

Anthelmintic

A material used for the control of internal worms (helminths) parasitic in man and animals.

Anthio*

BP: Sandoz Agro Ltd. (Anthio*)

Identification

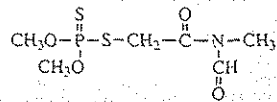
COMMON NAME: Formothion (BSI, ISO, ESA, JMAF).
EXP. CODE NUMBER: SAN 6913 I.
OTHER CODE NUMBERS: CAS 2540-82-1; SHA 366400; OMS 968 (WHO); ENT-27257.
DISCONTINUED NAMES: Aflix* (Sandoz Ltd.).

Chemistry

COMPOSITION: S-[2-(formylmethylamino)-2-oxoethyl] O,O-dimethyl phosphorodithioate (CAS).

FAMILY: Organophosphorus.

PROPERTIES: Made by the reaction of 2-chloro-N-formyl-N-methylacetamide with ammonium O,O-dimethyl phosphorodithioate. Yellow viscous oil or crystalline mass which cannot be distilled without decomposition. Pure compound melts at 25-26°C, vapor pressure 0.113mPa (20°C); d₄²⁰ 1.361; n_D²⁰ 1.5541. Solubility: Stable in nonpolar solvents. Miscible with alcohols, chloroform, diethyl ether, ketones, xylene.



Formothion

Action/Use

ACTION: Insecticide, acaricide (systemic and contact).
USE: May be used against aphids and spider mites (non-OP resistant strains only), armored scales, asparagus fly, ermine moths, fruit flies, jassids, leafminers, mangold fly, mealy bugs, olive fly, psyllids, sawflies, thrips, whiteflies.

FORMULATIONS: Emulsifiable concentrates, ULV.

COMBINATIONS: Anthiomix* and Sandothion* (+ fenitrothion) (Sandoz Agro Ltd.).

Environmental Guidelines

SOLUBILITY: Solubility in water, 2.6 g/l (24°C). Hydrolysed in presence of water, especially under alkaline conditions.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 365-500 mg/kg. Dermal >1000 mg/kg (male). In two-year feeding study (rats, dogs) dietary level of 80 ppm was without adverse effect. Minimal hazards to wildlife.

HANDLING AND STORAGE CAUTIONS: Store in original container, preferably in locked area away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Atropine with PAM or obidoxime chloride. Consult a physician in all cases of suspected poisoning.

Anthiomix* — see Anthio*; Fenitrothion.

Anthracene Oil

Identification

CODE NUMBERS: CAS 65996-91-0; SHA 006101.

OTHER NAME: Carbolineum.

Chemistry

PROPERTIES: Coal-tar distillate boiling between 270° - 300°C, with properties similar to coal-tar creosote.

Action/Use

ACTION: Wood preservative.

USE: Often used in open-tank weed preservation treatments.

Registration Notes

U.S.: All registrations for uses connected with food production or storage cancelled, 1989.

See Tar Oils.

Anthraquinone

BP: Bayer AG (Corbit*, Morkit*)

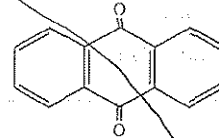
Identification

COMMON NAME: Anthraquinone (BSI, ISO).
CODE NUMBERS: CAS 84-65-1; SHA 122701; EINECS 201-549-0.
DISCONTINUED NAMES: Voronit*-Morkit* Special* (Bayer AG).

Chemistry

COMPOSITION: 9,10-anthracenedione.

PROPERTIES: Vapor pressure 5 μPa at 20°C. Melting point 236°C. Practically insoluble in organic solvents.



Anthraquinone

Action/Use

ACTION: Bird repellent.

USE: Protects planted seeds from crows and other birds.

FORMULATIONS: Seed treatment.

Registration Notes

U.S.: Not registered.

OUTSIDE U.S.: Not registered in Canada.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 72 mg/l (96h) (rainbow trout). Bee: Nontoxic when used as directed. Bird: LD₅₀ >2000 mg/kg (Japanese quail).

SOLUBILITY: Insoluble in water.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg b.w.; Dermal LD₅₀ >5000 mg/kg b.w.

Emergency Guidelines

FIRST AID: Symptomatic treatment.

See Tectoquinone.

Antibiotic

Any of certain chemical substances produced by microorganisms such as bacteria and fungi (molds) and having the capacity to inhibit the growth of or destroy bacteria and certain fungi causing animal and plant diseases.

Anti-Caking Agent — see Diatomaceous Earth.

Anticarie* Seed Protectant (hexachlorobenzene) — Discontinued 1993 by Cequisa.

Anticoagulant Rodenticide

A rodenticide which kills by inducing uncontrolled internal bleeding by preventing normal blood clotting. Some examples: Diphacin*, Fumarin*, Pivalyn*, Rozol*, Warfarin.

Antidote

An antidote is a substance intended to counteract the effects of a poison. It should be prescribed or administered only by a physician. Medical advice can be obtained from a Poison Control Center, as the correct antidote must be given. The particular pesticide must be determined, as by a label check, before an antidote is prescribed.

Antifeeding Compound

Material which does not repel but induces insects to stop feeding within a short time. The insects often refuse to eat untreated food afterward. Starvation results through an irreversible adverse effect upon the insect. Largely experimental.

See Antimetabolite.

Anti-Foam* — see Foam Suppressant.

Anti-Foam Agents — see Foam Suppressant.

Anti-Juvenile Hormones

Hormones that act by blocking development of insects to the juvenile stage.

Anti-K*

(Discontinued by Merck & Co., Inc.)

Identification

COMMON NAME: Sulfoquinoxaline.

CODE NUMBER: CAS 59-40-5.

ADDITIONAL TRADE NAME: Sulfa-Q-22*.

Action/Use

ACTION: Rodenticide, warfarin additive.

Antimetabolite

Experimental compound accepted by insects as though it contained normal food components (amino acids, vitamins, etc.) but which blocks growth. May interfere with enzyme secretion in the insect gut

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator
Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Antimilace

or permanently upset the nervous system concerned with normal functioning of the gut.

See Antifeeding Compound.

Antimilace* — see Metaldehyde.

Antimony Potassium Tartrate — see Tartar Emetic.

Antimycin

Identification

CODE NUMBERS: CAS 1397-94-0; SHA 006314.

DISCONTINUED NAME: Fintrol* (Ayerst Laboratories).

Action/Use

ACTION: Antibiotic.

Antiphen — see Dichlorophen.

Antiresistant DDT

(Discontinued 1970 by Penick Corp.)

Chemistry

COMPOSITION: N,N-Di-n-butyl-p-chlorobenzene-sulfonamide added to DDT.

Action/Use

ACTION: Insecticide.

Anti-Siphoning Device

A device attached to a filling hose to prevent water from the spray tank from draining back into the water source.

Anti-Transpirant

A material to prevent drying (loss of water by transpiration) of plants, such as vegetable transplants or evergreens subject to winter damage.

Antor*

(Discontinued 1993 by NOR-AM Chemical Co.)

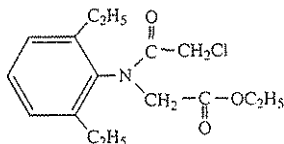
Identification

COMMON NAME: Diethyl-ethyl (ISO, ANSI, BSI, WSSA).

CODE NUMBER: CAS 58727-55-8.

Chemistry

COMPOSITION: N-(chloroacetyl)-N-(2,6-diethylphenyl)glycine ethyl ester.



Diethyl-ethyl

Action/Use

ACTION: Selective, soil-applied herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2300 mg/kg.

Emergency Guidelines

FIRST AID: **Eyes**, immediately flush with plenty of water for at least 15 minutes. **Skin**, remove contaminated clothing and wash skin with soap and plenty of water. **Ingestion**, do NOT induce vomiting. Get medical attention.

Antracol* — see Propineb.

Antracol* BT — see Bayleton*; Propineb.

Antracol* Kupfer — see Copper Oxchloride; Propineb.

Antracol* Ramato Micro — see Copper Oxchloride; Propineb.

Antracol* Triple — see Copper Oxchloride; Propineb; Bayleton*.

ANTU*

(Discontinued 1973 by Penick Corp.)

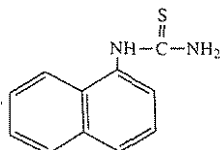
Identification

COMMON NAMES: Antu (ISO, BSI, JMAF), krysid (USSR).

CODE NUMBER: CAS 86-88-41

Chemistry

COMPOSITION: 1-(1-naphthyl)-2-thiourea; α-naphthylthiourea.



ANTU

Action/Use

ACTION: Rodenticide.

Environmental Guidelines

HAZARDS: Bird: Chickens are very sensitive.

PESTICIDE DICTIONARY

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Anvil*

—BF: ZENECA Agrochemicals (Anvil*, Planete Aster*)

Identification

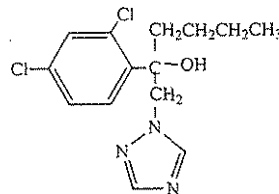
COMMON NAME: Hexaconazole (ISO draft, ANSI, BSI).

CODE NUMBER: CAS 79983-71-4.

Chemistry

COMPOSITION: (RS)-2-(2,4-dichlorophenyl)-1-(1H-1,2,4-triazol-1-yl)-hexan-2-ol.

PROPERTIES: White crystalline solid with no odor; melting point 111°C. Soluble in a range of organic solvents.



Hexaconazole

Action/Use

ACTION: Fungicide.

USE: Controls powdery mildews, scabs and rusts of vines, pome fruits, vegetables and major diseases of small grain cereals.

FORMULATIONS: Oil miscible liquid, soluble grain, suspension concentrate.

COMBINATIONS: Jaguar* (+ sulphur), various Planete* premixes (+ carbendazim or chlorothalonil or fenpropidin) (ZENECA Agrochemicals).

Environmental Guidelines

SOLUBILITY: Low solubility in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 6071 mg/kg (female).

PROTECTIVE CLOTHING: Protective gloves and eye protection when handling concentrate.

HANDLING AND STORAGE CAUTIONS: Refer to individual formulations.

AOAC International

Formerly the Association of Official Analytical Chemists, the association was established in 1884 to promote validation of chemical and biological methods for the analysis of foods, drugs, feeds, fertilizers, pesticides, water and quality measurements in the analytical sciences.

4-AP — see Avitrol*.

Apache* — see Rugby*.

Apachlor* Insecticide (chlorfenvinphos) — Discontinued 1989 by KenoGard AB.

Apadodine* Fungicide (dodine) — Discontinued 1993 by Rhone-Poulenc Ag Co.

Apadrin* Insecticide (monocrotophos) — Discontinued 1993 by KenoGard AB.

Apamidon* Insecticide (phosphamidon) — Discontinued 1989 by KenoGard AB.

Asasil*

(Discontinued by Kalo, Inc.)

Action/Use

ACTION: Reduces physiological russetting of apples.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

Apavap* Insecticide (DDVP) — Discontinued by KenoGard AB.

Apavinphos* Insecticide (mevinphos) — Discontinued 1989 by KenoGard AB.

APC — see Hydrol*.

Apex* — see Methoprene.

Aphamide

COMPOSITION: N,N-Ethylene bis(P,P-bis(1-aziridinyl)-N-methylphosphinic amide).

Action/Use

ACTION: Chemosterilant.

Registration Notes

U.S.: Experimental.

Aphamite* — see Parathion.

Aphicide

An aphicide is a compound used to control aphids (plant lice).

Aphidan*

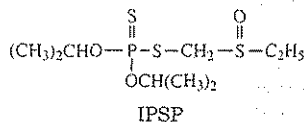
Identification

COMMON NAME: IPSP (JMAF).

CODE NUMBER: CAS 5827-05-4.

Chemistry

COMPOSITION: S-ethylsulfanyl methyl O,O-diisopropyl-phosphorodithioate.



Action/Use

ACTION: Systemic insecticide.

Apholate — see Chemosterilants.

Aphox* — see Pirimor.

Aphoxide* — see Tapa.

Apl-Luster* — see Thiabendazole.

Apl-Luster* T — see Thiabendazole.

APPO — see Tapa.

Apollo* — see Clofentezine.

Apolo* — see Clofentezine.

Appa* — see Phosmet.

Appex* — see Tetrachlorvinphos.

Applaud*

BP: Hanwha Corp.
Nihon Nohyaku Co., Ltd. (Applaud*)

Identification

COMMON NAMES: Buprofezin (ISO-E, BSI); buprofezine (ISO-F).

EXP. CODE NUMBERS: NNI-750 (Nichino); PP 618 (ICI Agrochemicals).

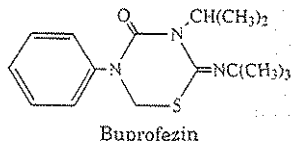
OTHER CODE NUMBER: CAS 69327-76-0.

DISCONTINUED NAME: Nichino* (Nihon Nohyaku Co., Ltd.).

Chemistry

COMPOSITION: 2-tert-butylimino-3-isopropyl-5-phenylperhydro-1,5-thiadiazin-4-one.

PROPERTIES: Pure buprofezin: Colorless crystalline solid, melting point 104.5-105.5°C. Vapor pressure 9.4×10^{-5} mmHg/25°C. Stable in acid and alkaline solutions. Solubility in acetone 240 g/l; in benzene 370 g/l; in toluene 320 g/l; in ethanol 80 g/l.



Action/Use

ACTION: Insecticide, larvicide.

USE: Persistent larvicide against mealybugs, rice planthoppers, scales and whiteflies.

FORMULATIONS: Wettable powder, suspension concentrate, dust, granule.

Environmental Guidelines

SOLUBILITY: In water 0.9 mg/l at 25°C.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2198 mg/kg (male); 2355 mg/kg (female).

HANDLING AND STORAGE CAUTIONS: Avoid skin and eye contact and inhalation. Store in a cool place.

Emergency Guidelines

FLASHPOINT: Nonflammable.

FIRST AID: Symptomatic treatment.

Aprocarb* — see Propoxur.

Apron* — see Metalaxyl; TCMTB.

Apron* C 70SD — see Metalaxyl.

Apron* 35SD — see Metalaxyl.

Apron* + Captan — see Captan; Metalaxyl.

Apron* TL — see Metalaxyl.

Apron* TZ69WS — see Metalaxyl.

Apron*-FL — see Metalaxyl.

Apron*-Terraclor* — see Metalaxyl; PCNB.

Apronox* — see Propanil.

AQ:10*

BP: Ecogen Inc. (AQ:10*)

Identification

COMMON NAME: *Ampelomyces quisqualis*.

Action/Use

ACTION: Biological fungicide.

USE: Controls powdery mildew in grapes, cucurbits, pome fruit and tomatoes.

FORMULATIONS: Wettable powder, extruded granule.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Wildlife: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry place.

Aqua 8* — see Ethion.

Aqua Cal* — see Calcium Sulfate.

Aquacide* — see Diquat Dibromide.

Aqua-Gel* Absorbent — Discontinued 1983 by Miller Chemical & Fertilizer Corp.

Aqua-Kleen*

F: Rhone-Poulenc Ag Co. (Aqua-Kleen*)

Identification

CODE NUMBERS: CAS 1929-73-3.

Chemistry

COMPOSITION: 2,4-D butoxyethyl ester (20%).

FAMILY: Chlorinated phenoxy.

PROPERTIES: Gray to tan granules with mild phenolic odor. 2,4-D acid not customarily used by itself; usually formulated as salt, amine, or ester.

Action/Use

ACTION: Aquatic herbicide-selective, hormone type.

USE: For control of water weeds such as: bladderwort, coontail, waterchestnut, watermilfoil, watershield, waterstargrass, white and yellow waterily or spatterdock in lakes and ponds.

FORMULATIONS: 20% Granular.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4050 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg. Slightly irritating to eyes, not irritating to skin.

PROTECTIVE CLOTHING: Chemical resistant gloves, safety glasses and protective clothing.

HANDLING AND STORAGE CAUTIONS: Do not swallow. Do not breathe dusts. Avoid getting in eyes, on skin or clothing. Do not store near food, feedstuffs, fertilizers, or seed. Do not contaminate water, food, or feed by storage or disposal; avoid drifts to susceptible plants. Do not apply to waters used for irrigation, agricultural sprays, watering dairy animals or domestic water supplies.

Emergency Guidelines

FIRST AID: Remove from source of exposure. Use artificial respiration if necessary. Get medical attention.

EMERGENCY TELEPHONE: 800-334-7577.

Aquashade*

BP: Applied Biochemists, Inc.

Chemistry

COMPOSITION: Dyes + water.

Action/Use

ACTION: Aquatic plant growth regulator.

USE: Filters sunlight to suppress submersed weeds and algae.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Store above freezing.

Aquathol* — see Endothall.

Aquathol K* — see Endothall.

Aquatin* — see Triphenyltin Chloride.

Aquatin* 20EC — see Triphenyltin Chloride.

Aquatrine*

BP: Applied Biochemists, Inc.

Chemistry

COMPOSITION: Mixed copper-ethanolamine complexes, chelated copper.

PROPERTIES: Dark blue liquid. Specific gravity 1.21 at 25°C, pH 10.4. Chelated copper does not precipitate out of solution in hard waters.

Action/Use

ACTION: Algicide, photosynthetic inhibitor.

USE: Controls chara, filamentous, planktonic algae in both fish and shrimp aquaculture facilities.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

FORMULATIONS: Liquid.

Environmental Guidelines

SOLUBILITY: Completely soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 0.50-2.00 ml/kg.

PROTECTIVE CLOTHING: Rubber gloves and protective eyewear advisable when handling concentrate.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. May cause skin damage. Do not get on skin, eyes or clothing. Avoid contamination with acids.

Emergency Guidelines

FLASHPOINT: N/Ap.

FIRST AID: Get immediate medical aid. Eyes, flush with plenty of water. Skin, flush with plenty of water. Ingestion, may be harmful if swallowed. Lavage with milk, or if immediately available, 1% solution of potassium ferrocyanide. Give demulcents. Maintain electrolyte and fluid balances. Meperidine may be necessary for control of pain. BAL, Calcium EDTA and Penicillamine have all met with some success in promoting copper excretion.

Aqua-Vex* Herbicide (silvex) — Discontinued by Pennwalt.

Aquazine* Herbicide (simazine) — Discontinued 1993 by Ciba.

Aracide* — see Aramite*.

Aracnol F* — see Cyhexatin.

Aracnol K* — see Tetradifon.

Aramite — see Aramite*.

Aramite*

(Discontinued 1962 by Uniroyal Chemical Co., Inc.)

Identification

COMMON NAME: Aramite (JMAF).

EXP. CODE NUMBER: 88-R (Uniroyal).

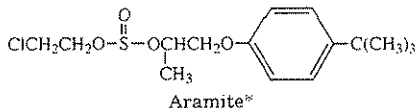
OTHER CODE NUMBER: CAS 140-57-8.

ADDITIONAL TRADE NAME: Aracide*.

DISCONTINUED NAMES: Niagaramite* (FMC Corp.). 88-R (Uniroyal Chemical Co., Inc.).

Chemistry

COMPOSITION: 2-(p-tert-Butylphenoxy)-1-methylethyl 2-chloroethyl sulfite.



Action/Use

ACTION: Acaricide.

Aramo* Herbicide (bentazone + MCPA) — Discontinued 1994 by BASF AG.

Araoil* — see Chlorpyrifos.

Arapam* — see Metam Sodium.

Arasan* Fungicide (thiram) — Discontinued by Du Pont Agricultural Products.

Arbex* — see Glyphosate.

Arbortrine* Fungicide (benomyl) — Discontinued by Applied Biochemists, Inc.

Arbotect*

BP: Merck & Co., Inc. (Arbotect*, Arbotect* S, Arbotect* 20-S)

Identification

COMMON NAME: Thiabendazole (ISO, BSI, JMAF).

TRIVIAL NAME: TBZ.

CODE NUMBER: CAS 148-79-8.

DISCONTINUED NAME: Elmpro*.

Chemistry

COMPOSITION: 2-(4-Thiazolyl)-1H-benzimidazole.

Action/Use

ACTION: Systemic fungicide.

USE: Controls Dutch elm diseases and sycamore anthracnose. Preventive and therapeutic treatments in elm and sycamore trees.

FORMULATIONS: Liquid.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3100 mg/kg.

PROTECTIVE CLOTHING: Arbotect* 20-S, rubber gloves and goggles.

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed. May irritate skin. Avoid contact with skin or eyes. Avoid freezing.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush with plenty of water for at least 15 minutes. Skin, flush with plenty of water. Ingestion, if conscious, induce vomiting by giving two glasses of warm water and touching back of throat.

Arbotect* S — see Arbotect*.

Arbotect* 20-S — see Arbotect*.

Archer* — see Fenpropimorph; Tilt*.

Ardent* — see Diflufenican.

Areginal*

Chemistry

COMPOSITION: Methyl formate + ethyl formate.

Action/Use

ACTION: Fumigant insecticide.

Registration Notes

OUTSIDE U.S.: Was used in Germany.

Arelon* — see Isoproturon.

Arelon Flusig* — see Isoproturon.

Arelon* Kombi — see Isoproturon.

Arelon P Flusig* — see Isoproturon.

Aresin* — see Monolinuron.

A-Rest*

BP: DowElanco

Identification

COMMON NAMES: Ancymidol (ISO-E draft, ANSI, BSI); ancymidole (ISO-F).

EXP. CODE NUMBER: EL-531.

OTHER CODE NUMBERS: CAS 12771-68-5; SHA 108601.

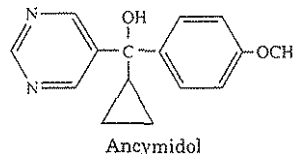
ADDITIONAL TRADE NAME: Reducymol*.

DISCONTINUED NAME: Quel* (Elanco Products).

Chemistry

COMPOSITION: α -Cyclopropyl- α -(4-methoxyphenyl)-5-pyrimidine-methanol.

PROPERTIES: Pure ancymidol, white crystalline solid, melting point 110-111°C. Soluble in most organic solvents.



Action/Use

ACTION: Growth regulator.

USE: Reduces internode elongation. For a wide range of plant species applied to either foliage or soil. Greenhouse plants: chrysanthemums, daffodils, lilies, poinsettias, and tulips.

FORMULATIONS: Solution.

Registration Notes

OUTSIDE U.S.: Reducymol*.

Environmental Guidelines

SOLUBILITY: In water 650 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 4500 mg/kg. (Rabbit): Dermal LD₅₀ >200 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid freezing. Store in original container. Destroy empty container; do not reuse. Keep out of reach of children. May be harmful if swallowed. Avoid contact with skin, eyes, or clothing. Do not contaminate water, food or feed.

Aretan* Fungicide (MEMC) — Discontinued 1984 by Bayer AG.

Aretan* 6 Fungicide (MEMC) — Discontinued by ICI Agrochemicals.

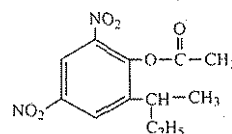
Aretan-nieuw* Fungicide — Discontinued by Bayer AG.

Aretit*

(Discontinued 1987 by Hoechst AG)

Identification

COMMON NAME: Dinoseb acetate (BSI, ISO).



EXP. CODE NUMBER: Hoe 002904.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

OTHER CODE NUMBER: CAS 2813-95-8.
 ADDITIONAL TRADE NAMES: Ivosit* (Hoechst AG); Phenotan*.

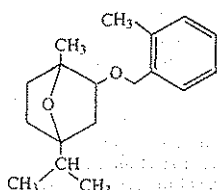
Action/Use
 ACTION: Selective herbicide.

Safety Guidelines
 SIGNAL WORD: DANGER.
 TOXICITY CLASS: I.

Argold*
 BP: American Cyanamid Co. (Argold*)
Identification
 COMMON NAMES: Cinmethylin (ISO-E draft, ANSI, BSI, WSSA); cinmethyline (ISO-F).
 DISCONTINUED NAMES: Cinch* (Du Pont).

Chemistry
 COMPOSITION: exo-1-methyl-4-(1-methylethyl)-2-[(2-methylphenyl)methoxy]-7-oxabicyclo [2.2.1]heptane.
 FAMILY: Cineole.

PROPERTIES: Amber colored liquid. Boiling point 313°C at 760 mm/Hg. Vapor pressure 10.1 m Pa at 20°C. Chemically, thermally stable. Miscible in a range of other solvents.



Cinmethylin

Action/Use
 ACTION: Herbicide.
 USE: For paddy rice.
 FORMULATIONS: Emulsifiable concentrate.
 COMBINATIONS: Argold* GR (+ 2,4-D) in transplanted rice.

Registration Notes
 OUTSIDE U.S.: Argold*.

Environmental Guidelines
 HAZARDS: Fish: Moderate. Bird: Low.
 SOLUBILITY: In water 63 ppm.

Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: III.
 TOXICITY: (Rat): Oral LD₅₀ 4553 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Overalls and rubber gloves.
HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling and before eating or smoking. Avoid breathing spray mist. Remove contaminated clothing and wash before reuse. Store under cool, dry conditions.

Emergency Guidelines
 ANTIDOTE: Unknown. Poisoning unlikely.
Imazan* Herbicide (buturon) — Discontinued by BASF AG.
Imidacloprid* Insecticide (DDT) — Discontinued by Shell International Chemical Co. Ltd.

Armac*
 BP: Akzo Nobel Chemicals Inc. (Armac*)

Chemistry
 COMPOSITION: Aliphatic amine acetates.

Armeen*
 BP: Akzo Nobel Chemicals Inc. (Armeen*)

Identification
 COMPOSITION: Aliphatic amines.

Armix*
 BP: Witco Corp., Oleo Surfactants Group (Armix*)

Action/Use
 ACTION: Series of adjuvants.
 USE: Spreading, wetting, penetrating, emulsifying agents.

Armour* — see Impact*.
Armul*

BP: Witco Corp., Oleo Surfactants Group (Armul*)

Action/Use
 ACTION: Series of emulsifiers.
 USE: Multipurpose emulsifying agents for agricultural formulations.
 FORMULATIONS: Flowables, crop oils, insecticide, specialty herbicide emulsifiers.

Arnox*
 (Discontinued 1986 by DeSoto Inc.)

Action/Use
 ACTION: Specialty nonionics.

Arochlor*
 (Discontinued 1970 by Monsanto Agricultural Co.)

Chemistry
 COMPOSITION: Mixture of chlorinated biphenyls.

Action/Use
 ACTION: Reduce vapor pressure; prolong residual activity of insecticides.

Aromatic Compound
 Compound derived from benzene or related raw material having a pungent odor; characterized by the presence of the benzene ring.



Benzene Ring

Aromatic Oils
 Petroleum oil distillates differ in their content of aromatic (ring type) compounds. Xylene range is of higher purity and more solvent than the heavier aromatic solvents, and better adapted to multiple formulations (two or more toxicants in same formulation). Those distillates high in aromatics are used directly as selective and non-selective herbicides, sometimes with other herbicides dissolved in them. Oil fractions high in aromatics are commonly the solvent in emulsifiable insecticide concentrates.
 See Petroleum Oils.

Arozin* — see Anilofos.

Arpege* Fungicide — see Tetraconazole.

Arpege* EPI Fungicide (chlorothalonil + tetraconazole) — Discontinued 1994 by ISAGRO.

Approcarb — see Propoxur.

Arquad* 2C-75
 BP: Akzo Nobel Chemicals Inc. (Arquad* 2C-75)

Chemistry
 COMPOSITION: Dimethyldicocoammonium chloride.
 PROPERTIES: Quaternary ammonium compound from coconut oil.

Action/Use
 ACTION: Surface active agents.

Arrat* Herbicide (chloridazon + phenmedipham) — Discontinued 1989 by BASF AG.

Arrhenal* — see DSMA.

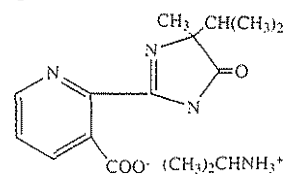
Arrivo* — see Cypermethrin.

Arrosolo* — see Mollinate; Propanil.

Arsenal*
 BP: American Cyanamid Co. (Arsenal*)
Identification
 COMMON NAME: Imazapyr (ISO draft, ANSI, BSI).
 EXP CODE NUMBERS: CL 252,925, AC 252,925.
 DISCONTINUED NAMES: Topsite* (+ diuron) (American Cyanamid).
 OTHER CODE NUMBER: CAS 81334-34-1 (imazapyr); CAS 81510-83-0 (isopropylamine salt).

Chemistry
 COMPOSITION: 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)nicotinic acid (IUPAC); isopropylamine salt of imazapyr(2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid) (CAS).
 FAMILY: Imidazolinone.

PROPERTIES: Clear, slightly viscous, pale yellow to dark green aqueous liquid with a slight ammoniacal odor.



Arsenal*

Action/Use
 ACTION: Nonselective, broad-spectrum systemic herbicide with residual activity.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

USE: Controls most annual and perennial grasses, broadleaf weeds and woody species in noncropland areas such as railroad, utility and pipeline rights-of-way, utility plant sites, petroleum tank farms, pumping installations, fence rows, storage areas, and other similar areas.

FORMULATIONS: Aqueous liquid with wetting agent.

Environmental Guidelines

SOLUBILITY: Miscible in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2148 mg/kg. Mild eye, skin irritation.

HANDLING AND STORAGE CONDITIONS: Keep out of reach of children. Avoid contact with skin, eyes or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before re-use. Spray solutions of Arsenal* should be mixed, stored and applied only in stainless steel, fiberglass, plastic and plastic-lined steel containers. Do not mix, store or apply in unlined steel (except stainless steel) containers or spray tanks.

Emergency Guidelines

FLASHPOINT: >98.9° C, 210°F (seta closed cup).

FIRE EXTINGUISHING MEDIA: Water, foam, dry chemical or CO₂. Alcohol foam is the recommended type of foam.

FIRST AID: Get medical attention. Eyes, flush with plenty of water.

Skin, wash with plenty of soap and water. Ingestion, Drink 2 glasses of water, induce vomiting if person is conscious. Inhalation, remove to fresh air.

Arsenic Acid

Identification

CODE NUMBERS: CAS 7778-39-4; SHA 006801.

ADDITIONAL TRADE NAMES: Hi-Yield Desiccant H-10* (PPG Industries), Zotox* Crab Grass Killer.

DISCONTINUED NAMES: Crab Grass Killer* (Garden Products); Desiccant L-10* (ELF Atochem North America).

Chemistry

COMPOSITION: Orthoarsenic acid (H₂AsO₄).

PROPERTIES: 75% Water miscible. Parent compound of arsenates.

Action/Use

ACTION: Cotton desiccant, herbicide.

COMBINATIONS: With endothall (Texas only).

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 48-100 mg/kg. U.S. tolerance of 4 ppm As₂O₃ equivalent on raw cottonseed.

HANDLING AND STORAGE CAUTIONS: Do not graze or feed treated plants or gin waste.

Arsenic Trioxide

(Discontinued 1971 by American Smelting + Refining)

Identification

COMMON NAMES: Arsenous oxide (ISO-E); oxyde arsenieux (ISO-F).

CODE NUMBERS: CAS 1327-53-3; SHA 007001.

OTHER NAME: Refined known as white arsenic.

Action/Use

ACTION: Chemical intermediate, herbicide, insecticide, and rodenticide.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bird: Moderately toxic.

Safety Guidelines

TOXICITY: Acutely toxic.

Arsenicals

The earliest insecticides against chewing insects were the arsenicals, chiefly copper acetoarsenite (Paris green), lead arsenate, and calcium arsenate. Sodium arsenite has been used as a sterilant herbicide and a potato-vine killer. These applications have been superceded because of the hazard to man and animals. Sodium arsenate was formerly the toxicant in many ant sirups for household use, but this application also has been discontinued. Organic arsenicals are at present of the most pesticidal interest because of their value as selective herbicides. See Cacodylic Acid, DSMA, MAMA, MSMA.

Arsenic Oxide — see Arsenic Trioxide.

Arsinyl* — see DSMA.

Arsonate

An arsenical compound with a hydrocarbon group connected to the arsenic atom; hence, an organic arsenical.

See Arsenicals.

Arsonate Liquid* — see MSMA.

Artaban* — see Benzoximate.

Arvest* — see Ethephon.

Aryl

Refers to a compound with the 6-carbon ring structure of benzene, etc., and aromatic derivatives.

Asafetida

Identification

CODE NUMBERS: CAS 9000-04-8; SHA 261200.

Chemistry

PROPERTIES: Gummy resin obtained from the roots of Ferula species, having an unpleasant odor.

Action/Use

ACTION: Animal repellent.

Asalto* — see Fenpyroximate.

Asana* XL

BP: Du Pont Agricultural Products (Asana* XL)

Identification

COMMON NAME: Esfenvalerate (ISO, BSI).

CODE NUMBERS: CAS 66230-04-4; OMS 3023 (WHO)

Chemistry

COMPOSITION: (S)-α-cyano-3-phenoxybenzyl (S)-2-(4-chlorophenyl)-3-methylbutyrate (IUPAC); (S)-cyano(3-phenoxyphenyl)methyl (S)-4-chloro-α-(1-methylethyl)benzeneacetate (CAS).

PROPERTIES: Amber liquid. Specific gravity: 0.96. Boiling at 305-332°F. Miscible and stable in up to equal volumes of nonvolatile refined vegetable oils.

Action/Use

ACTION: Broad spectrum insecticide.

USE: For almond, apple, artichoke, bean (dry, snap), broccoli, cabbage, carrot, cauliflower, collard, corn (field, sweet, seed, popcorn), cotton, cucumber, dry pea, eggplant, filbert, green pea, lentil, melon, peanut, pear, pecan, pepper, potato, pumpkin, radish, soybean, squash (summer, winter), sugarcane, sunflower, stone fruit, tomato, walnut. Noncrop (excluding public lands such as forests, parks, recreational areas), Christmas tree plantings, conifer seed orchards, forest tree nurseries.

FORMULATIONS: Emulsifiable concentrates.

Registration Notes

U.S.: Some or all applications may be classified as RUP.

Environmental Guidelines

HAZARDS: Fish: Highly toxic.

SOLUBILITY: Good emulsibility (0.025 lb ai/gal) in soft water (3 ppm as Ca Co₂), medium hard water (342 ppm as Ca Co₂), and hard water (500 ppm as Ca Co₂).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 458 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

Emergency Guidelines

FLASHPOINT: 66°C (150°F). Combustible. Heating can release vapors which can be ignited. Hazardous gases/vapors produced in fire are toxic and may include hydrogen cyanide.

FIRE EXTINGUISHING MEDIA: Water spray, water fog, dry chemical CO₂.

FIRST AID: Skin, refer to label. Ingestion, Do NOT induce vomiting. Carry out gastric lavage with care to prevent aspiration of liquid in lungs. Treat symptomatically.

EMERGENCY TELEPHONE: 1-800-441-3637 (Du Pont).

Asarinin — see Sesamin.

Asataf* — see Acephate.

Ascurit* — see Prochloraz.

Asozin* — see Rhizoctol*.

ASP-51 — see Aspon*.

Aspon*

(Discontinued 1987 by Stauffer Chemical Co.)

Identification

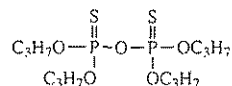
EXP. CODE NUMBERS: ASP-51 (Stauffer Chemical Co.).

OTHER CODE NUMBER: CAS 3244-90-4.

OTHER NAME: NPD.

Chemistry

COMPOSITION: Tetrapropyl dithiopyrophosphate.



Active Ingredient of Aspon*

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION. May cause cholinesterase inhibition.

TOXICITY CLASS: III.

Emergency Guidelines

ANTIDOTE: Atropine.

Aspon® Chlordane insecticide (chlordane) — Discontinued by Eusey & Besthoff, Inc.

Aspor® — see Zineb.

Assert®

BP: American Cyanamid Co. (Assert®, Dagger®)

Identification

COMMON NAME: Imazamethabenz-methyl (ISO-E draft, BSD).

EXP. CODE NUMBER: AC 222 293.

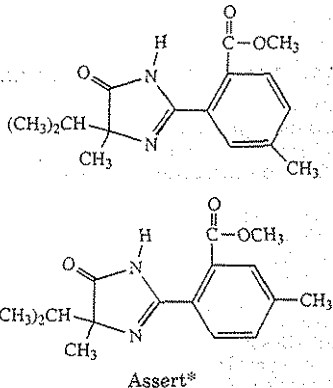
OTHER CODE NUMBERS: CAS 81405-85-8; SHA 128842, 128843.

Chemistry

COMPOSITION: m-toluic acid, (±)-6-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-, methyl ester and p-toluic acid, (±)-2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)-, methyl ester.

FAMILY: Imidazolinone.

PROPERTIES: Clear colorless-amber liquid with mild amine odor. Softening begins at 108-117°C, melting point 113-122°C, and is completed at 144-153°C. Soluble in most common organic solvents.



Action/Use

ACTION: Selective postemergence herbicide.

USE: For sunflowers and all varieties of barley and wheat for control of wild oats, mustards and buckwheat.

FORMULATIONS: Liquid concentrate.

Registration Notes

OUTSIDE U.S.: Dagger® in U.K.

Environmental Guidelines

HAZARDS: Fish: >100 mg/l (rainbow trout, bluegill). Bee: >100. Bird:

Dietary: >5000 ppm (bobwhite, mallard).

SOLUBILITY: In distilled water, 1370 ppm for the m-isomer; 857 ppm for the p-isomer.

Safety Guidelines

SIGNAL WORD: DANGER (eye).

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

Formulation (Rat): Oral LD₅₀ 2679 mg/kg. (Rabbit) dermal LD₅₀ >2000.

Corrosive to eyes; mildly irritating to skin.

PROTECTIVE CLOTHING: Wear goggles, face shield, and gloves when handling.

HANDLING AND STORAGE CAUTIONS: Corrosive, causes eye damage. Avoid vapor or spray mist. Use with adequate ventilation.

Wash thoroughly after handling with soap and water. Remove contaminated clothing and wash before reuse.

Emergency Guidelines

FLASHPOINT: >82°C (SETA closed cup).

FIRE EXTINGUISHING MEDIA: Water, foam, dry chemical, or CO₂. Alcohol foam is the recommended type of foam.

FIRST AID: Get medical aid. **Eyes,** hold eyelids open and flush with a steady, gentle stream of water for 15 minutes. **Skin,** wash thoroughly with soap and water. **Ingestion,** drink promptly a large quantity of milk, egg white, or gelatin solution. If these are not available, drink large quantities of water. Avoid alcohol.

EMERGENCY TELEPHONE: 201-835-3100.

See Imidazolinone Herbicides.

Asset® — see Galtak®.

Assist®

(Discontinued 1985 Westvaco Chemicals Div.)

Chemistry

COMPOSITION: Lignin-based tank mix additive.

Association of American Pesticide Control Officials, Inc. (AAPCO)

Association composed of officials and their deputies charged by law with the active execution of the laws regulating sale of economic poisons. These officials are employed by state, territory, dominion or federal agencies.

The object of the group is to promote uniform and effective legislation, definitions, rulings and enforcement of laws relating to the control of sale and distribution of economic poisons.

See Regulatory File in Section D for list of state officials.

Assure® — see Quizalofop-Ethyl.

Assure II® — see Quizalofop-P-Ethyl.

Astro® — see Permethrin.

Astrol® — see Isoproturon.

Asulam

BP: Rhone-Poulenc Ag Co. (Asulox®)

Sanachem (Pty) Ltd. (Sanulam®)

Identification

COMMON NAMES: Asulam (ISO, ANSI, BSI, WSSA, JMAF); asulame (ISO-F).

EXP. CODE NUMBERS: MB 9057 (Rhone-Poulenc Ag Co.).

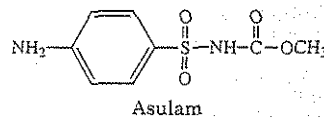
CODE NUMBERS: CAS 3337-71-1; SHA 106901.

DISCONTINUED NAMES: Jonnix® (Union Carbide Corp.).

Chemistry

COMPOSITION: Methyl sulfanilylcarbamate or methyl [(4-amino-phenyl)sulfonyl]carbamate.

PROPERTIES: Colorless crystals, melting point 143-144°C. Moderately soluble in chlorinated hydrocarbons, petroleum oils, and many hydroxylic solvents (alcohol, etc.).



Action/Use

ACTION: Herbicide.

USE: Postemergence in sugarcane. Reforestation areas, Christmas tree plantings, noncropland, turf, and ornamentals. Candex® (pre to early postemergence), Tartan® (pre to mid postemergence) for plant and ratoon cane. Talent® postemergence for bananas, cocoa, coffee, coconuts, citrus, and sugarcane.

FORMULATIONS: Liquid aqueous solution of sodium salt, flowable, wettable powder.

COMBINATIONS: Candex® (+ atrazine), Talent® (+ paraquat), Dialam®, Krater®, Tartan® (all + diuron), Target®, SLAM® (+ dalapon); Graslam® (+ mecoprop + MCPA) (all Rhone-Poulenc Ag Co.).

Registration Notes

OUTSIDE U.S.: Canada: Asulox® F for wild oat control in flaxseed.

U.K.: Target® late postemergence for severe infestations of perennial grasses in sugarcane, rubber, oil palm. Western Europe, Australia: For control of dock (Rumex) in pasture, orchards; bracken in pasture, forestry and noncropland; wild oat and certain broadleaf weeds in oilseed poppy.

Western Europe: For preemergence annual weed control in spinach.

Japan: Asilan® for annual weed control in mulberry and zoysia turf.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ of potassium salts (75%) >5000 mg/l (trout).

Bee: Nontoxic.

SOLUBILITY: In water approx. 0.5%. Solubility of asulam sodium salt in water is >60% w/v acid equivalent at 20-25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech and formulated sodium salt of asulam (Rat): Oral LD₅₀ >5000 mg/kg.

Formulated sodium salt (Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: None required.

HANDLING AND STORAGE CAUTIONS: Handle carefully. Store at temperatures above 20°F. Do not contaminate water, food, or feed by storage or disposal of this chemical.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water, foam, CO₂, dry chemical.

FIRST AID: Treat symptomatically. Get medical attention as necessary. **Eyes,** flush thoroughly with large volumes of water for at least

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

15 minutes. Skin, wash with plenty of soap and water. Inhalation, remove from area of exposure.

Asulox* — see Asulam.

AT*-90 Herbicide (amitrole) — Discontinued by Custom Chemicides.

AT*-Liquid Herbicide (amitrole) — Discontinued by Custom Chemicides.

ATA — see Amitrole.

Atabron*

BP: Ishihara Sangyo Kaisha, Ltd. (Atabron*, Helix*)

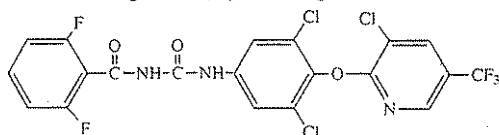
Identification

COMMON NAME: Chlorfluazuron (ISO, BSI).

EXP. CODE NUMBERS: IKI-7899 (Ishihara Sangyo Kaisha, Ltd.); CGA-112913 (Ciba-Geigy Ltd.); PP145 (ICI); UC-64644 (Union Carbide Corp.). OTHER CODE NUMBER: CAS 71422-67-8.

Chemistry

COMPOSITION: 1-[3,5-dichloro-4-(3-chloro-5-trifluoromethyl-2-pyridyloxy)phenyl]-3-(2,6-difluorobenzoyl)urea.
PROPERTIES: Solid. Colorless crystals. Melting point 228° C (d). Solubility: Acetone: 5.21 g/100 ml, Ethanol: 0.17g/100 ml, n-hexane: 3.0 ppm, methanol: 0.22 g/100 ml, xylene: 0.3g/100 ml.



Chlorfluazuron

Action/Use

ACTION: Insecticide.

USE: Chitin inhibitor controlling Lepidopterous insect pests in cotton, tea, and vegetables where there is insecticide resistance.

Registration Notes

U.S.: Not available.

OUTSIDE U.S.: Registered in Japan.

Environmental Guidelines

SOLUBILITY: Water: 0.016 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >8500 mg/kg.

PROTECTIVE CLOTHING: Protective gloves, goggles, and clothing.

Atafer* — see Fenvalerate.

Atamethrin* — see Cypermethrin.

Atemi* — see Cyproconazole.

Atemi* 10 Pepite Fungicide (cyproconazole) — Discontinued by Sandoz Agro Ltd.

Atemi* 50 SL Fungicide (cyproconazole) — Discontinued by Sandoz Agro Ltd.

Aterbutox* 20/20

BP: Pyosa, S.A. de C.V.

Identification

ADDITIONAL TRADE NAME: Gesaprim Combi*.

Chemistry

COMPOSITION: Atrazine + terbutryn.

PROPERTIES: Colorless crystals.

Action/Use

ACTION: Soil herbicide.

USE: Inhibits photosynthesis by absorption through roots to control annual grasses, broadleaf weeds on corn and sorghum.

FORMULATIONS: Wettable powder.

Environmental Guidelines

SOLUBILITY: In water 33-58 mg/l at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2980-3080 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in original container only.

Ateflox* — see Trifluralin.

Atflow* Emulsifier (Atsurf*) — Discontinued.

Athado L* — see Terbutmeton.

Athado Summer* — see Terbutmeton.

Athado Super* — see Glyphosate.

Athado Winter* — see Terbutmeton.

Atlacide* Herbicide (sodium chlorate) — Discontinued by Rhone-Poulenc Ag Co.

Atlas "A" Fungicide/Herbicide/Insecticide (sodium arsenite) — Discontinued by Rhone-Poulenc Ag Co.

Atlox*

BP: ICI Surfactants

Action/Use

ACTION: Emulsifier series of surface active agents.

USE: Used in the formulation of pesticides.

Atomite* — see Calcium Carbonate.

Atphos*

BP: ICI Surfactants

Action/Use

ACTION: Series of phosphate ester surfactants.

USE: Used in formulation of pesticides and as adjuvants.

Atplus*

BP: ICI Surfactants

Action/Use

ACTION: Adjuvant series of surface action agents.

Atra-Bor* Herbicide (atrazine + borate) — Discontinued by Ciba-Geigy.

Atram

(Discontinued)

Identification

ADDITIONAL TRADE NAME: Triaram*.

Chemistry

COMPOSITION: Ethylene bis-N,N'-dimethylthiuram monosulfide.

Action/Use

ACTION: Fungicide.

Atramet Combi* — see Atrazine.

Atranex* — see Atrazine.

Atranex Combi* — see Ametryn; Atrazine.

Atrataf* — see Atrazine.

Atratul 8P* Herbicide (atrazine + sodium chlorate + sodium metaborate) — Discontinued 1991 by Ciba-Geigy.

Atratul 90* Herbicide (atrazine) — Discontinued 1991 by Ciba-Geigy.

Atraton — see Gesatamin*.

Atratone — see Gesatamin*.

Atratylone* — see Atrazine.

Atrazine

BP: Atanor S.A. (Trac* 50 FL)

Ciba (AAtrex*)

Ciba, Ltd. (Gesaprim*, Primatol A*)

Crystal Chemical Inter-America (Crisazina*)

Drexel Chemical Co. (Drexel* Atrazine)

HELM AG

Hubei Sanonda Co., Ltd.

Makhteshim-Agan (Atranex*)

OXON Italia S.p.A.

Pyosa, S.A. de C.V. (Azinotox*-500)

Rallis India Ltd. (Atrataf*)

Sanachem (Pty) Ltd. (Flotrazine*, Sanazine*)

Sostram Corp. (Atrazine 4L, Atrazine DF)

Identification

COMMON NAME: Atrazine (ISO, ANSI, WSSA, JMAF, BSI).

EXP. CODE NUMBER: G-30027 (Ciba-Geigy).

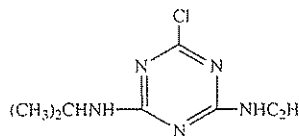
OTHER CODE NUMBERS: CAS 1912-24-9; SHA 080803.

ADDITIONAL TRADE NAMES: X-siprim* (Agsin Pte. Ltd.); Atrazylone* (Chimac-Agriphar S.A.); Malermis* (Diachem S.P.A.); Vegfru Solaro* (Pesticides India); Farmco Atrazine.

DISCONTINUED NAMES: Atred* (Agrimont S.p.A.); Prozine* (+ pendimethalin) (American Cyanamid); Aktikon*, Zeapos* (Chemol Trading Ltd. Co.); Atra-Bor* (+ borate), Aatram* (+ propechlor), Atratul 90*, Atratul 8P* (+ sodium chlorate + sodium metaborate) (Ciba-Geigy); Weed Pro* (+ 2,4-D) (Cornbelt Chemical); Conquest* and Extrazine* (+ cyanazine) (Du Pont); Griffex* (Griffin Corp.); Rack Granular* (+ fenac) (Rhone-Poulenc Ag Co.).

Chemistry

COMPOSITION: 6-chloro-N²-ethyl-N²-isopropyl-1,3,5-triazine-2,4-diamine (IUPAC).



Atrazine

FAMILY: Triazine.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

PROPERTIES: Colorless crystals, melting point 173-175°C. Solubility: In n-pentane 360 ppm; diethyl ether 12,000 ppm; methanol 18,000 ppm; ethyl acetate 28,000 ppm; chloroform 52,000 ppm; dimethyl sulfoxide 183,000 ppm.

Action/Use

ACTION: Selective herbicide.

USE: Season-long weed control in corn, sorghum, and certain other crops. At highest rates for nonselective weed control in noncropped areas. Crisazina* pre and early postemergence on African oil palm, bananas, citrus groves, coffee, corn, pineapples, sorghum, sugarcane.

FORMULATIONS: Dry flowable, flowable liquid, liquid, water dispersible granule, wettable powder.

COMBINATIONS: Bellater* (+ cyanazine), Contour* (+ imazethapyr) (American Cyanamid); Maxipack Trac* 50 (+ acetochlor) (Atanor S.A.); Laddok*, Laddok* 600 (+ bentazone) (BASF AG); Prompt* (+ bentazone) (BASF Corp.); Bicep* (+ metolachlor) (Ciba); Primagram* and Primextra* (+ metolachlor) (Ciba, Ltd.); Crisazina-Crisatrina Kombi* (+ ametryne) (Crystal Chemical Inter-America); Simazat* (+ simazine) (Drexel); Extrazine II* (+ cyanazine) (Du Pont); Alazine* (+ alachlor), Atranex Combi* (+ ametryn), Atramet Combi* (Makhateshim-Agan); Bullet* and Lariat* (+ alachlor), Harness* Xtra (+ acetochlor) (Monsanto Co., The Agricultural Group); Aneldazin* (+ butylate), Erunit* (+ acetochlor) (Nitrokémia Ltd.); Rastra* (+ alachlor) (Pyosa), Candex* (+ asulam) (Rhône-Poulenc Ag Co.); Guardsman* (+ dimethenamid), Marksman* (+ dicamba) (Sandoz Agro, Inc.); Surpass* 100 (+ acetochlor), Sutazine* (+ butylate) (ZEN-CO Ag Products); Farmco Amizine-AA Flowable* (+ amitrole); Prado* (+ pyridate); Rhino* (+ butylate); Tomahawk* (+ butylate).

Registration Notes

U.S.: RUP. Effective 1993, revisions to Ciba-Geigy label eliminated use of atrazine for noncrop total vegetation control, and required buffer areas between atrazine application sites and surface water.

OUTSIDE U.S.: Not registered in Germany. Registered for use in Denmark and France. Bellater* for use on maize. Crisazina* marketed outside U.S.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

SOLUBILITY: In water 33 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 1780 mg/kg.

Azinotox 500* (Rat): Oral LD₅₀ 3080 mg/kg.

AAtrex* (Rat): Oral LD₅₀ 1869 mg/kg. Dermal LD₅₀ >3100 mg/kg. (Rabbit): Non-irritating to eyes; mild to skin.

AAtrex* 4L (Rat): Oral LD₅₀ 3800 mg/kg. Inhalation LC₅₀ >6.8 mg/l (4 hr.). (Rabbit): Dermal >10,200 mg/kg; mild eye and skin irritation.

AAtrex* 80W (Rat): Oral LD₅₀ 5100 mg/kg. Inhalation LC₅₀ >2 mg/l (4 hr.). (Rabbit): Dermal LD₅₀ 9300 mg/kg; mild eye, minimal skin irritation.

AAtrex* Nine-O* (Rat): Oral LD₅₀ 1600 mg/kg. Inhalation LC₅₀ 5.2 mg/l (4 hr.). (Rabbit): Dermal >10,200 mg/kg. Minimal eye, skin irritation.

PROTECTIVE CLOTHING: Wear gloves as standard protection. Eye protection not required for normal use.

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed. Avoid contact with eyes, prolonged contact with skin, inhalation of dust. Store in well-ventilated, secure area out of reach of children and domestic animals. Use with adequate ventilation. Do not contaminate food, feed, or water supplies. Shelf-life of 3 years under environmental conditions, provided the product is stored in its unopened, undamaged original containers, in well-ventilated and dry storehouses kept away from sources of heat, free flames, or spark-generating equipment.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemical, CO₂, or water.

FIRST AID: Get medical aid. **Eyes,** flush with plenty of water. **Ingestion,** induce vomiting.

Atrazine 4L — see Atrazine.

Atrazine 90DF — see Atrazine.

Atred* Herbicide (atrazine) — Discontinued by Agrimont S.p.A.

Atrimmec* — see Dikegulac sodium.

Atrinal* Plant Growth Regulator (dikegulac sodium) — Discontinued by Ciba-Geigy.

Atropine (atropine sulfate)

An antidote used to treat poisoning by cholinesterase-inhibiting pesticides (organophosphate and carbamate compounds).

Atsurf*

BP: ICI Surfactants

Identification

DISCONTINUED NAME: Atflow*.

Action/Use

ACTION: Emulsifiers.

USE: Series of surface active agents for flowable pesticides.

Attac* Insecticide (toxaphene) — Discontinued 1985 by NOR-AM Chemical Co.

Attacloy*

BP: Engelhard Corp. (Attacloy*, Attapulgu* Clay)

Identification

COMMON NAME: Fuller's Earth.

Chemistry

COMPOSITION: Attapulgit (Magnesium aluminum silicate).

PROPERTIES: High sorptivity.

Action/Use

ACTION: Carrier.

USE: With pesticides.

FORMULATIONS: Dust, wettable powder, water-dispersible granule, water-resistant granule base.

Safety Guidelines

TOXICITY: Inert. Exempt.

See Attapulgit Clay.

Attagel* — see Attapulgit Clay.

Attapulgit Clay

BP: Agrisorbents Product Group, Div. of OIL-DRI Corp. of America (Agsorb*)

Engelhard Corp. (Attacloy*, Attagel*, Attapulgu* Clay)

Floridin Co. (Ag-Dri*, Dihue*, Florex*, Min-U-Gel*)

Identification

COMMON NAME: Fuller's Earth.

Chemistry

COMPOSITION: Attapulgit. (OH)₂, (OH)₂Mg, Si₂O₂. There is considerable replacement of magnesium by aluminum in formula 4H₂O.

PROPERTIES: Attagel* 50, Min-U-Gel* 400 are colloidal grades exhibiting thixotropic properties useful in the formulation of flowable suspensions.

Action/Use

ACTION: Carrier, thickener, suspending aid and conditioner.

USE: For insecticides, fungicides, herbicides.

FORMULATIONS: Granules, powder, flowables.

Safety Guidelines

TOXICITY: Inert. Exempt.

HANDLING AND STORAGE CAUTIONS: May contain respirable hazards (silica, crystalline quartz).

Attapulgu* Clay — see Attacloy*; Attapulgit Clay.

Attatox* — see Baythroid*.

Attractant

A material used primarily for the control of insects, birds, and other vertebrates. The most successful lures when available, are the specific secretions of particular insect species or their synthetic chemical equivalents. Many attractants are food lures such as sugar syrups or other substances in long use to attract insects.

See also Pheromone.

Attract'n Kill* PBW Pheromone — Discontinued by Scentry, Inc.

Atwet*

(Discontinued 1987 by ICI Americas)

Action/Use

ACTION: Surfactant series.

Augur* — see Isoproturon.

Aules* — see Thiram.

Auragreen* — see Copper Carbonate, Basic.

Aurigel* — see Ioxynil.

Auroch* — see Ioxynil.

Aurore* — see Calixin*; Follicur*.

Auxin

Auxins are plant hormones able in low concentrations to promote elongation in plant shoots and usually to produce other specific growth effects. Many auxins occur naturally, others are manufactured.

See Plant Growth Regulators.

Avadex* Herbicide (diallate) — Discontinued by Monsanto Agricultural Co.

Avadex* BW — see Far-Go*.

Avanon* — see Isoproturon.

Avenge*

BP: American Cyanamid Co. (Avenge*, Finaven*, Yeh-Yan-Ku*)

Identification

COMMON NAME: Difenzoquat metilsulfate (ISO, ANSI, BSI, WSSA).
EXP. CODE NUMBERS: AC 84777. CL 84777 (both American Cyanamid).

OTHER CODE NUMBER: CAS 43222-48-6.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

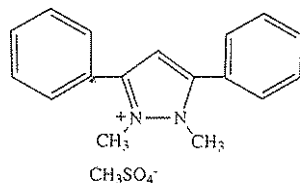
Avicide

Chemistry

COMPOSITION: 1,2-dimethyl-3,5-diphenyl-1H-pyrazolium methyl sulfate.

FAMILY: Pyrazolium salt.

PROPERTIES: Odorless, clear, very slightly yellow liquid. Boiling point >100°C. Melting point: 150°-160° C.



Difenzoquat Metilsulfate

Action/Use

ACTION: Selective herbicide.

USE: Postemergence control of wild oats in barley, wheat.

FORMULATIONS: Water miscible liquid, soluble powder.

COMBINATIONS: Refer to specific labels.

Environmental Guidelines

HAZARDS: Fish: LD₅₀ 696 (bluegill); 694 mg/l (96h) (rainbow trout).

Bee: Nontoxic to honeybees. Bird: Relatively nontoxic (duck/quail).

SOLUBILITY: Soluble in water 76% at 25°C, 78% at 37°C and 85% at 56°C. Miscible in all proportions.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 270 mg/kg. (Rabbit): Dermal LD₅₀ 470 mg/kg. Slight eye, skin irritation.

Avenge* (Rat): Oral LD₅₀ 863 mg/kg (male); 912 mg/kg (female). (Rabbit): Dermal LD₅₀ >2028 mg/kg.

PROTECTIVE CLOTHING: Wear goggles, face shield, rubber gloves when handling, apron or impermeable covering when splashing could occur.

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed or absorbed through skin. Causes eye damage. If ice forms in container (15°F, -10°C), place container at room temperature until ice melts.

Emergency Guidelines

FLASHPOINT: >180°F (closed cup).

FIRE EXTINGUISHING MEDIA: Water, foam, dry chemical or CO₂.

ANTIDOTE: Physostigmine sulfate used in conjunction with norepinephrine (by injection) may be beneficial in treatment of acute intoxication following accidental ingestion.

FIRST AID: Get medical aid. Eyes, hold lids open and flush with a steady, gentle stream of water for 15 minutes. Skin, wash with plenty of soap and water. Ingestion, drink promptly a large quantity of milk, egg white, gelatin solution, or if these are not available, large quantities of water. Avoid alcohol.

EMERGENCY TELEPHONE: 201/835-3100 (American Cyanamid).

Avicide

A material used primarily for the control of pest birds. Generally not designed to kill but to repel or to so affect a few individuals that others are frightened away.

See Bird Repellent.

Avicol* — see PCNB.

Avid* — see Abamectin.

Aviocaffaro* — see Copper Oxychloride.

Aviocaffaro* PF — see Copper Oxychloride.

Avirosan*

BP: Ciba-Geigy Ltd.

Identification

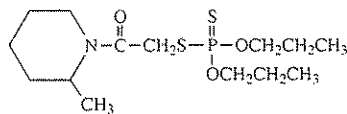
COMMON NAME: Piperophos + dimethametryn.

EXP. CODE NUMBERS: 19490; C 18898 (Ciba-Geigy Ltd.).

OTHER CODE NUMBERS: CAS 24151-93-7 (piperophos); CAS 22936-75-0 (dimethametryn).

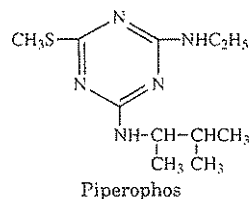
Chemistry

COMPOSITION: C 19490: O,O-dipropyl S-2-methylpiperidinocarbon-yl-methyl phosphorodithioate. C 18898: 4-(1,2-dimethyl-n-propylamino)-2-ethylamino-6-methylthio-s-triazine.



Dimethametryn

PESTICIDE DICTIONARY



Piperophos

Action/Use

ACTION: Herbicide.

USE: Weed control in transplanted rice. C 19490 on annual grass weeds; C 18898 on broadleaf weeds.

FORMULATIONS: Emulsifiable concentrate, granules.

COMBINATIONS: Wider* (+ bentazone); Kusahope D* GR (+ preti-lachlor + pyrazolynate) (Sankyo Co., Ltd.).

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Avirosan* GR used in some Asian areas.

Environmental Guidelines

SOLUBILITY: In water (C 19490) 25 ppm, (C 18898) 50 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 324 mg/kg (C 19490); Dermal 3000 mg/kg (C 18898).

Avico* Combi — see Metiram; Ofurace.

Avico* Cup — see Copper Oxychloride; Cymoxanil; Metiram.

Avico* DF — see Cymoxanil; Metiram.

Avico* S — see Cymoxanil; Metiram.

Avitrol*

BP: Avitrol Corp.

Identification

CODE NUMBERS: CAS 504-24-5; SHA 069201.

Chemistry

COMPOSITION: 4-aminopyridine.

FAMILY: Pyridine.

PROPERTIES: White, odorless crystals, melting point 158°C. Stable to light.

Action/Use

ACTION: Avi-repellent. Causes birds to signal vocal and physical distress as area repellent to flock.

USE: Controls blackbirds, cowbirds, crows, gulls, pigeons, grackles, sparrows, starlings, in and around structures, and agriculture (field corn, sunflowers, sweet corn).

FORMULATIONS: Grain baits, powder concentrate.

Registration Notes

U.S.: Some or all applications may be classified as RUP.

Environmental Guidelines

SOLUBILITY: Moderately soluble.

Safety Guidelines

SIGNAL WORD: DANGER (powder concentrates). CAUTION (grain baits).

TOXICITY CLASS: I (powder concentrates). IV (grain baits).

TOXICITY: (Rat): LD₅₀ 40-7500 mg/kg (depending on formulation).

PROTECTIVE CLOTHING: Applicators of powder concentrates must wear protective clothing with long sleeves, gloves, and respirators. Handle grain concentrates with protective gloves.

HANDLING AND STORAGE CAUTIONS: Wash thoroughly with soap and water after handling all concentrates. Keep out of reach of children. Store in original container only, apart from food or animal feed. Keep dry for indefinite shelf-life.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemical, CO₂ or foam.

FIRST AID: Eyes, flush with plenty of water. Ingestion, patient unconscious, maintain breathing and heart beat (CPR: Cardiopulmonary resuscitation). Never give anything by mouth to an unconscious person. Patient conscious, induce vomiting with syrup of Ipecac, or stimulate back of throat with finger. Contact Poison Control Center or get medical aid.

Axall* — see Bromoxynil; Ioxynil; Mecoprop.

Axiom* — see Akton*.

Azac* — see Azak*.

Azacosterol HCL — see Ornitrol*.

Azad — see Azatin.

Azadieno — see Amitraz.

Azadirachtin

A low toxicity extract from the neem plant, native to India. See Azatin*; Margosan-O*; Safer* Bioneem.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Azak*

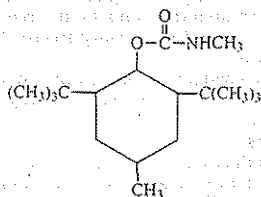
(Discontinued 1976 by Hercules)

Identification

COMMON NAMES: Terbutcarb (ISO-E, BSD); terbutol (WSSA); terbutcarbe (ISO-F).

EXP. CODE NUMBER: Hercules 9573.

DISCONTINUED NAMES: Azac*, Azar*.



Terbutcarb

Action/Use

ACTION: Selective herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

Azamethiphos

BP: Ciba, Ltd. (Alfacon*)

Identification

COMMON NAME: Azamethiphos (ISO, BSI).

EXP. CODE NUMBER: CGA 188909 (Ciba-Geigy).

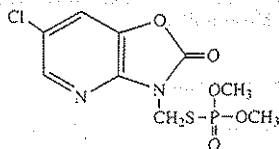
OTHER CODE NUMBERS: CAS 35575-96-3; OMS 1825 (WHO).

ADDITIONAL TRADE NAMES: Alficon*, Snip*.

Chemistry

COMPOSITION: S-6-chloro-2,3-dihydro-2-oxo-oxazol[4,5-b]pyridin-3-ylmethyl O,O-dimethyl phosphorothioate.

PROPERTIES: Grey to white crystalline powder; melting point 89°C. Soluble in methylene chloride, benzene, methanol, hexane and n-octanol.



Azamethiphos

Action/Use

ACTION: Insecticide, acaricide.

USE: Controls flies, various beetles, bugs, spiders and other arthropods in farm buildings.

FORMULATIONS: Wettable powder, bait.

Environmental Guidelines

HAZARDS: Fish: Very-to-slightly toxic. Bee: Toxic. Bird: Practically nontoxic.

SOLUBILITY: In water 0.11 at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1180 mg/kg. Dermal LD₅₀ >2150 mg/kg.

Azar* — see Azak*.

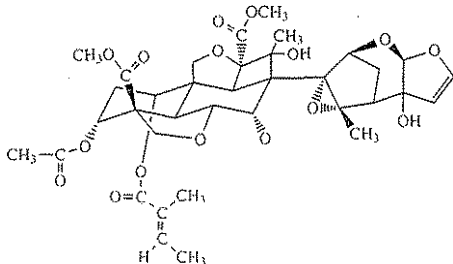
Azatin*

BP: AgriDyne Technologies Inc. (Align*, Azatin*, Turplex*)

Identification

TRIVIAL NAMES: Azadirachtin, azad.

CODE NUMBER: CAS 11141-17-6.



Azadirachtin

Chemistry

PROPERTIES: Nortriterpenoid botanical insecticide of the liminoid class extracted from the neem tree *Azadirachta indica*. Yellow-green powder, with strong, noxious, garlic-sulfur odor.

Action/Use

ACTION: Disrupts insect molting by antagonizing the insect hormone ecdysone. May also serve as feeding deterrent for some insects. Depending on stage of life-cycle, insect death may not occur for several days. However, upon ingestion of nanogram quantities, insects become quiescent and stop feeding. Residual insecticidal activity is evident for 7 to 10 days or longer, depending on insect and application rate.

Environmental Guidelines

SOLUBILITY: In water 0.00005.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Wear dust mask or respirator and eye protection while spraying.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes. Do not contaminate water by cleaning of equipment or disposal of waste. Do not re-use empty container. Destroy by perforation or crushing. Bury or discard in safe place away from water supplies. Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FLASHPOINT: >140°F TAG Closed Cup.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water for 15 minutes. Skin, wash thoroughly with soap and water.

Azethion

Chemistry

COMPOSITION: O,O-Diethyl S-(carbomethoxymethyl) phosphorothioate.

PROPERTIES: Related to acetoxon which is the ethoxy homolog.

Action/Use

ACTION: Insecticide.

Azidithion — see Menazon.

Azindoyle

BP: Sanex Inc.

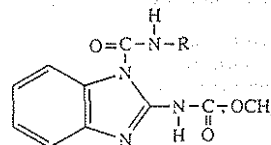
Identification

OTHER NAME: Azindoyle.

Chemistry

COMPOSITION: 1-Methyl-1-(methyl carbamoyl)-2-benzimidazole carbamate; 2-methyl-1-(ethyl carbamoyl)-2-benzimidazole carbamate; 3-methyl-1-(propyl carbamoyl)-2-benzimidazole carbamate; 4-methyl-1-(hexyl carbamoyl)-2-benzimidazole carbamate; 5-Methyl-1-(phenyl carbamoyl)-2-benzimidazole carbamate.

PROPERTIES: White crystalline solid.



Azindoyle

Action/Use

ACTION: Systemic fungicide.

USE: Controls wide range of fungi affecting fruit, nuts, turf, vegetables, field crops and ornamentals. Active against benomyl resistant strains.

FORMULATIONS: Dry flowable, oil dispersible, wettable powder.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bee: Nontoxic.

SOLUBILITY: Very low in water or oil.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg. (Rabbit): Dermal LD₅₀ >10,000 mg/kg. Non-irritating to eye.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, clothing or foodstuffs. Keep in cool, dry place. Keep container tightly closed when not in use.

Azinos* — see Azinphos-Ethyl.

Azinotox 500* — see Atrazine.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Azinphos-ethyl

BP: General Quimica, S.A. (Acifon E*)
Makhteshim-Agan (Cotnion-Ethyl*)

Identification

COMMON NAMES: Azinphos-ethyl (ISO, BSI), triazotion (USSR).
EXP. CODE NUMBERS: Bay 16259; R 1513 (Stauffer Chemical Co.).
OTHER CODE NUMBERS: CAS 2642-71-9; ENT-22014; EINECS 220-147-6.

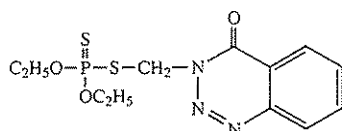
ADDITIONAL TRADE NAMES: Azinos*, Bionex* (Planters Products); Crysthion* (Crystal Chemical Inter-America); Gusathion A*, Gusathion K Forte* (Bayer AG).

DISCONTINUED NAME: Ethyl Guthion* (Bayer AG); Co-thion* (+ azinphos-methyl + parathion) (Chemagro Corp.).

Chemistry

COMPOSITION: O,O-diethyl S-[(4-oxo-1,2,3-benzotriazin-3(4H)-yl)methyl] phosphorodithioate, the ethyl homolog of Guthion*.

PROPERTIES: Colorless crystals. Melting point 50°C. Vapor pressure 3.2×10^{-6} mbar at 20°C. Readily soluble in dichloromethane, toluene. Soluble in 2-propanol. Barely soluble in n-hexane.



Azinphos-ethyl

Action/Use

ACTION: Insecticide.

USE: For beetles, caterpillars and their larvae, aphids, spider mites, etc.

FORMULATIONS: Dusts, emulsifiable concentrate, ULV, wettable powder.

COMBINATIONS: Cotnion-Ethyl-Methyl* (+ azinphos-methyl) (Makhteshim-Agan); Gusathion A-M* (+ azinphos-methyl) (Bayer AG).

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Azinos 40EC*, Cotnion 30*, Gusathion A* for many insect pests of beets, maize, potatoes, rape and rice. Not marketed in Canada.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.008 mg/l (rainbow trout). Bird: LD₅₀ approx. 20 mg/kg (Japanese quail). Bee: Toxic.

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ approx. 12 mg/kg. Dermal LD₅₀ approx. 500 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in original container, preferably in locked storage, away from children, food, or feed.

Emergency Guidelines

ANTIDOTE: Atropine, PAM, Toxogonin* (Merck).

Azinphos-methyl

BP: Bayer AG (Gusathion*)
General Quimica, S.A. (Acifon*)
Makhteshim-Agan (Cotnion-Methyl*)
Miles Inc. (Guthion*)

Identification

COMMON NAMES: Azinphos-methyl (ISO, BSI), metiltriastion (Former exception, USSR).

EXP. CODE NUMBERS: Bay 17147 (Bayer AG); R 1582 (Stauffer Chemical Co.).

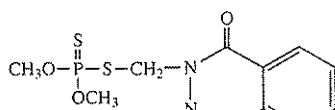
OTHER CODE NUMBERS: CAS 86-50-0; EINECS 201-676-1.

ADDITIONAL TRADE NAMES: Carfene*.

DISCONTINUED NAMES: Guthion-Methyl Parathion, Gusathion MS* (+ demeton-S-methyl) (Bayer AG); Co-thion* (+ azinphos-ethyl + parathion) (Chemagro Corp.); Crysthion 2L* (Cumberland Intl.).

Chemistry

COMPOSITION: O,O-Dimethyl S-[(4-oxo-1,2,3-benzotriazin-3(4H)-yl)methyl] phosphorodithioate.



Azinphos-Methyl

FAMILY: Organophosphorus.

PROPERTIES: Colorless crystals, melting point 72.4°C. Vapor pressure 0.18 mPa at 20°C. Subject to hydrolysis. Decomposes at elevated temperatures with gas evolution. Readily soluble in n-hexane, dichloromethane, 2-propanol, toluene.

Action/Use

ACTION: Insecticide.

USE: Controls many chewing and sucking insects and spider mites pests on various fruits, grapes, melons, nuts, vegetables, tobacco, coffee, sugar cane, ornamentals, and shade trees.

FORMULATIONS: Emulsifiable concentrate, liquid flowable, ULV liquid, wettable powder.

COMBINATIONS: Gusaden* (+ propoxur), Gusathion A-M* (+ azinphos-ethyl) (Bayer AG); Cotnion-Ethyl-Methyl* (+ azinphos-ethyl) (Makhteshim-Agan).

Registration Notes

U.S.: Some or all applications of Guthion* may be classified as RUP.

OUTSIDE U.S.: For many insect pests in lowland rice.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.02 mg/l (96 h) (rainbow trout). Bird: LD₅₀ 32.2 mg/kg (bobwhite quail). Bee: Toxic.

SOLUBILITY: In water 28 ppm at 20°C.

Safety Guidelines

SIGNAL WORDS: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 4 mg/kg b.w.; Dermal LD₅₀ 150-200 mg/kg.

PROTECTIVE CLOTHING: See label.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food, and feed. Store in original container and out of reach of children, preferably in a locked storage area.

Emergency Guidelines

FLASHPOINT: 150°F.

ANTIDOTE: Administer atropine sulfate in large therapeutic doses. Repeat as necessary to the point of tolerance. 2-PAM is antidotal and may be administered in conjunction with atropine.

EMERGENCY TELEPHONE: 816/242-2582 (Miles Inc.)

Aziprotryn — see Mesoramil*.

Azithiram**Identification**

COMMON NAMES: Azithiram (ISO-E, BSI), azithirame (ISO-F).

Chemistry

COMPOSITION: Bis 3,3-dimethylaminocarbonyl disulfide.

Action/Use

ACTION: Fungicide.

Azobane 12***Chemistry**

COMPOSITION: Monocrotophos + Strobane*.

Action/Use

ACTION: Insecticide.

USE: Formerly foliage application on cotton to control bollworms, boll weevils, cabbage loopers.

Azobenzene*

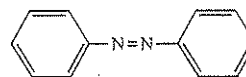
(Discontinued by Eastern Chemical)

Identification

COMMON NAME: Azobenzene (ISO, BSI).

OTHER NAME: Azobenzide.

CODE NUMBERS: CAS: 103-33-3; SHA 007401; ENT-14611.



Azobenzene*

Action/Use

ACTION: Acaricide.

Azobenzide — see Azobenzene*.

Azocyclotin — see Peropal*.

Azodrin* Insecticide/Acaricide (U.S.) (monocrotophos) —

Discontinued by Du Pont Agricultural Products.

Azodrin* (outside U.S.) — see Monocrotophos.

Azofene* — see Phosalone.

Azolamid***Identification**

Code Number: CAS 309719-48-7.

Chemistry

COMPOSITION: N-(2-methylpropyl)-2-oxo-1-imidazolidinecarboxamide (CAS 9CI).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Herbicide.

AZolan* — see Amitrole.

Azole* — see Amitrole.

Azomark* — see Fenvalerate.

Azophenyiene — see Phenazine.

Aztec* — see Baythroid*; Tebupirimphos.

B-995 — see Daminozide.

B-1216 — see Fluazinam.

B-1776 — see DEF 6*; Folex* 6EC.

Baam* Insecticide/Acaricide (amitraz) — Discontinued 1987 by NOR-AM Chemical Co.

Bacillus popilliae — see Milky Spore Powder.*Bacillus popilliae dutky* — see Milky Spore Powder.*Bacillus subtilis* — see System*.*Bacillus thuringiensis* var. *aizawai*

BP: Abbott Laboratories (XenTari*)

Identification

DISCONTINUED TRADE NAME: Certan* (Sandoz Crop Protection).

Chemistry

COMPOSITION: Serotype (H-7). Spores, crystals.

Action/Use

ACTION: Microbial insecticide.

USE: Controls wax moth larval infestations in stored or active honeycombs.

FORMULATIONS: Water-dispersible liquid concentrate.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic. Treatment of honeycombs will not have detrimental effect upon the bee colony or honey produced. Bird: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Certan* is nontoxic.

Bacillus thuringiensis var. *berliner* — see *Bacillus thuringiensis* var. *israelensis*; *Bacillus thuringiensis* var. *kurstaki*; *Bacillus thuringiensis* var. *morrisoni*.*Bacillus thuringiensis* var. *israelensis*

BP: Abbott Laboratories (Gnatrol*, VectoBac*)

Becker Microbial Products, Inc. (BMP 144*)

Caffaro S.p.A. (Bactis*)

Novo-Nordisk Bioindustrials, Inc. (Bactimos*, Skeetal*,

Tecnar*)

Sanex Inc. (Vectocide*)

Identification

OTHER NAMES: B.t., B.t.i., H14.

EXP. CODE NUMBER: ABG-6108 (Abbott Laboratories).

DISCONTINUED NAMES: Mosquito Attack*, Mosquito Attack Rings* (Ringer Corp.); BMC*.

ChemistryCOMPOSITION: Crystalline delta-endotoxin as a.i. (produced by fermentation of *Bacillus thuringiensis berliner* var. *israelensis*, Serotype H-14).

PROPERTIES: Insoluble in organic solvents.

Action/Use

ACTION: Microbial insecticide, larvicide.

USE: Serotype H-14 is the most potent subspecies of *Bacillus thuringiensis* against mosquito and black fly larvae. Controls mosquitoes and black flies larvae such as spp. of *Aedes*, *Anopheles*, *Culex*, *Culiseta*, *Psorophora*, *Simulium*, and *Wyeomyia*. Tecnar* and VectoBac* are selective aquatic larvicides for mosquitoes and black flies. Bactimos* for mosquito. Gnatrol* for fungus gnats in greenhouse.

FORMULATIONS: Aqueous suspension, briquets, flowable concentrate, granules, liquid; pellets, sprays, time release rings, wettable powder.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic. Bird: Nontoxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III, IV (Gnatrol*).

TOXICITY: Nontoxic. Safe for the environment. Tolerance exempt on all raw agricultural commodities when applied pre or postharvest to growing crops. Gnatrol*: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: None.

HANDLING AND STORAGE CAUTIONS: Gnatrol*: Store in cool, dry, well-ventilated, secure area, out of reach of children and animals.

Emergency GuidelinesFIRST AID: Gnatrol*: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water.*Bacillus thuringiensis* var. *kurstaki*

BP: Abbott Laboratories (DiPel*)

Bactec Corp. (Bactec Bernan*)

Becker Microbial Products, Inc. (BMP 123*)

Du Pont Agricultural Products (Biobit* HP)

Gilmore, Inc.

Novo-Nordisk Bioindustrials, Inc. (Biobit*,

Biobit 16K WP*, Biobit 32B* FC, Foray*,

Foray 48B*, Foray 64B* Futura*)

Ringer Corp. (Safer* Caterpillar Attack, Safer* Vegetable

Insect Attack)

Sandoz Crop Protection Corp. (Javelin* WG, Thuricide*

Vault* WP)

Sanex Inc. (Bactosid K*)

Tecomag (Agrobac*)

Troy Biosciences Inc./Fermone Corp. (Troy-BT*)

Identification

CODE NUMBERS: CAS 68038-71-1; SHA 006401.

DISCONTINUED NAMES: Tribactur* (Atochem Agri BV); Bug Time*, Larvatrol*, Lepticide*, Leptox*, Novabac*3 (Biochem Products); Bacticide* (Caffaro S.p.A.); Cekubacilina* (Cequisa); Bactospeine Plus* (Duphar B.V.); Larvo-BT* (Fermone Corp., Inc.); Agritol* (Merck & Co., Inc.); Bactospeine (Novo-Nordisk Bioindustrials, Inc.); Bakthane*, Bio-Guard*, Biotrol* K, Biotrol* BT, Biotrol* 16K (Nutrilite); Victory* (Olympic Horticultural Prod.); SOK*-Bt (Pennwalt); Sod Webworm Attack*, Tomato Worm Attack* (Ringer Corp.); Bactur* (TH Agriculture & Nutrition).

ChemistryCOMPOSITION: Spores and crystalline delta-endotoxin as a.i. which are produced by *Bacillus thuringiensis berliner* var. *kurstaki*, Serotype H-3a3b in fermentation.

PROPERTIES: Biologically active, fine, brown powder. Insoluble in organic solvents.

Action/Use

ACTION: Microbial insecticide, caterpillar larvicide.

USE: For most lepidopterous larvae with high gut pH, such as armyworms, cabbage loopers, imported cabbageworm, gypsy moth, spruce budworm, etc., of alfalfa, corn, cotton, forested areas, fruit trees, ornamentals, shade trees, soybeans, tobacco, vegetables. Pre or postharvest to growing crops.

FORMULATIONS: Aqueous suspensions, bait, dust, dust base, emulsifiable suspensions, flowable concentrate, granules, liquid concentrate, sprays, stabilized suspension, wettable powder.

COMBINATIONS: BT 320 Sulfur 25 Dust (+ sulfur); BT 320 Sulfur 50 Dust (+ bentonite + sulfur) (Wilbur-Ellis).

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic. Bird: Nontoxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Nontoxic. Safe for the environment. Tolerance exempt on all raw agricultural commodities when applied to growing crops preharvest or postharvest.

HANDLING AND STORAGE CAUTIONS: (BMP 123*) Tightly re-close containers of unused materials. Do not contaminate water, food, or feed by storage or disposal. Store in a secure, cool, dry, well-ventilated room, building or covered area. Avoid temperatures > 85° F.

SPILL CONTROL/CLEANUP: (BMP 123*) Absorb spill with an inert material, such as clay, and place in a container for disposal.

PRODUCT/WASTE DISPOSAL: (BMP 123*) Dispose of product in accordance with federal, state, and local regulations.

Emergency Guidelines

FLASHPOINT: (BMP 123*) 171° C or 365° F; minimum COC.

FIRE EXTINGUISHING MEDIA: (BMP 123*) Water fog, mechanical foam, dry chemical powder, carbon dioxide.

ANTIDOTE: (BMP 123*) Unknown. Provide symptomatic/supportive care as necessary.

FIRST AID: (BMP 123*) Eyes, Skin, flush with plenty of water. If irritation persists, seek medical aid. Inhalation, remove to fresh air. Seek medical attention if there is breathing difficulty.*Bacillus thuringiensis* var. *kurstaki*, encapsulated delta endotoxin

BP: Mycogen Corp. (MVP*, M-Peril*)

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Biological insecticide, caterpillar larvicide.

USE: For most lepidopterous larvae such as armyworms, cabbage loopers, imported cabbageworm, cotton bollworm, tobacco budworm, corn borers, diamondback moth, western grapeleaf skeletonizer, etc. of canola, corn, cotton, fruit crops, vegetables, peanuts, soybeans, tobacco. Pre or postharvest to growing crops.

FORMULATIONS: Aqueous flowable (MVP*), sand core granules (M-Peril*).

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic. Bird: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Nontoxic. Tolerance exempt on all raw agricultural commodities when applied to growing crops pre or postharvest.

HANDLING AND STORAGE CAUTIONS: See label. Avoid extreme temperatures.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-228-5635.

Bacillus thuringiensis var. morrisoni

BP: Bactec Corp. (Bactec Bernan*)

Chemistry

COMPOSITION: Spores and crystalline delta-endotoxin as a.i. which are produced by *Bacillus thuringiensis berliner* var. *morrisoni*, Serotype 8a8b, in fermentation.

Action/Use

ACTION: Microbial insecticide, larvicide.

USE: Caterpillar larvicide. Controls most lepidopterous larvae with high gut pH, such as armyworms, cabbage loopers, imported cabbage worm, gypsy moth, spruce budworm, etc. of alfalfa, cotton, forested areas, fruit trees, ornamentals, shade trees, soybeans, tobacco, vegetables, and home gardens.

FORMULATIONS: Dry flowable (water dispersible) and wettable powder.

COMBINATIONS: Compatible with most insecticides, maintain agitation when mixing and applying. Refer to labels.

Environmental Guidelines

HAZARDS: Fish: Nontoxic (carp). Bee: Nontoxic. Bird: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Nontoxic. Safe for the environment. Tolerance exempt on all raw agricultural commodities when applied to growing crops, either preharvest or postharvest.

PROTECTIVE CLOTHING: None.

HANDLING AND STORAGE CAUTIONS: Avoid extreme temperatures. Refer to label.

Bacillus thuringiensis var. tenebrionis

BP: Ringer Corp. (M-One*, Safer* Bt Leaf Beetle Attack)
Novo-Nordisk Bioindustrials, Inc. (Novodor*)

Identification

EXP. CODE NUMBER: MYX 1806 (Mycogen Corp.).

DISCONTINUED NAME: M-One* (Mycogen Corp.).

Chemistry

COMPOSITION: *Bacillus thuringiensis* var. *tenebrionis*.

Action/Use

ACTION: Biological insecticide.

USE: Controls Colorado potato beetle on eggplant, potato, tomato; elm leaf beetle and other selected leaf beetles on shade and ornamental trees. For several beetle species in the Coleoptera order.

FORMULATIONS: Water dispersible liquid.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic. Bird: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Nontoxic. Tolerance exempt on all raw agricultural commodities when applied to growing crops pre or postharvest.

HANDLING AND STORAGE CAUTIONS: See label. Avoid extreme temperatures.

Bacillus thuringiensis var. tenebrionis, encapsulated delta endotoxin

BP: Mycogen Corp. (M-Trak*)

Identification

EXP. CODE NUMBER: MYX 1806 (Mycogen Corp.).

Action/Use

ACTION: Biological insecticide.

USE: Controls Colorado potato beetle on eggplant, potato, tomato; elm

leaf beetle and other selected leaf beetles on shade and ornamental trees.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic. Bird: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Nontoxic. Tolerance exempt on all raw agricultural commodities when applied to growing crops pre or postharvest.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-228-5635 (Mycogen Corp.).

Bactec Bernan* — see *Bacillus thuringiensis* var. *kurstaki*; *Bacillus thuringiensis* var. *morrisoni*.

Bacterial Inhibitor — see Inhibitor.

Bactericide

A material used primarily for the control of bacteria.

Bacteriostat

A material to prevent growth or multiplication of bacteria.

Bacterium (plural: Bacteria)

A microscopic, generally one-celled, plant that lacks chlorophyll. Bacteria, like fungi, cannot manufacture their own food. Some feed on dead organic matter and keep the earth from becoming loaded with plant and animal remains. Many live in the bodies of plants or animals and cause disease. Bacteria reproduce by simple fission (dividing in halves).

Bacterol-100*

F: CEQSA Especialidades Quimicas S.A. (Bacterol-100*)

Chemistry

PROPERTIES: Light yellow clear liquid.

Action/Use

ACTION: Aids in the washing process of postharvest fruits and vegetables. Removes dust, soil and pesticide residue. Prepares product for further treatment. Nonresidual effects on fruit maturation.

Environmental Guidelines

SOLUBILITY: Complete in water.

Safety Guidelines

TOXICITY: Nontoxic.

Bacticin*

(Discontinued by TUCO)

Identification

CODE NUMBERS: CAS 105-67-9; SHA 086804.

Chemistry

COMPOSITION: 2,4-Xylenol, m-cresol in emulsified formulation of hydrocarbons and water.

Action/Use

ACTION: Horticultural fungicide.

Bactimos* — see *Bacillus thuringiensis* var. *israelensis*.

Bactis* — see *Bacillus thuringiensis* var. *israelensis*.

Bactosid K* — see *Bacillus thuringiensis* var. *kurstaki*.

Bactospeine* Insecticide (Bacillus thuringiensis var. kurstaki) — Discontinued 1993 by Novo-Nordisk Bioindustrials, Inc.

Bactospeine* Plus Insecticide (Bacillus thuringiensis var. kurstaki) — Discontinued 1986 by Duphar B.V.

Bactucide* Insecticide (Bacillus thuringiensis var. kurstaki)

— Discontinued 1993 by Caffaro S.p.A.

Bactur* Insecticide (Bacillus thuringiensis var. kurstaki) —

Discontinued by TH Agriculture & Nutrition.

Badiilin-Blumenspray* Fungicide (dodine + fenitrothion +

tetradifon) — Discontinued 1994 by BASF AG.

Badiilin-Rosenfluid* Fungicide (dodemorph acetate + dod-

ine) — Discontinued 1993 by BASF AG.

Bag-A-Bug*

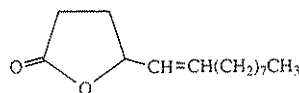
(Discontinued by J.T. Baker Chemical)

Identification

CODE NUMBER: CAS 64726-91-6.

ADDITIONAL TRADE NAMES: Gypsy Moth Spray, Gypsy Moth

Trap, IntegraLure*, Japanese Beetle Trap, Japonilure*.



Active Ingredient of Bag-A-Bug* (Japonilure*)

Action/Use

ACTION: Microbial insecticide; selective insect traps.

Safety Guidelines

SIGNAL WORD: CAUTION.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

TOXICITY CLASS: III.

Bag-A-Bug* Time Release Insecticide Strips

(Discontinued by J.T. Baker Chemical)

Identification

CODE NUMBER: CAS 34681-23-7.

ADDITIONAL TRADE NAME: Plant Pin*.

Chemistry

COMPOSITION: Strips: a.i. 50 mg/stick; 3-(methylsulfonyl)-2-butanone O-[(methylamino)carbonyl]oxime 9.75% (Butoxycarboxim); 90.25% inert ingredients.

Action/Use

ACTION: Systemic insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

Bagalol* — see MEMC.

Bait

A food or other substance used to attract a pest to a pesticide or to a trap where it can be destroyed.

Bakreni Euparen* — see Copper Oxochloride; Euparen*.

Bakthane* Insecticide (*Bacillus thuringiensis* var. *kurstaki*)

— Discontinued by Nutrilite Products.

Balan* — see Benefin.

Balfin* — see Benefin.

Balwan* — see Monocrotophos.

Ball Clay — see Clay.

BAN

British Approved Name.

See Common Name.

Banafine* Herbicide (benfluralin) — Discontinued by Elanco Products Co.

Banair*

(Discontinued by ICI Australia)

Chemistry

COMPOSITION: 2-Methoxy-3,6-dichlorobenzene.

Action/Use

ACTION: Herbicide.

Banco*

BP: Takeda Chemical Industries, Ltd.

Identification

COMMON NAME: Bensultap (ISO, BSI).

EXP. CODE NUMBERS: TI-78, TI-1671 (Takeda Chemical).

OTHER CODE NUMBERS: CAS 17606-31-4; OMS 3011 (WHO).

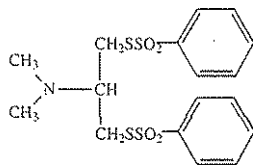
ADDITIONAL TRADE NAMES: Rubang*, Vichtenon*.

DISCONTINUED NAME: ZZ-Doricida* (Takeda Chemical).

Chemistry

COMPOSITION: S,S'-2-dimethylaminotrimethylene di(benzenethio-sulfonate).

PROPERTIES: Pale yellow crystalline powder, melting point 83-84°C (decomposed at ca. 150°C); volatility ca. 1×10^{-6} mm Hg. Solubility in acetone, acetonitrile, chloroform, N,N-dimethylformamide >1 kg/l; in ethanol 13 g/l; in n-hexane 170 mg/l; in methanol 25 g/l. Stable in acidic conditions, hydrolysed in neutral or alkaline solution.



Bensultap

Action/Use

ACTION: Insecticide.

USE: Effective against Coleopterous and Lepidopterous insects, etc. Especially beet tortoise beetle, Colorado potato beetle, corn weevil, diamondback moth, grape berry moth, rice stem borers, etc.

Environmental Guidelines

SOLUBILITY: In water 0.7-0.8 mg/l at 30°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1105 mg/kg (male); 1120 mg/kg (female).

(Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with mouth, eyes, and skin. Store in original containers in a cool, dry place away

from foodstuffs and animal feeds.

Emergency Guidelines

ANTIDOTE: Intravenous injection of 100-200 mg of L-cysteine or an intramuscular injection of 20-60 mg of BAL (dimercaprol or 2,3-dimercapto-1-propanol).

Band Application

Application of herbicide in a narrow band on each side of a row crop as a saving over treatment of entire field area between rows. Remainder of area between rows may then be machine cultivated.

Bandane*

(Discontinued by Velsicol Chemical Corp.)

Identification

OTHER NAME: Halts*.

CODE NUMBERS: CAS 8029-29-6; SHA 020301.

Chemistry

COMPOSITION: Polychlorodicyclopentadiene.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Bandur* — see Aclonifen.

Bangald — see Aldrin.

Ban-Hoe* Herbicide (lenacil + propham) — Discontinued by Shell Chemical UK.

Banlene Plus* — see Banvel*; MCPA; Mecoprop.

Banlene Solo* — see Banvel*; Dichlorprop; Ioxynil.

Banner* — see Propiconazole.

Banol* — see Propamocarb Hydrochloride.

Banox* — see Glyphosate.

Banrot*

BP: Grace Sierra Crop Protection Co.

Chemistry

COMPOSITION: Etridiazole + thiophanate-methyl in a 3 to 5 ratio.

Action/Use

ACTION: Soil fungicide.

USE: Controls damping off, root and stem rot diseases caused by Fusarium, Phytophthora, Pythium, Rhizoctonia, and Thielaviopsis on a broad range of ornamental plants.

FORMULATIONS: Granular, wettable powder.

Safety Guidelines

SIGNAL WORD: DANGER (WP); CAUTION (G).

TOXICITY CLASS: I (WP), III (G).

TOXICITY: (Rat): Oral LD₅₀ 5000 mg/kg. (Rabbit): Dermal LD₅₀ 2000-4000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Keep container tightly closed.

Bantrol* — see Ioxynil.

Banvel*

BP: Sandoz Agro, Inc. (Banvel*, Banvel* SGF)

Identification

COMMON NAMES: Dicamba (ANSI, BSI, ISO, WSSA); dianat (USSR); MDBA (JMAF).

CODE NUMBERS: CAS 1918-00-9; SHA 029801 (dicamba); CAS 2300-66-5 (dicamba dimethylammonium); CAS 1982-69-0 (dicamba sodium); EINECS 217-635-6.

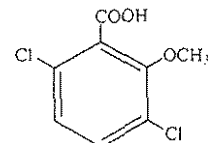
ADDITIONAL TRADE NAMES: Metambane* (Diachem S.P.A.); Scotts Proturf* K-O-G (O.M. Scott & Sons).

DISCONTINUED NAMES: Diamant* (+ bentazone) (BASG AG); Banweed* (Exsin Industries); Hormotuh Special* (Kemira Oy); Mondak* (+ MCPA), Trooper* (Sandoz Agro, Inc.); Maygon* (+ 2,3,6-TBA + MCPA + mecoprop) (Shell Chemicals UK Ltd.).

Chemistry

COMPOSITION: 3,6-Dichloro-2-methoxybenzoic acid, or 3,6-dichloro-o-anisic acid.

PROPERTIES: Melting point 114-116°C. Soluble in ethanol, acetone, methyl ethyl ketone and other ketones. Less readily in xylene.



Dicamba

Action/Use

ACTION: Herbicide.

USE: Controls both annual and perennial broadleaf weeds in aspara-

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

gus, field and silage corn, grass seed crops, grain sorghum, noncrop-land areas, pasture, rangeland, reduced tillage fallow, small grains not underseeded to legumes, sugarcane, turf, between cropping (after harvest of one crop, but before planting the next). Controls brush and vines in pasture, industrial (railroads, roadsides, utility rights-of-way) areas, noncrop-land areas, rangeland. Controls perennial broadleaf weeds with spot treatments and ropewick applications.

FORMULATIONS: Liquid as potassium, dimethylamine salt (1 lb./gal., 4 lb./gal.), as diglycolamine salt (4 lb./gal.), as sodium salt (3 lb./gal.), isopropylamine salt (3 lb./gal.). Granular.

COMBINATIONS: Resolve* (+ imazethapyr) (American Cyanamid); Diptyl* (+ MCPA + MCPP), Selectone G* (+ 2,4-D), Trimonal* (+ 2,4-D + MCPA) (Chimac-Agriphar S.A.); Fallowmaster* and Wallop* (+ glyphosate) (both Monsanto); Trimec* 992, Trimec* Bentgrass, Trimec* Classic, Trimec* Southern (all with 2,4-D + MCPP), Trimec* Brushmaster Brushkiller (+ 2,4-D + 2,4-DP) (PBI/Gordon); Banvel 720* and Weedmaster* (+ 2,4-D), Marksman* (+ atrazine) (Sandoz Agro, Inc.); Banlene Plus* and Docklene* (+ mecoprop + MCPA), Banlene Solo* (+ dichlorprop + ioxynil) (Schering AG); Triplet* (+ 2,4-D + MCPP), Tri-Power* (+ MCPA + MCPP), Veteran* 520 and Veteran* 720 (+ 2,4-D) (Riverdale Chemical); Farmco One-Shot* (+ MCPA).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 35 mg/l (48 h) (rainbow trout); 40 mg/l (bluegill); 65 mg/l (carp). Bee: Nontoxic.

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: WARNING (eye).

TOXICITY CLASS: II (eye).

TOXICITY: Banvel*: (Rat): Oral LD₅₀ 2629 mg/kg. (Rabbit): Dermal >2000 mg/kg.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** flush with tap water for at least 15 minutes. **Skin,** wash with mild soap and water, rinse with copious amounts of water. **Inhalation,** remove to fresh air. Apply artificial respiration if necessary. **Ingestion,** induce emesis.

Banvel* SGF — see Banvel*.

Banvel T*

(Discontinued by Velsicol Chemical Corp.)

Identification

COMMON NAME: Tricamba (ISO, ANSI, BSI, WSSA).

CODE NUMBERS: CAS 2307-49-5; SHA 017301.

ADDITIONAL TRADE NAME: Metriben*.

Chemistry

COMPOSITION: 3,5,6-trichloro-o-anisic acid.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: II.

Banweed* Herbicide (dicamba) — Discontinued 1993 by Exsin Industries.

BAP

BP: Agri-Pharm International Inc.

Chemol Trading Ltd. Co. (Paturyl*)

Young IL Chemical Co., Ltd.

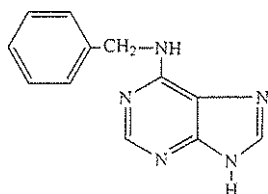
Identification

CODE NUMBERS: CAS 1214-39-7; SHA 116901.

Chemistry

COMPOSITION: 6-Benzyladenine; 6-Benzylaminopurine.

PROPERTIES: Off-white powder, 95% min. purity. Solubility in mineral acids 5g/100g.



6-Benzylaminopurine

Action/Use

ACTION: Plant growth regulator.

FORMULATIONS: Water soluble concentrate.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: Slight in water 0.00044 g/cm³ at 15°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3980 mg/kg. (Rabbit): Non-irritating to eyes, skin.

PROTECTIVE CLOTHING: Overalls, head covering, rubber gloves.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry area.

Stable shelf-life.

Baran* Rodenticide (fluoroacetamide) — Discontinued by Tamoan Chemicals Ltd.

Barbanate — see Carbyne*.

Barban — see Carbyne*.

Barbane — see Carbyne*.

Barbasco

General term in Latin American countries to denote plants used as fish poisons, mostly plants containing rotenone.

Bardac* Quaternary Ammonium Compounds

BP: Lonza Inc.

Identification

CODE NUMBERS: CAS 68424-85-1 and 68424-95-3.

Chemistry

COMPOSITION: Quaternary ammonium compounds.

PROPERTIES: Cationic compounds.

Action/Use

ACTION: Germicides.

USE: In algicides, deodorants, detergent-sanitizers, germicides, microbicides for a wide variety of microorganisms.

Emergency Guidelines

FLASHPOINT: Bardac* 205M 118°F.

FIRE EXTINGUISHING MEDIA: CO₂, dry chemical, water fog.

FIRST AID: Get medical aid. **Eyes,** flush with large amounts of running water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eye and lids with water. **Skin,** wash with large amounts of running water, and soap if available, for 15 minutes. Remove contaminated clothing and shoes. Wash clothing and decontaminate shoes before reuse. **Inhalation,** remove to fresh air. **Ingestion,** immediately give several glasses of water. Do NOT induce vomiting. If vomiting occurs, give fluids again.

Barden*

BP: J. M. Huber Corp., Chemicals Div.

Chemistry

COMPOSITION: Hydrated aluminum silicate (kaolin).

PROPERTIES: Bulk density 25-30 pounds/cubic foot. Particle size, % <2 μ , 87-92. Air floated fine powder.

Action/Use

ACTION: Pesticide carrier, diluent.

USE: Conditioning agent for agricultural industry.

Safety Guidelines

TOXICITY: TLV 7.5 - 15 mg/m³ (OSHA regulations).

HANDLING AND STORAGE CAUTIONS: None.

Emergency Guidelines

ANTIDOTE: N/Ap.

See also Kaolin.

BareSpot* Monobor-Chlorate

BP: J.R. Simplot Co. (BareSpot* Monobor-Chlorate)

Identification

DISCONTINUED NAME: Chem-Frost* (U.S. Borax).

Chemistry

COMPOSITION: Sodium metaborate + sodium chlorate.

Action/Use

ACTION: Nonselective grass and weed killer.

USE: Spray as water solution or apply dry when rains will follow.

FORMULATIONS: Granular, water soluble.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 6800 mg/kg. (Rabbit): Dermal LD₅₀ 2g/kg.

HANDLING AND STORAGE CAUTIONS: No fire hazard. Store in cool dry place on pallets. Do not store on ground or concrete floors. Do not contaminate water, food, or feed by storage or disposal.

FIRST AID: Get medical aid as necessary. **Eyes,** flush with a directed stream of water for at least 15 minutes, while holding eyelids apart to ensure complete irrigation. **Skin,** remove contaminated clothing. Wash skin with plenty of soap and water. **Ingestion,** do NOT induce vomiting; dilute by drinking water. If vomiting occurs, administer more water. Never give anything by mouth to an unconscious person.

BareSpot* Ureabor

BP: J.R. Simplot Co. (BareSpot* Ureabor)

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry
COMPOSITION: Sodium metaborate + sodium chlorate + bromacil.
Action/Use
ACTION: Nonselective herbicide.
USE: Applied in dry form or as an aqueous spray as an industrial weed and grass killer.
FORMULATIONS: Granular, water-soluble.
Safety Guidelines
SIGNAL WORD: DANGER.
TOXICITY CLASS: I.
TOXICITY: (Rat): Oral LD₅₀ 2710 mg/kg. (Rabbit): Dermal LD₅₀ >2 g/kg.
HANDLING AND STORAGE CAUTIONS: Not a fire hazard. Store in cool, dry place on pallets. Do not store on ground or concrete floors.

Emergency Guidelines
FIRST AID: Get medical aid. **Eyes,** flush with a directed stream of water for at least 15 minutes, while holding eyelids apart to ensure complete irrigation of all eye and lid tissue. **Skin,** remove contaminated clothing. Wash skin with plenty of soap and water. **Ingestion,** do NOT induce vomiting; dilute by drinking water. If vomiting occurs, administer more water.

BareSpot® Weed & Grass
 BP: J.R. Simplot Co. (BareSpot® Weed & Grass)

Identification
ADDITIONAL TRADE NAMES: Monobor Chlorate Granular D*.
DISCONTINUED NAME: Oxy Weed and Grass Killer* (J.R. Simplot Co.).

Chemistry
COMPOSITION: Sodium metaborate + sodium chlorate + diuron.
PROPERTIES: Granular.
Action/Use
ACTION: Nonselective weed and grass killer.
USE: For spraying as water solution or applying dry when rains will follow.

Environmental Guidelines
SOLUBILITY: Water soluble.
Safety Guidelines
SIGNAL WORD: WARNING.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 2330 mg/kg. (Rabbit): Dermal LD₅₀ 2 g/kg.
HANDLING AND STORAGE CAUTIONS: No fire hazard. Store in a cool, dry place on pallets. Do not store on ground or concrete floors.

Emergency Guidelines
FIRST AID: Get medical aid. **Eyes,** flush with a directed stream of water for at least 15 minutes, while forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. **Skin,** remove contaminated clothing. Wash with plenty of soap and water. **Ingestion,** do not induce vomiting; dilute by drinking water, if vomiting occurs, administer more water. Never give anything by mouth to an unconscious person.

Barium Carbonate
 (Discontinued 1974 by Sherwin-Williams Chemical)

Identification
CODE NUMBERS: CAS 513-77-9; SHA 007501.

Chemistry
COMPOSITION: BaCO₃.

Action/Use
ACTION: Rodenticide.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.

Barium Fluosilicate
 BP: Barium & Chemicals, Inc.

Identification
CODE NUMBERS: CAS 17125-80-3; SHA 075302.
OTHER NAME: Barium silicofluoride.

Action/Use
ACTION: Insecticide.
USE: For fruits, vegetables prior to formation of edible parts.

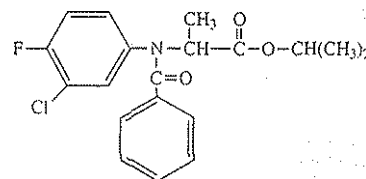
Barium Polysulfide
 BP: Biochem S.R.L. (Coccins®, Zolfosol®)

Identification
ADDITIONAL TRADE NAMES: Solabar®, Solbar®.

Action/Use
ACTION: Fungicide, acaricide.
Safety Guidelines
TOXICITY CLASS: II.
TOXICITY: (Rat): Oral LD₅₀ 375-500 mg/kg.

Barium Silicofluoride — see Barium Fluosilicate.
Barnon*

(Discontinued by Shell International Chemical Co.)
Identification
COMMON NAME: Flamprop-isopropyl (ISO, BSI, WSSA).
EXP. CODE NUMBER: WL 29672.
OTHER CODE NUMBER: CAS 52756-22-6.



Flamprop-isopropyl

Action/Use
ACTION: Selective herbicide.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.

Barnon Plus* — see Suffix BW*.
Barnon* Fungicide

BP: Hokko Chemical Industry Co., Ltd.

Identification
COMMON NAME: Phosdiphen.

Chemistry
COMPOSITION: Bis(2,4-dichlorophenyl) ethyl phosphate.

Action/Use
ACTION: Fungicide.
USE: Controls rice blast.
COMBINATIONS: With kasugamycin.

Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
PROTECTIVE CLOTHING: None.
HANDLING AND STORAGE CAUTIONS: Keep cool and dry.

Emergency Guidelines
ANTIDOTE: None.
FIRST AID: **Ingestion,** induce vomiting.

Baron* Herbicide (erbon) — Discontinued.
Barox* — see Bentazone; MCPA.

Barquat* Compounds
 BP: Lonza Inc. (Barquat®)

Chemistry
COMPOSITION: Quaternary ammonium compounds.
PROPERTIES: Cationic compounds.

Action/Use
ACTION: Germicides.
USE: In algicides, deodorants, detergent-sanitizers, and germicides for a wide variety of microorganisms.

Emergency Guidelines
FLASHPOINT: Barquat® MB-50, 105°F.
FIRE EXTINGUISHING MEDIA: (Barquat® MB-50) CO₂, dry chemical, water fog.

FIRST AID: (Barquat® MB-50) Get medical aid. **Eyes,** flush with large amounts of running water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eye and lids with water. **Skin,** wash with large amounts of running water, and soap if available, for 15 minutes. Remove clothing and shoes. Wash clothing and decontaminate shoes before reuse. **Inhalation,** remove to fresh air. **Ingestion,** immediately give several glasses of water. Do NOT induce vomiting. If vomiting occurs, give fluids again.

Barrage* — see 2,4-D.
Barricade* (Outside U.S.) — see Cypermethrin.
Barricade* (U.S.) — see Prodiamine.
Barrier* 50W — see Dichlobenil.

Barthrin
Identification
CODE NUMBERS: CAS 70-43-9; SHA 218400.

Chemistry
COMPOSITION: 6-Chloropiperonyl-2,2-dimethyl-3-(2-methylpropenyl) cyclopropanecarboxylate, or 6-chloropiperonyl chrysanthemumate.
PROPERTIES: Synthetic pyrethrin-like substance.

Registration Notes
 U.S.: Never registered.
 See Pyrethroids.
BAS 421 (Corbel*) (U.K. only) — see Fenpropimorph.
BAS 438 (Corbel* CL) (U.K. only) — see Chlorothalonil; Fenpropi-

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

morph.
BAS 464 (Gemini*) (U.K. only) — see Fenpropimorph; Tridemorph.
BAS 518 — see Quinmerac.
BAS 2430 Herbicide — Discontinued by BASF AG.
BAS 2572
 (Discontinued by BASF AG)
Identification
 CODE NUMBER: CAS 13114-31-3.
Chemistry
 COMPOSITION: 4-bromo-2-phenyl-5-(2,2,2-trichloro-1-hydroxyethylamino)pyridazin-3(2H)-one.

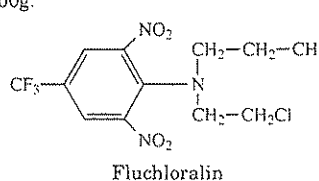
Action/Use
 ACTION: Herbicide.
BAS 319F — see Benodil*.
BAS 480F — see Opus*.
BAS 31700F — see Benodanil.
BAS 30000F — see Pallitop*.
BAS 290H — see Prynachlor.
BAS 3740H Herbicide — Discontinued by BASF AG.
BAS 9106H — see Compete*.
BAS 50110H — see Storm* (U.S.).
BAS 51400H — see Facet*.
BAS 51700H — see Focus*.
BAS 263I — see Lance*.
BAS 0830W — see Mepiquat-chloride.
BAS 08305W — see Mepiquat-chloride.
BAS 08306W — see Mepiquat-chloride.
BAS 08307W — see Mepiquat-chloride.
Basagin* — see Carbendazim.
Basagran* — see Bentazone.
Basagran 60* — see Bentazone.
Basagran* 600 — see Bentazone.
Basagran* DP-P — see Bentazone; Dichlorprop-P.
Basagran* DP-P — see Bentazone; Dichlorprop-P.
Basagran* Forte — see Bentazone.
Basagran* KV — see Bentazone; Mecoprop.
Basagran* KV-P — see Bentazone; Duplosan* KV.
Basagran* M — see Bentazone; MCPA.
Basagran* M60 — see Bentazone; MCPA.
Basagran* M75 — see Bentazone; MCPA.
Basagran* Pl — see Bentazone; Facet*.
Basagran* PL2 — see Bentazone; Propanil.
Basagran* Plus — see Bentazone; Scepter*.
Basagran* Pulta — see Bentazone; Facet*.
Basagran* Ultra Herbicide (bentazone + dichlorprop + ioxynil)
 — Discontinued 1994 by BASF AG.
Basagran* Ultra-P — see Bentazone; Dichlorprop-P; Ioxynil.

Basal Application
 A pesticide application of a chemical on plant stems or tree trunks just above the soil line.

Basal Treatment
 Herbicidal treatment with minimal foliage contact, to stems of woody plants at and just above ground level so as to encircle just the stem.

Basalin*
 (Discontinued 1985 by BASF Corp.)

Identification
 COMMON NAMES: Fluchloralin (ISO-E, ANSI, BSI, WSSA); fluchloraline (ISO-F).
 ADDITIONAL TRADE NAME: Flusul* (Sulphur Mills Ltd.).
 CODE NUMBERS: CAS 33245-39-5; SHA 108701.
Chemistry
 PROPERTIES: Solubility of tech: in acetone <100 g/100g; in cyclohexanone ca. 25 g/100g.



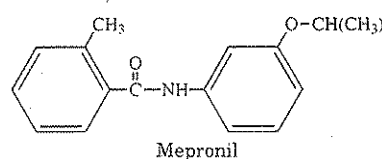
Action/Use
 ACTION: Herbicide.
Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: III.
Basamais* — see Bentazone.

Basamaize* Herbicide (prynachlor) — Discontinued by BASF AG.
Basamid* — see Dazomet.
Basanite* Herbicide (dinoseb) — Discontinued by BASF Wyandotte.
Basathrin* — see Cypermethrin.
Basafon* Herbicide (dalapon) — Discontinued by BASF AG.
BASF-Grünkupfer* Fungicide (copper oxychloride) — Discontinued 1989 by BASF AG.
Basfitox* Herbicide (buturon + isonoruron) — Discontinued by BASF AG.
BASF-Mehltaumittel* — see Dodemorph Acetate.
Basic Copper 53* — see Copper Sulfate, Basic.
Basic Copper Arsenate — see Copper Arsenate, Basic.
Basic Copper Carbonate — see Copper Carbonate, Basic.
Basic Copper Chloride — see Copper Oxychloride.
Basic Copper Sulfate — see Copper Sulfate, Basic.
Basic Lead Arsenate — see Lead Arsenate.
Basic Zinc Sulfate — see Zinc Sulfate, Basic.
Basicop* — see Copper Sulfate, Basic.
Basilex* — see Rizolex*.

Basitac*
 BP: Kumiai Chemical Industry Co., Ltd. (Basitac*)

Identification
 COMMON NAME: Mepronil (ISO, BSI, JMAF).
 CODE NUMBER: CAS 55814-41-0.

Chemistry
 COMPOSITION: 3'-isopropoxy-o-toluanilide (IUPAC).
 PROPERTIES: Stable under light and heat. Soluble in organic solvents. Stable in alkaline, acidic solution.



Action/Use
 ACTION: Fungicide.
 USE: For rice sheath blight, rusts of pear and chrysanthemum, damping-off and southern blight of vegetables, black scurf of lettuce.

FORMULATIONS: Dust, flowable, wettable powder.

Environmental Guidelines
 SOLUBILITY: In water 12.7 ppm (20°C).

Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: IV.

TOXICITY: (Rat/Mouse): Oral LD₅₀ >10,000 mg/kg.

- Bassa*** — see BPMC.
- Basta*** — see Glufosinate-ammonium.
- Bastion* S** — see Bentazone.
- Basudin*** — see Diazinon.
- Batasan*** — see Triphenyltin Acetate.
- Bavical* Fungicide (carbendazim + maneb + tridemorph)** — Discontinued by BASF AG.
- Bavical F* Fungicide (carbendazim + maneb + tridemorph)** — Discontinued by BASF AG.
- Bavistin*** — see Carbendazim; Systemic Fungicides.
- Bavistin M** — see Carbendazim; Systemic Fungicides.
- Bay 5712** — see Euparen M*.
- Bay 6076** — see Bayluscid*.
- Bay 10756** — see Systox*.
- Bay 15080** — see Ceredon*.
- Bay 15203** — see Metasystox*.
- Bay 16259** — see Azinphos-Ethyl.
- Bay 17147** — see Azinphos-Methyl.
- Bay 19639** — see Disulfoton.
- Bay 21097** — see Oxydemeton-methyl.
- Bay 22555** — see Lesan*.
- Bay 23323** — see Disyston S*.
- Bay 23655** — see Metasystox-S*.
- Bay 25141** — see Dasanit*.
- Bay 25634** — see Racumin*.
- Bay 29493** — see Fenthion.
- Bay 30130** — see Propanil.
- Bay 30686** — see Eradex*.
- Bay 33051** — see Phenthoate.
- Bay 33172 (I)** — see Fuberidazole.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

- Bay 36205 — see Morestan*.
- Bay 37289 — see Agritox*
- Bay 37344 — see Methiocarb.
- Bay 38819 — see Gophacide*.
- Bay 39007 — see Propoxur.
- Bay 40557 — see Trimeturon.
- Bay 41831 — see Fenitrothion.
- Bay 44646 — see Matacil*.
- Bay 45432 — see Folimat*.
- Bay 46131 — see Propineb.
- Bay 47531 — see Euparen*.
- Bay 49854 — see Euparen M*.
- Bay 50282 — see Hydrol*.
- Bay 60618 — see Gatnon*.
- Bay 62863 — see Decarbofuran.
- Bay 68138 — see Nema-cur*.
- Bay 70143 — see Carbofuran.
- Bay 70533 — see Bidisin*.
- Bay 71628 — see Methamidophos.
- Bay 74283 — see Tribunil*.
- Bay 77049 — see Quinalphos.
- Bay 77488 — see Baythion*.
- Bay 78418 — see Edifenphos.
- Bay 79770 — see Imugan*.
- Bay 92114 — see Isofenphos.
- Bay 94337 — see Metribuzin.
- Bay 108594 — see Croneton*.
- Bay BUE 1452 — see Peropal.
- Bay DIC 1468 — see Metribuzin.
- Bay ENE 11183 B — see Racumin*.
- Bay FCR 1272 — see Baythroid*.
- Bay FCR 4545 — see Beta-cyfluthrin.
- Bay HWG 1608 — see Tebuconazole.
- Bay KWG 0519 — see Baytan*.
- Bay KWG 0599 — see Baycor*.
- Bay MAT 7484 — see Tebupirimphos.
- Bay MEB 6046 — see Plifenate.
- Bay MEB 6447 — see Bayleton*.
- Bay MNF 0166 — see Isocarbamid.
- Bay NTN 8629 — see Tokuthion*.
- Bay NTN 9306 — see Bolstar*.
- Bay NTN 19701 — see Monceren*.
- Bay NTN 33893 — see Imidacloprid.
- Bay S 276 — see Disulfoton.
- Bay S 5660 — see Fenitrothion.
- Bay SIR 8514 — see Alsystin*.
- Bay SLJ 0312 — see Cropotex*.
- Bay SMY 1500 — see Tycor*.
- Bay SRA 3886 — see Nema-cur*.
- Bay SRA 7747 — see Baythion* C.
- Bay SRA 12869 — see Isofenphos.
- Baycarb* Insecticide (BPMC)— Discontinued 1992 by Bayer AG.
- Baycid* — see Fenthion.
- Baycidal* — see Alsystin*.
- Bayclean* — see Dimanin A.
- Baycor*

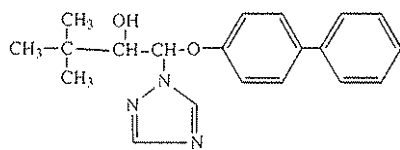
BP: Bayer AG (Baycor*, Baymat*, Sibutol*)

Identification

COMMON NAME: Bitertanol (ISO, BSI).
 EXP. CODE NUMBER: Bay KWG 0599.
 OTHER CODE NUMBERS: Bitertanol: CAS 55179-31-2; SHA 117801; EINECS 259-513-5.

Chemistry

COMPOSITION: β -([1,1'-biphenyl]-4-yloxy)- α -(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol (C.A.).



Baycor*

FAMILY: Triazole.

PROPERTIES: Colorless crystals; mixture of two diastereoisomeric enantiomer pairs (A,B). Vapor pressure A: 0.22 nPa, B: 2.5 nPa, at 20°C. Stable under normal storage conditions. Insoluble in aliphatic hydrocarbons. Very slightly soluble in isopropanol, toluene, methylene chloride, and cyclohexanone.

Action/Use

ACTION: Fungicide.

USE: Baycor* controls Venturia scab diseases on pome fruit and Monilinia on stone fruit; rusts and powdery mildews on ornamentals; black spot on roses; Sigatoka on bananas; leafspot and other diseases on vegetables, and peanuts. Sibutol* as seed dressing for smuts, bunts, and seed-borne snow mould of wheat and rye.

FORMULATIONS: Aerosol, emulsifiable concentrate, paste, wettable powder.

COMBINATIONS: Cereline* (+ fuberidazole + triadimenol), Sibutol* (+ fuberidazole for seed dressing) (Bayer AG).

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 2.2-2.7 mg/l (96 h) (rainbow trout). Bird: LD₅₀ >2000 mg/kg (mallard). Bee: Nontoxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg b.w.; Dermal LD₅₀ >5000 mg/kg b.w.

PROTECTIVE CLOTHING: Wear protective clothing when applying. HANDLING AND STORAGE CAUTIONS: Refer to Precautionary Statements on label for hazards.

Emergency Guidelines

ANTIDOTE: None.

FIRST AID: Treat symptomatically. Tech: Get medical aid.

Baycor 5072 — see Lesan*.

Bayfidan* — see Baytan*.

Baygon* — see Propoxur.

Bayleton*

BP: Bayer AG (Bayleton*)
 Miles Inc. (Bayleton*)

Identification

COMMON NAMES: Triadimefon (BSI, E-ISO), triadimefone (F-ISO).
 EXP. CODE NUMBER: Bay MEB 6447 (Bayer AG).

OTHER CODE NUMBERS: CAS 43121-43-3 (triadimefon); SHA 109901; EINECS 256-103-8.

ADDITIONAL TRADE NAMES: Acizol* (Agro Chemicals Industries Ltd.); Rofon* (Rotam Group); Amiral*.

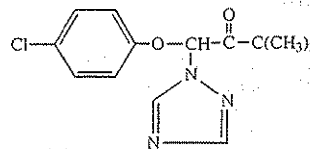
DISCONTINUED NAME: Tenor* (+ prochloraz) (Schering AG).

Chemistry

COMPOSITION: 1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone (CAS).

FAMILY: Triazole.

PROPERTIES: Colorless crystals, melting point 82.3°C. Vapor pressure 0.02 mPa at 20°C. Stable under normal storage conditions. Moderately soluble in most organic solvents except aliphatics.



Triadimefon

Action/Use

ACTION: Systemic fungicide.

USE: Controls powdery mildew on cereals, deciduous fruit, grapes and vegetables; rust diseases of cereals, coffee, seed grasses and pine; diseases on sugarcane and pineapple; diseases of turf and ornamentals.

FORMULATIONS: Dry flowable, emulsifiable concentrate, granule, wettable powder.

COMBINATIONS: Antracol* BT (+ propineb), Antracol Triple* (+ copper oxychloride + propineb), Folicur* BT (+ tebuconazole), Hicombi* (+ chinomethionat) (Bayer AG); Reach* (+ chlorothalonil) (ISK Bio-sciences Corp.).

Environmental Guidelines

HAZARDS: Fish (tech): LC₅₀ 17.4 mg/l (96 h) (rainbow trout). Bee: Nontoxic. Bird: LC₅₀ >4000 (mallard).

SOLUBILITY: Insoluble in water.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 1000 mg/kg. Dermal LD₅₀ >5000 mg/kg.

PROTECTIVE CLOTHING: Wear hat, long-sleeved shirt, long-legged trousers or overalls during mixing, loading and application. Wear rubber or neoprene gloves and dust mask during mixing and loading.

HANDLING AND STORAGE CAUTIONS: Refer to Precautionary Statements on label for hazards. Store in a cool, dry place and prevent cross contamination with other pesticides, fertilizers, food or feed. Store in original container. Keep out of reach of children, preferably in a locked area.

SPILL CONTROL/CLEANUP: Handle and open container so as to prevent spillage. If material is spilled or container leaking, carefully sweep material into a pile. Do not walk through spilled material and keep unauthorized people away.

Emergency Guidelines

FLASHPOINT: 009EC: 162°F.

FIRE EXTINGUISHING MEDIA: Water spray, foam, CO₂.

FIRST AID: Treat symptomatically.

EMERGENCY TELEPHONE: 816-242-2582 (Miles Inc.).

Bayluscid*

BP: Bayer AG (Bayluscid*, Bayluscide*, Mansonl*, Yomesan*)

Identification

COMMON NAMES: Niclosamide (Bayluscide* EC 250); clonitralid (2-hydroxyethylammonium salt) (Bayluscide* WP 70).

EXP. CODE NUMBER: SR 73.

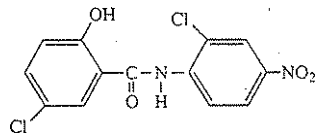
OTHER CODE NUMBERS: CAS 1420-04-8 (clonitralid); CAS 50-65-7 (niclosamide); SHA 077401; EINECS 200-056-8 (niclosamide).

Chemistry

COMPOSITION: 5-Chloro-N-(2-chloro-4-nitrophenyl)-2-hydroxybenzamide compound respectively with 2-aminoethanol (1:1) (CAS 9CI).

FAMILY: Salicylanilide.

PROPERTIES: Bright yellow crystalline solid. Decomposes at 208°C. Vapor pressure <1 mPa at 20°C. Nearly insoluble in n-hexane, dichloromethane, 2-propanol, toluene.



Niclosamide

and
NH₂CH₂CH₂OH**Action/Use**

ACTION: Molluscicide.

USE: Controls golden apple snail infestations.

FORMULATIONS: Emulsifiable concentrate, wettable powder.

Registration Notes

U.S.: Some or all applications may be classified as RUP.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ 0.1 mg/l (96 h) (goldenorfe). Especially toxic to fresh water snails, such as those which serve as intermediate hosts of organisms causing schistosomiasis and fascioliasis in man.

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING (Bayluscide* EC 250); CAUTION.

TOXICITY CLASS: II (Bayluscide* EC 250); IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg/b.w.Bayluscide* EC 250: Dermal LD₅₀ >1000 mg/kg/b.w.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in locked area, away from children, food, feed.

Emergency Guidelines

FIRST AID: Symptomatic treatment.

EMERGENCY TELEPHONE: 816-242-2582 (Mobay).

Bayluscid* — see Bayluscid*.**Baymat*** — see Baycor*.**Bayrusil* Insecticide (quinafos)** — Discontinued 1994 by Bayer AG.**Baysyston*** — see Baytan*; Disulfoton.**Baytan***BP: Bayer AG (Baytan*)
Miles Inc. (Baytan*)**Identification**

COMMON NAME: Triadimenol (ISO, BSI).

EXP. CODE NUMBER: Bay KWG 0519 (Bayer AG).

OTHER CODE NUMBERS: CAS 55219-65-3 (triadimenol); SHA 127201; EINECS 259-537-6.

ADDITIONAL TRADE NAMES: Bayfidan*, Baytan* 30 (Gustafson Inc.).

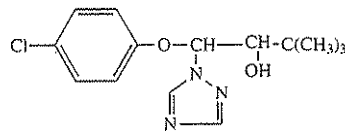
DISCONTINUED NAME: Summit* (Miles Inc.).

Chemistry

COMPOSITION: β-(4-chlorophenoxy)-α-(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol (CAS 9CI).

FAMILY: Triazole.

PROPERTIES: Colorless crystals. Mixture of two stereoisomeric enantiomer pairs. Melting point: 110-130°C. Vapor pressure <1 mPa at 20°C. Stable under normal storage conditions. Slightly soluble in isopropanol, methylene chloride, cyclohexanone. Insoluble in aliphatic hydrocarbons.



Baytan*

Action/Use

ACTION: Systemic fungicide.

USE: Seed treatment to control smut and bunt of wheat, loose and covered smut and Typhula blight of barley, powdery mildew, rusts, leaf spot and take-all and common root and foot rot of wheat and barley; headsmut of corn and grain sorghum. Foliar treatments of Bayfidan* to control powdery mildew, rusts, and Rhynchosporium in cereals. Also used on vegetables, ornamentals, coffee, deciduous fruit, grapes, tobacco, bananas, and other crops.

FORMULATIONS: Emulsifiable concentrate, flowable, granule, seed dressing, water dispersible granule, water-oil emulsion, wettable powder.

COMBINATIONS: Baysyston* and Repulse* (+ disulfoton), Baytan Universal* (+ fuberidazole + imazalil), Cereline* (+ bitertanol + fuberidazole), Matador* and Silvacur* (+ tebuconazole) (Bayer AG); RTU*. Baytan*-Thiram (+ thiram) (Gustafson).

Registration Notes

U.S.: For use only by commercial seed treaters or for agricultural use, and for sale to, use and storage by, commercial applicators and other service persons.

Environmental GuidelinesHAZARDS: Fish (tech): LC₅₀ 14 ppm (96 h) (rainbow trout). Bee: Non-toxic. Bird: (Oral) LD₅₀ >2000 mg/kg (quail).

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 700 mg/kg b.w.; Dermal LD₅₀ >5000 mg/kg b.w.

PROTECTIVE CLOTHING: Wear goggles, face shield or safety glasses.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, in a cool, dry place. Keep out of reach of children. Avoid cross contamination with other pesticides, fertilizers, food or feed.

Emergency Guidelines

ANTIDOTE: None.

FIRST AID: Treat symptomatically. Get immediate medical aid as necessary. **Eyes**, flush with water for at least 15 minutes. **Skin**, wash immediately with soap and water. **Inhalation**, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth.**Ingestion**, administer water freely and induce vomiting by giving one dose (1/2 oz. or 15 ml) syrup of ipecac. If vomiting does not occur within 10-20 minutes, administer second dose. If syrup is not available, induce vomiting by sticking finger down throat. Repeat until vomit fluid is clear. Never give anything by mouth to an unconscious person. Have patient lie down and keep quiet.

EMERGENCY TELEPHONE: 816-242-2582 (Miles Inc.).

Baytan* 30 — see Baytan*.**Baytan Universal*** — see Fuberidazole.**Baytex*** — see Fenthion.**Baythion***

BP: Bayer AG (Baythion*, Volaton*)

Identification

COMMON NAMES: Phoxim (ISO-E, BSI, ESA); phoxime (ISO-F).

EXP. CODE NUMBERS: Bay 77488, Bay-SRA 7502 (Bayer AG).

OTHER CODE NUMBERS: CAS 14816-18-3 (phoxim); EINECS 238-887-3.

DISCONTINUED NAMES: Valexon* (Bayer AG).

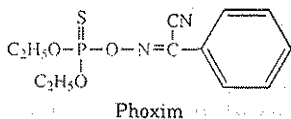
Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: α -[[[(diethoxyphosphinothioyl)oxy]imino] benzene-acetonitrile.

FAMILY: Organophosphorus insecticides.

PROPERTIES: Yellow oil; melting point 6.1°C. Vapor pressure 2.1 mPa at 20°C. Readily soluble in n-hexane, dichloromethane, 2-propanol, toluene.



Phoxim

Action/Use

ACTION: Insecticide.

USE: Baythion* controls stored-product insects in granaries, silos, mills, vessels, port facilities, etc. Volaton* controls soil-inhabiting pests in a range of crops, including cotton, bananas, grain, maize, nuts, potatoes, and tobacco.

FORMULATIONS: Aerosol, bait, dustable powder, emulsifiable concentrate, granules, ULV liquid.

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Not marketed in Canada.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.53 mg/l (96 h) (rainbow trout). Bird: LD₅₀ 40 mg/kg (hen).

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ > 2000 mg/kg/b.w. Dermal LD₅₀ > 5000 mg/kg/b.w.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Atropine, PAM.

Baythion C*

(Discontinued 1990 by Bayer AG)

Identification

COMMON NAME: Chlorphoxim.

OTHER NAME: Bay SRA 7747 (Bayer AG).

CODE NUMBERS: CAS (phoxim) 14816-18-3.

Chemistry

COMPOSITION: 7-(2-chlorophenyl)-4-ethoxy-3,5-dioxa-6-aza-4-phosphaoct-6-ene-8-nitrile-4-sulfide.

Action/Use

ACTION: Insecticide.

Safety Guidelines

TOXICITY: (Rat): Oral LD₅₀ > 2500 mg/kg; Dermal LD₅₀ > 500 mg/kg.

Baythroid*

BP: Bayer AG (Attatox*, Baythroid*, Baythroid* H, Contur*, Laser*, Responsar*, Solfac*, Tempo*, Tempo* H) Miles Inc.

Identification

COMMON NAMES: Cyfluthrin (ISO-E, BSI, BAN); cyfluthrine (ISO-F).

EXP. CODE NUMBER: BAY FCR 1272 (Bayer AG).

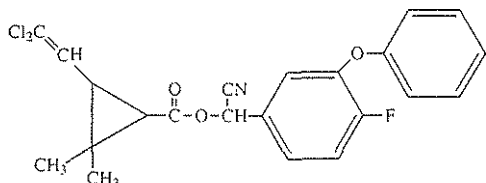
OTHER CODE NUMBERS: CAS 68359-37-5 (cyfluthrin); SHA 598800; OMS 2012 (WHO); EINECS 269-855-7.

Chemistry

COMPOSITION: Cyano(4-fluoro-3-phenoxyphenyl)methyl 3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate.

FAMILY: Synthetic pyrethroid.

PROPERTIES: Viscous, partly crystalline, amber oil. Tech grade product is mixture of 4 diastero-isomeric enantiomer pairs (I-IV). Barely soluble in n-hexane, 2-propanol. Readily soluble in dichloromethane, toluene.



Cyfluthrin

Action/Use

ACTION: Nonsystemic synthetic pyrethroid insecticide.

USE: Foliar insecticide controls chewing and sucking insects on a variety of crops such as cereal, corn, cotton, deciduous fruit, peanuts, potatoes, vegetables. Baythroid*, Tempo H*, and Solfac* for numerous species of stored product, turf and ornamental pests.

FORMULATIONS: Aerosol, emulsifiable concentrate, granules, liquid, oil-in-water emulsion, ULV oil spray, wettable powder.

COMBINATIONS: Baythroid* TM (+ methamidophos) (Bayer AG); Aztec* (+ tebuirimphos) (Miles Inc.).

Registration Notes

U.S.: Registered on cotton. Some Baythroid* applications may be RUP.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.0006 ppm (96 h) (rainbow trout). Bee: Toxic by direct application. Bird: LD₅₀ > 2000 mg/kg b.w. (bobwhite quail).

SOLUBILITY: In water practically insoluble, 0.002 ppm at 20°.

Safety Guidelines

SIGNAL WORD: WARNING. DANGER (eye) (Baythroid* 2).

TOXICITY CLASS: II; I (eye) (Baythroid* 2).

TOXICITY: Tech (Rat): Oral LD₅₀ 500mg/kg b.w. (xylol); Inhalation LC₅₀ (4 h) 0.5 mg/l (aerosol); Dermal LD₅₀ > 5000 mg/kg b.w.

PROTECTIVE CLOTHING: Wear goggles, face shield or safety glasses.

HANDLING AND STORAGE CAUTIONS: See label. Store in a cool, dry place and away from open flame and extreme heat and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food, and feed. Store in original container and out of reach of children, preferably in a locked storage area.

Emergency Guidelines

FLASHPOINT: >200°F (set-a-flash).

FIRE EXTINGUISHING MEDIA: DCP, water spray, foam, CO₂.

ANTIDOTE: No specific antidote available.

FIRST AID: Treat symptomatically. Call a physician immediately. **Eyes,** flush with plenty of water. **Skin,** wash immediately with soap and warm water. **Inhalation,** remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. **Ingestion,** do NOT induce vomiting. Gastric lavage should be supervised by a physician or professional medical staff because of possible pulmonary damage via aspiration of the solvent.

EMERGENCY TELEPHONE: 816-242-2582 (Miles Inc.).

Baythroid* 2 — see Baythroid*.

Baythroid* H — see Baythroid*.

Baythroid* TM — see Baythroid*.

BBC 12* Fumigant (dibromochloropropane) — Discontinued by Occidental Chemical Corp.

BCM — see Carbendazim.

BCPE — see Milbex; Mitran; Qikron*.

BDH 10131

(Discontinued 1979 by British Drug Houses)

Chemistry

COMPOSITION: Synthetic female sex hormone.

Action/Use

ACTION: Sex attractant.

Beacon*

BP: Ciba (Beacon*)
Ciba, Ltd. (Tell*)

Identification

COMMON NAME: Primisulfuron-methyl (ISO draft, BSI).

EXP. CODE NUMBER: CGA-136872 (Ciba-Geigy).

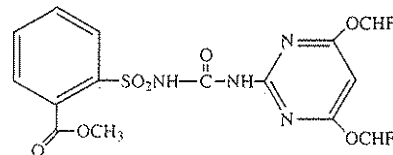
OTHER CODE NUMBER: CAS 86209-51-0.

DISCONTINUED TRADE NAME: Rifle* (Ciba).

Chemistry

COMPOSITION: 3-[4,6-bis(difluoromethoxy)pyrimidin-2-yl]-1-(2-methoxycarbonylphenyl)sulfonylurea.

FAMILY: Sulfonylurea.



Primisulfuron-methyl

Action/Use

ACTION: Herbicide.

USE: Postemergence control or suppression of certain problem grass-weeds including shattercane, sorghum, johnsongrass, quackgrass, and many broadleaf weeds. Residual preemergence control of many weeds.

FORMULATIONS: 75% Wettable granules in water soluble packets.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Registration Notes

U.S.: Marketed since 1990.

OUTSIDE U.S.: Argentina, Eastern Europe, South Africa.

Environmental Guidelines

SOIL PARTICLE ADSORPTION: Weakly adsorbed by soil components and accordingly leaching can occur in soils. Short-to-moderate soil persistence.

SOLUBILITY: In water 70 ppm at 20°C and pH 7.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >5050 mg/kg. Dermal LD₅₀ >2010 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes and clothing. Do not inhale dust, vapor or mist. Do not contaminate food or feed. Wash thoroughly after handling. Store in well-ventilated, secure area out of reach of children and domestic animals.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemicals, foam, CO₂, water.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. If not breathing, give artificial respiration. **Ingestion,** drink one or two glasses of water and induce vomiting.

FIRST AID: Symptomatic.

Beam* — see Tricyclazole.

Bean Guard* — see Captan; Carboxin.

Bean Seed Protectant*

(Discontinued 1987 by Hopkins Agricultural Chemical Co.)

Chemistry

COMPOSITION: Diazinon + captan + streptomycin sulfate.

Action/Use

ACTION: Insecticide, fungicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

Bed

A narrow flat-topped ridge on which crops are grown with a furrow on each side for drainage of excess water. Or an area in which seedlings or sprouts are grown before transplanting (Weed Science Society of America).

Beeline*

BP: Custom Chemicides

Chemistry

COMPOSITION: Food supplement of essential food elements, lactose, fats, minerals, protein, sucrose, and vitamins.

Action/Use

ACTION: Bee attractant.

USE: Used during bloom periods for various crops requiring bees for proper pollination and fruit set.

FORMULATIONS: Wettable powder.

Beeline Sticker* — see Sticker*.

Beet-Kleen* Herbicide (chlorpropham + fenuron + propham)

— Discontinued by Shell Chemicals UK Ltd.

Belgran* — see Ioxynil; Isoproturon.

Bellater* — see Atrazine; Cyanazine.

Belmark* — see Fenvalerate.

Beit* Insecticide (chlordane) — Discontinued.

Beltanol L* — see Chinosol.

Ben Franklin* — see Calcium Sulfate.

Benalan* (benfluralin) — Discontinued by Elanco Products Co.

Benalaxyl — see Galben*.

Benatec* — see Maneb.

Benazalox* — see Galtak*.

Benazolin — see Galtak*.

Benazoline — see Galtak*.

Benazolin-ethyl — see Galtak*.

Bencarbate Insecticide (bendiocarb) — Discontinued.

Benchmark*

(Discontinued by Chevron Chemical Co.)

Identification

COMMON NAME: Furtamone (BSI, ANSI, ISO-E draft).

EXP. CODE NUMBER: RE-40885.

OTHER CODE NUMBER: CAS 96525-23-4.

Chemistry

COMPOSITION: 5-(methylamino)-2-phenyl-4-(3-trifluoromethylphenyl)-3(2H)-furanone.

FAMILY: Dihydrofuranone.

PROPERTIES: Solid, melting point 152-155°C. Low volatility. Solu-

ble in acetone, methanol, methylene chloride. Slightly soluble in isopropanol.

Action/Use

ACTION: Herbicide.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96/h) 7mg/l (rainbow trout); LC₅₀ (96/h) 11 mg/l (bluegill). Bee: LD₅₀ >100 mg/bee. Bird: LC₅₀ (8 da) >6000 ppm (bobwhite); (8 da) LC₅₀ 2000 ppm (mallard).

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >5 g/kg; Dermal >5 g/mg.

Bencornox* Herbicide (benazolin) — Discontinued by Schering AG.

Bendiocarb

BP: AgrEvo USA Co. (Ficam*, Turcam*)

Hoechst Schering AgrEvo GmbH (Garvox*, Multamat*, Seedox*)

Identification

COMMON NAMES: Bendiocarb (ANSI, BSI, ISO-E, JMAF, ESA); bendiocarbe (ISO-F).

EXP. CODE NUMBERS: NC 6897; SN 52020.

OTHER CODE NUMBERS: CAS 22781-23-3; SHA 105201; OMS 1394 (WHO).

ADDITIONAL TRADE NAMES: Dycarb*, Turcam*.

DISCONTINUED NAMES: Tattoo* (FBC Ltd.); Rotate* (NOR-AM); Niomil* (Schering).

Chemistry

COMPOSITION: 2,2-dimethyl-1,3-benzodioxol-4-yl methylcarbamate, alternatively named as 2,3-isopropylidenedioxyphenyl methylcarbamate.

PROPERTIES: White crystalline solid. Melting point 129-130°C. Vapor pressure 5.0×10⁻⁶ mm Hg at 25°C. Solubility in kerosene 0.03%; in o-xylene 1.0%; in dichloromethane or acetone 20%.

Action/Use

ACTION: Residual insecticide.

USE: Ficam*, Ficam Plus* control ants, cockroaches, crickets, silverfish, wasps, etc., in foodstores, houses, and other buildings by professional applicators and service persons. Dycarb*, Turcam*, control a broad spectrum of pests in turf and ornamentals, including aphids, beetle larvae, caterpillars, lacebugs, mealy bugs, mites, weevils, whitefly, and scale on horticultural crops. Garvox*, soil insecticide. Seedox* controls a number of soil and foliar pests in agricultural crops. Baits, dust, and ULV formulations for grasshoppers and locusts.

FORMULATIONS: Dust, granules, ULV, wettable powder.

Registration Notes

U.S.: Ficam* ULV for mosquito control in cold ULV ground applications only. Listed by FAO for ground and aerial control of grasshoppers and locusts.

Environmental Guidelines

SOLUBILITY: In water 0.004% at 25°C.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 40-156 mg/kg (varies with strain). 76 WP (Rat): Oral LD₅₀ 179 mg/kg. Dermal LD₅₀ >1000 mg/kg.

PROTECTIVE CLOTHING: Wear rubber or PVC gloves, face shield when handling concentrate.

HANDLING AND STORAGE CAUTIONS: Harmful or fatal if swallowed. May be absorbed through skin. Avoid contact with eyes, mouth, skin, and clothing. Avoid working in spray mist. Wash hands and exposed skin before eating, drinking or smoking. Do not store near feed or food products. Remove or cover all foodstuffs before application; protect food preparing equipment, surfaces, and eating utensils from contamination during application. Remove all animals during period of application.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemical, foam, or water.

ANTIDOTE: Atropine sulfate 2 mg (equiv. to 1/30 grain). Adult dose should be given by injection and repeated as necessary until fully atropinized.

FIRST AID: **Eyes,** flush with plenty of water. **Skin,** remove contaminated clothing. Wash affected area with soap and water. **Ingestion,** drink 1-2 glasses of water and induce vomiting by touching back of throat with finger. Get immediate medical aid.

Bendiocarbe — see Bendiocarb.

Bendioxide — see Bentazone

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Benefex* — see **Benefin**.

Beneficial Insect

An insect that serves the best interests of man, such as pollinating insects and predators or parasites of pest species.

Benefin

BP: DowElanco (Balan* (U.S.), Balfin*, Quilan*)
Makhteshim-Agan (Benefex*)

Identification

COMMON NAMES: Benefin (ANSI, WSSA), benfluralin (BSI, ISO-E); methrodine (JMAF); benfluraline (ISO-F).
EXP. CODE NUMBER: EL-110.

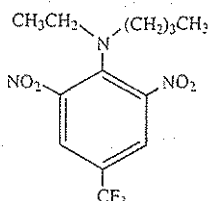
OTHER CODE NUMBER: CAS 1861-40-1.

DISCONTINUED NAME: Emblem* (Mallinckrodt, Inc.); Flubalex* (Chemol Trading Ltd. Co.).

Chemistry

COMPOSITION: N-Butyl-N-ethyl- α,α,α -trifluoro-2,6-dinitro-p-toluidine (IUPAC).

PROPERTIES: Pure benefin is yellow-orange crystalline solid, melting point 65-66°C. Vapor pressure is 2.8×10^5 mm/Hg at 25 °C. Readily soluble in organic solvents such as acetone and xylene. Less soluble in solvents such as ethanol.



Benefin

Action/Use

ACTION: Herbicide.

USE: Selective preemergence. Controls annual grasses and broadleaf weeds in seeded alfalfa, birdsfoot trefoil, ladino clover, red clover, direct-seeded lettuce, peanuts, transplant air cured (burley, dark) tobacco, established turf. May be applied and soil incorporated as early as 10 weeks prior to planting. Will not control established weeds.

FORMULATIONS: Dry flowable, emulsifiable concentrate.

COMBINATIONS: Banafine* and Binnell* (+ benfluralin), Team* (+ trifluralin), XL* (+ oryzalin) (DowElanco).

Environmental Guidelines

SOLUBILITY: In water 0.1 ppm at pH 7 and 25°C.

Safety Guidelines

SIGNAL WORD: Varies with formulation.

TOXICITY CLASS: IV.

TOXICITY: Benefin (Rat): Oral LD₅₀ >10,000 mg/kg.

PROTECTIVE CLOTHING: Coveralls, long-sleeved shirt, impermeable gloves when handling.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. Harmful if swallowed, inhaled or absorbed through the skin. Avoid breathing spray mist. Avoid skin or eye contact. Avoid freezing; store above 40°F (4.5°C). Do not use or store near heat or open flame. Corrosive. EC formulations containing benefin have caused severe eye irritation in laboratory animals. Benefin may cause skin sensitization reactions in certain individuals.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, or Skin, immediately flush with plenty of water. Ingestion, do NOT induce vomiting.

Benelux* — see Thiofanox.

Benex* — see Banvel*; Benomyl.

Benfos* Insecticide (DDVP) — Discontinued 1993 by Quimica Estrella.

Benfuracarb — see Oncol*.

Benfluralin — see Benefin.

Benfluraline — see Benefin.

Benit* Fungicide (etaconazole) — Discontinued by Ciba-Geigy Ltd.

Benlate* — see Benomyl.

Benlate* OD — see Benomyl.

Benlate* T — see Benomyl.

Benochem* 50 — see Benomyl.

Benodanil

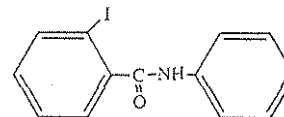
Identification

COMMON NAME: Benodanil (ISO, BSI).

EXP. CODE NUMBER: BAS 31700F.

OTHER CODE NUMBERS: CAS 15310-01-7; EINECS 239-352-7.

DISCONTINUED NAME: Calirus* (BASF AG).



Benodanil

Action/Use

ACTION: Systemic fungicide.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

Benodil*

(Discontinued by BASF AG)

Identification

COMMON NAME: Furcarbanil (ISO, BSI).

EXP. CODE NUMBER: BAS 319F (BASF AG).

Chemistry

COMPOSITION: 2,5-dimethylfuran-3-carboxylic acid anilide. Other chemical names: 2,5-dimethyl-3-furanilide; 2,5-dimethyl-N-phenyl-3-furancarboxamide.

Benofun* — see Benomyl.

Benomilo-50A* — see Benomyl.

Benomyl

BP: Aragonesas Agro, S.A. (Benor*)

Chemol Trading Co. Ltd. (Chinoin Fundazol*)

Chinoin Pharmaceutical & Chemical Works Co. Ltd.

(Chinoin Fundazol*)

Crystal Chemical Inter-America (Benex*)

Du Pont Agricultural Products (Benlate*)

Fulon Chemical Industrial Co. Ltd. (Funomyl*)

Gilmore, Inc.

HELM AG

Inquinoso

Pen-Tsao-Materia-Medica-Center GmbH

Pilarquim Corp. (Pilarben*)

Point Enterprise S.A. (Benopoint*)

Rotam Group (Romyl*)

Shinung Corp.

Sundat (S) Pte. Ltd.

Identification

COMMON NAME: Benomyl (ANSI, BSI, ISO, JMAF).

EXP. CODE NUMBER: Du Pont 1991.

OTHER CODE NUMBERS: CAS 17804-35-2; SHA 099101.

ADDITIONAL TRADE NAMES: Benofun* (Agsin Pte. Ltd.); Fitomyl

PB* (Diachem S.P.A.); Benochem* 50 (Eurochem, S.A.); Benomilo-

50A* (Orgasa Industria Espanda de Products Organicos S.A.); Ter-

san* 1991.

DISCONTINUED NAMES: Agrocit* (Chemol Trading Ltd. Co.); Ar-

bortrine* (Applied Biochemists, Inc.).

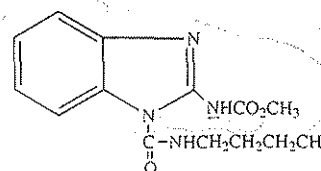
Chemistry

COMPOSITION: Methyl 1-(butylcarbamoyl)benzimidazol-2-ylcarbamate (IUPAC).

PROPERTIES: White crystalline solid. Decomposes without melting upon heating. Practically insoluble in oil. Solubility: Tech at 25°C:

chloroform, 94 g/kg; dimethylformamide, 53 g/kg; acetone, 18 g/kg; xy-

lene 10 g/kg; ethanol 4 g/kg.



Benomyl

Action/Use

ACTION: Systemic foliar fungicide.

USE: Controls a wide range of diseases of fruits, nuts, vegetables, field crops, and turf.

FORMULATIONS: Oil dispersible, wettable powder.

Registration Notes

OUTSIDE U.S.: Benex* (Crystal Chemical).

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Environmental Guidelines

HAZARDS: Fish (96 hr.): LC₅₀ 0.17 mg/l (rainbow trout); 4.2 mg/l (goldfish). Bird (8 day): LC₅₀ >500 mg/kg (mallard duck, bobwhite quail). Bee: Nontoxic.

SOLUBILITY: Tech at 25°C: water, 2 mg/l. Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg. Inhalation LC₅₀ 2 mg/l (4 hr.). (Rabbit): Dermal LD₅₀ >10,000 mg/kg. Not an eye irritant (FHSA System).

HANDLING AND STORAGE CAUTIONS: Do not contaminate water, food, or feeds by storage or disposal. Keep dry during storage to avoid certain chemical changes affecting fungicidal effectiveness. Keep container tightly closed when not in use.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Benopan* (benazolin) — Discontinued by Schering AG.

Benopoint* — see Benomyl.

Benor* — see Benomyl.

Benquinox — see Ceredon*.

Bensecal* (benazolin) — Discontinued by Schering AG.

Ben-Sul* — see Bentonite; Sulfur.

Bensulfuron-Methyl — see Fujigrass*, Hinochloa*, Londax*.

Bensulide

BP: Gowan Co. (Betasan*, Prefar*)

PBI/Gordon Corp. (Bensumec*, Pre-San*)

ZENECA Ag Products (Betasan*, Prefar*)

Identification

COMMON NAME: Bensulide (ISO, BSI, WSSA); SAP (JMAF).

OTHER NAMES: Exporsan*.

EXP. CODE NUMBER: R-4461 (Stauffer Chemical Co.).

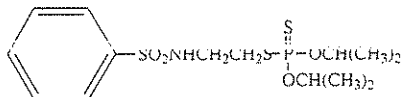
OTHER CODE NUMBERS: CAS 741-58-2; SHA 009801.

DISCONTINUED NAME: Betamec* (Stauffer Chemical Co.).

Chemistry

COMPOSITION: O,O-diisopropyl phosphorodithioate S-ester with N-(2-mercaptoethyl)benzenesulfonamide. CAS (8CI) Other chemical name: S-2-benzenesulfonamidoethyl O,O-di-isopropyl phosphorodithioate (IUPAC).

PROPERTIES: Viscous amber liquid above 34.4°C, solid below. Specific gravity 1.23 at 20/20°C.



Bensulide

Action/Use

ACTION: Herbicide.

USE: Betasan* for preemergence control of annual grasses, broadleaf weeds in dichondra, grass lawns. Seasonal control of crabgrass, annual bluegrass in grass, dichondra lawns. Prefar* for crop use in carrots, cole crops, cucumbers, lettuce, melons, peppers, squash, tomatoes.

FORMULATIONS: Emulsifiable concentrate, granules.

Registration Notes

U.S.: For annual grasses in cotton in southwestern states.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 1-2 mg/l (96 h) (goldfish).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 271-1470 mg/kg. 4-E (Rat): Oral LD₅₀ 826-1778 mg/kg.

Granules (3.6) (Rat): Oral LD₅₀ >1000 mg/kg; (12.5) 2650 mg/kg.

SOLUBILITY: In water 25 ppm at 20°C.

Emergency Guidelines

FLASHPOINT: 315°F, 157°C (Tag OC).

ANTIDOTE: Exposure to a.i. may cause cholinesterase inhibition. Atropine by injection is antidotal. 2-PAM is also antidotal when administered early and in conjunction with atropine. NEVER use morphine.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion,** drink one or two glasses of water and induce vomiting. **Inhalation,** remove to fresh air.

Bensultap — see Bancol*.

Bensumec* — see Bensulide.

Bentazon — see Bentazone.

Bentazon 60* — see Bentazone.

Bentazone

BP: BASF AG (Basagran*, Basagran* 600)

BASF Brasileira (Basagran*)

Forward International Ltd.

Hubei Sanonda Co., Ltd.

Q.E.A.C.A. S.A. (Bentazon 60*)

Sostram Corp.

Identification

COMMON NAMES: Bentazon (ANSI, CSA, WSSA); bentazone (ISO, BSI, JMAF); bendioxide (So. Africa).

CODE NUMBERS: CAS 25057-89-0; EINECS 246-585-8.

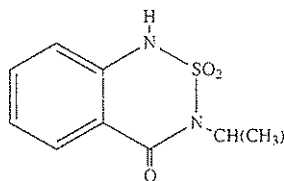
ADDITIONAL TRADE NAMES: Basagran* Forte, Basamais* (BASF AG); Entry* (Sostram Corp.).

DISCONTINUED TRADE NAMES: Aramo* (+ MCPA), Basagran* Ultra (+ dichlorprop + ioxynil), Campogran* D (+ 2,4-DB), Diamant* (+ dicamba), Ultima* Plus (+ dichlorprop + MCPA), Vega* (+ cyanazine + dichlorprop), Vega* Plus (+ dichlorprop-P + ioxynil) (BASF AG); Pledge* (Helena Chemical Co.); Leader* (Terra International, Inc.).

Chemistry

COMPOSITION: 3-isopropyl-1H-2,1,3-benzothiadiazin-4(3H)-one 2,2-dioxide.

PROPERTIES: Tech: Colorless; melting point approx. 138°C. Solubility: Tech at 20°C in xylene <1g/100g; in cyclohexanone approx. 18g/100g.



Bentazone

Action/Use

ACTION: Herbicide.

USE: Selective postemergence control of many broadleaf weeds and cyperaceae (sedges) in alfalfa, asparagus, cereals, clover, corn, digitalis, dry beans, dry peas, flax, garlic, grasses, green (succulent) lima beans, lawns, mint, narcissus, onions, ornamental turf, peanuts, potatoes, rice, snap beans for seed, sorghum, soybeans, and sugarcane.

FORMULATIONS: Soluble concentrate (sodium salt of bentazon).

COMBINATIONS: Doble*, Galaxy*, Galaxy* Top, and Storm* (+ acifluorfen), Laddok* and Laddok* 600 (+ atrazine), Campogran* (+ 2,4-DB), Basagran* DP (+ dichlorprop), Basagran* DP-P (+ dichlorprop-P), Trigran* (+ dichlorprop + MCPA), Vulkan* (+ haloxyfop-ethyl), Basagran* Plus (+ imazaquin) Barox*, Basagran* M, Basagran* M60, Basagran* M75, and Quitt* (+ MCPA), Acumen* (+ MCPA + MCPB), Pulsar* (+ MCPB), Basagran* KV (+ mecoprop), Basagran* KV-P (+ mecoprop-P), Vulkan* T (+ pendimethalin), Basagran* PL 2 (+ propanil), Basagran* Pl and Basagran* Pulta (+ quinclorac), Basagran* Ultra-P (+ dichlorprop-P + ioxynil), Extoll* (+ bromoxynil), Trenox* (+ fluoroglycofen-ethyl + dichlorprop-P) (all BASF AG); Prompt* (+ atrazine) (BASF Corp.); Grasszin* D (+ 2,4-D); Wider* (+ piperophos + dimetha-metryn).

Registration Notes

U.S.: Storm*.

OUTSIDE U.S.: Galaxy*, Galaxy Top*. Brazil: Doble*.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >100 mg/l (rainbow trout). Bee: Nontoxic.

DEGRADATION AND METABOLISM: Natural products incorporated into soil organic matter fraction; CO₂. Half-life in soils: average of 13 days under field conditions. Lysimeter studies clearly demonstrate bentazone does not leach.

Safety Guidelines

SIGNAL WORD: CAUTION (Basagran*).

TOXICITY CLASS: III (Basagran*).

TOXICITY: Form. (Rat): Oral LD₅₀ 2063 mg/kg. Dermal LD₅₀ >6050 mg/kg.

PROTECTIVE CLOTHING: Goggles, impermeable gloves and apron, protective clothing and boots when handling the undiluted product.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, clothing. Avoid freezing; store away from foodstuff.

SPILL CONTROL/CLEANUP: Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Emergency Guidelines

ANTIDOTE: None.

FIRST AID: Get medical aid. **Eyes**, flush immediately with water. **Skin**, wash affected areas thoroughly with soap and water. **Inhalation**, remove to fresh air. **Ingestion**, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: (U.S.) 800-832-4357 (BASF); or 800-24-9300 (CHEMTREC).

Benthio carb — see Saturn*.

Bentonite

BP: Agrisorbents Product Group, Div. of OIL-DRI Corp. of America (Agsorb*)
American Colloid Co. (Agro-Gel S*, Grow Aid*)

Identification

CODE NUMBERS: CAS 1302-78-9; SHA 180.1001.

DISCONTINUED NAMES: Creek-O-Nite* (Golden Cat Corp.)

Chemistry

PROPERTIES: A clay of the montmorillonite type, derived primarily from the alteration of volcanic ash. Two distinct types of bentonite are (1) the Wyoming and South Dakota deposits referred to as sodium montmorillonite having high gelling, swelling, and viscosity properties and (2) the Mississippi bentonite referred to as calcium montmorillonite with little or no swelling capacity.

Action/Use

ACTION: Granular carrier.

USE: Small quantities of bentonite are used in many wettable dusting powders. Often used in conjunction with other clay types as a granular carrier for pesticides; also as a binder in pelletized feeds and for sealing farm ponds against leakage.

COMBINATIONS: Ben-Sul (+ sulfur), BT 320 Sulfur 50 Dust (+ *Bacillus thuringiensis* + sulfur) (both Wilbur-Ellis).

See Clay, Dust, Granular Formulation.

Bentranil Herbicide — Discontinued by BASF AG.

Benzabor*

(Discontinued by U.S. Borax)

Chemistry

COMPOSITION: Sodium borates + trichlorobenzoic acid.

Action/Use

ACTION: Herbicide.

Benzac* Herbicide (trichlorobenzoic acid) — Discontinued by Union Carbide Corp.

Benzac* 354 Herbicide (PBA) — Discontinued by Union Carbide Corp.

Benzadox — see Topcide*.

Benzahex* Insecticide (BHC) — Discontinued by Woolfolk Chemical.

Benzaldehyde

(Discontinued 1982 by Tenneco Chemical Inc.)

Identification

CODE NUMBERS: CAS 100-52-7; SHA 008601.

Action/Use

ACTION: Bee repellent.

Benzaikonium Chloride

BP: Diachem S.P.A. (Chimibac 100*)
Lonza Inc. (Barquat*, Hyamine*)

Identification

ADDITIONAL TRADE NAMES: BTC, Roccal* (Winthrop), Zephiran*.

Chemistry

COMPOSITION: Alkyl dimethyl benzylammonium chloride.

Action/Use

ACTION: Bactericide, fungicide.

USE: In algicides, deodorants, detergent/sanitizers and germicides for a wide variety of microorganisms.

Emergency Guidelines

FLASHPOINT: Barquat* MB-50, 105°F.

FIRE EXTINGUISHING MEDIA: (Barquat* MB-50) Alcohol foam, CO₂, dry chemical, water fog.

FIRST AID: (Barquat* MB-50) Get immediate medical aid. **Eyes**, flush with large amounts of running water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eye and lids with water. **Skin**, wash with large amounts of running water, and soap if available, for 15 minutes. Remove contaminated clothing and shoes. Wash clothing and decontaminate shoes before reuse. **Inhalation**, remove to fresh air. **Ingestion**, immediately give several glasses of water. Do NOT induce vomiting. If vomiting occurs, give fluids again.

Benzar* Herbicide (benazolin) — Discontinued by Schering AG.

Benzene

Identification

CODE NUMBERS: CAS 71-43-2; SHA 109301.

DISCONTINUED NAME: Benzol* (Crowley Tar Products Co.).

Action/Use

ACTION: An ingredient of some early grain fumigants.

Benzene Hexachloride — see BHC.

Benzethazet — see Plifenate.

Benzex* Insecticide (BHC) — Discontinued by Woolfolk Chemical.

Benzilan* Acaricide (chlorobenzilate) — Discontinued 1994 by Makhteshim-Agan.

Benzimidazoles

A group of systemic fungicides including benomyl (Benlate*), thiazobenzazole (Mertect*), thiophanate-methyl, and OM 2424 (Terrazole*).

Benz-O-Chlor* (chlorobenzilate) — Discontinued by Tower Chemical.

Benzoe pin — see Endosulfan.

Benzofenap — see Yukawide*.

Benzofuroline* — see Resmethrin.

Benzoic Acid

Identification

CODE NUMBERS: CAS 65-85-0; SHA 009101.

Action/Use

ACTION: Has activity as plant growth regulator.

Benzol* (benzene) — Discontinued by Crowley Tar Products Co.

Benzomarc*

(Discontinued by Rhone-Poulenc Ag Co.)

Identification

COMMON NAME: Phenobenzuron (BSI, ISO).

CODE NUMBERS: CAS 3134-12-1; SHA 281500.

Chemistry

COMPOSITION: 1-benzoyl-1-(3,4-dichlorophenyl)-3,3-dimethylurea.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Benzomate — see Benzoximate.

Benzoximate

BP: Nippon Soda Co., Ltd. (Aazomate*, Citrazon*)

Identification

COMMON NAMES: Benzomate (JMAF); benzoximate (ISO, BSI).

EXP. CODE NUMBER: NA-53M (Nippon Soda).

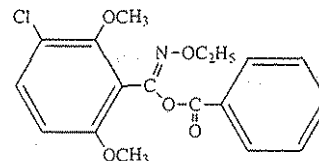
OTHER CODE NUMBER: CAS 29104-30-1; EINECS 2494391.

ADDITIONAL TRADE NAMES: Artaban* (Procida); Acarmate* (Sipcam).

Chemistry

COMPOSITION: Ethyl O-benzoyl 3-chloro-2, 6-dimethoxybenzohydroximate.

PROPERTIES: White crystalline solid. Melting point 73°C (pure product). Stable in acid but decomposed by strong alkali. Solubility in benzene 650g/l; in xylene 710 g/l; in hexane 80 g/l.



Benzoximate

Action/Use

ACTION: Acaricide.

USE: Strong contact and residual effect on adult mites and eggs, such as European red mite. Controls *Panonychus* and *Eotetranychus* sp.

FORMULATIONS: Emulsifiable concentrate.

COMBINATION: With cyhexatin in liquid suspension (flowables).

Registration Notes

Outside U.S.: Citrazon* in Europe.

Environmental Guidelines

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >15,000 mg/kg.

PROTECTIVE CLOTHING: Apron, gloves, plastic or rubber boots.

Mask for powders.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes. Keep in dry, cool, ventilated place.

Benzoylprop Ethyl — see Suffix*.

Benzthiazuron — see Gatnon*.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Benzyl Acetone**Action/Use**

ACTION: Insect attractant.

USE: Melon fly trap.

6-Benzyladenine — see BAP.**6-Benzylaminopurine** — see BAP.**Beosit*** — see Endosulfan.**Berelex*** — see Gibberellic Acid.**Berelex* A₁/A₂** — see Gibberellic Acid.**Beret*** — see Fenpiclonil.**Beret Combi*** — see Difenconazole; Fenpiclonil.**Beret MLX*** — see Fenpiclonil; Metalaxyl.**Beret Special*** — see Fenpiclonil; Imazalil.**Beret Universal*** — see Carboxin; Fenpiclonil; Imazalil.**Bermat* (chlordimeform)** — Discontinued 1992 by Quimica Estrella.**Best* Fungicide (sulfur)** — Discontinued by Chippenham.**Beta-asarone****Chemistry**

COMPOSITION: a.i. of Indian calamus root extract.

Action/Use

ACTION: Chemosterilant.

USE: Sterilizes female insects by preventing ovary development.

Registration Notes

U.S.: Experimental.

Beta-cyfluthrinBP: Bayer AG (Bulldock*, Full*, Responsar*)
Miles Inc.**Identification**

COMMON NAMES: Beta-cyfluthrin (BSI, ISO-E).

EXP. CODE NUMBER: Bay FCR 4545 (Bayer AG).

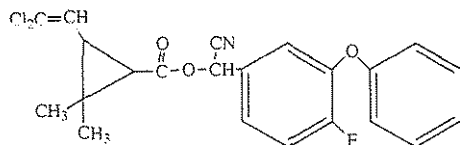
OTHER CODE NUMBERS: CAS 68359-37-5; OMS-3031 (WHO); EINECS 269-855-7.

Chemistry

COMPOSITION: Reaction mixture of isomers of cyfluthrin comprising two enantiomeric pairs in approximate ratio 1:1.

FAMILY: Synthetic pyrethroid.

PROPERTIES: Whitish to yellowish powder. Tech grade product is mixture of 2 of the diastereo-isomeric enantiomer pairs of cyfluthrin. Barely soluble in n-hexane, 2-propanol. Readily soluble in dichloromethane, toluene.



Beta-cyfluthrin

Action/Use

ACTION: Nonsystemic synthetic pyrethroid.

USE: Foliar insecticide for control of chewing and sucking insects on cereal, corn, cotton, deciduous fruit, peanuts, potatoes, vegetables, turf and ornamentals.

FORMULATIONS: Aerosol, emulsifiable concentrate, granules, oil-in-water emulsion, suspension concentrate, ULV liquid, wettable powder.

Registration Notes

U.S.: Not registered.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ 89 mg/l (96 h) (rainbow trout). Bee: Toxic by direct contact, depending on mode of application. Bird: LD₅₀ >2000 mg/kg (Japanese quail).

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING (tech).

TOXICITY CLASS: II (tech).

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 500mg/kg b.w (in polyethylene glycol); Dermal: LD₅₀ >5000 mg/kg b.w.; Inhalation: LC₅₀ (4 h) approx. 0.1 mg/L (aerosol), 0.53 mg/L (dust).

PROTECTIVE CLOTHING: Wear a mask or pesticide respirator.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place in such a manner as to prevent cross contamination with other pesticides, fertilizers, food and feed. Store in original container, out of the reach of children, preferably in a locked storage area.

Emergency GuidelinesFIRE EXTINGUISHING MEDIA: DCP, water spray, foam, CO₂.

ANTIDOTE: No specific antidote available.

FIRST AID: Treat symptomatically. Call physician immediately. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation**, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. **Ingestion**, do NOT induce vomiting. Gastric lavage should be supervised by a physician or professional medical staff because of possible pulmonary damage via aspiration of the solvent.

EMERGENCY TELEPHONE: 816-242-2582 (Miles Inc.).

Beta-Hydroxy Ethyl Hydrazine**Action/Use**

ACTION: Plant growth regulator.

USE: For pineapples.

FORMULATIONS: Solution.

Betamec* Herbicide (bensulide) — Discontinued by Stauffer Chemical Co.**Betamix*** — see Desmedipham; Phenmedipham.**Betanal*** — see Phenmedipham.**Betanal* AM** — see Desmedipham.**Betanal* Compact** — see Desmedipham; Phenmedipham.**Betanal* OF** — see Phenmedipham.**Betanal* Progress*** — see Desmedipham; Ethofumesate; Phenmedipham.**Betanal* Trio*** — see Ethofumesate; Metamitron; Phenmedipham.**Beta-Naphthol****Identification**

COMMON NAMES: 2-naphthol, beta-naphthol.

CODE NUMBERS: CAS 135-19-3; SHA 010301.

ADDITIONAL TRADE NAMES: Adrop Polvere* (Diachem S.P.A.).

Action/Use

ACTION: Trapping material, wood preservative.

USE: Formerly for chemical treatment of paper bands to trap mature codling moth larvae on orchard tree trunks. Small quantities utilized in wood preservation.

Beta-Naphthoxy Acetic AcidBP: Agri-Pharm International Inc.
Inchema, Inc.**Identification**

CODE NUMBERS: CAS 135-19-3; SHA 010301.

OTHER NAME: BNOA.

Action/Use

ACTION: Fruit set, growth regulator.

USE: For pineapples, strawberries and tomatoes.

Betanex* — see Desmedipham.**Betapost*** — see Phenmedipham.**Betasan*** — see Bensulide.**Bethrodine*** — see Benefin*.**Bexton* (propachlor)** — Discontinued by Dow Chemical.**BH* 43 Growth Retardant (2,4-D + maleic hydrazide)** — Discontinued 1993 by SDS Biotech Corp.**BH* MCPA** — see MCPA.**BHC**BP: Hindustan Insecticides Ltd. (Hilbeech*)
Inquinosa
Koruma Tarim A.S.
Veipol, S.A. de C.V.**Identification**

COMMON NAMES: BHC (India/Europe), HCH (Europe), 666 (Denmark), hexachlor (Sweden), hexachloran (USSR).

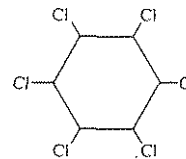
CODE NUMBERS: CAS 608-73-1 (all isomers); SHA 180140.

ADDITIONAL TRADE NAMES: Gammexane*, Gexane*, HCCH, Hexyclan*, Soproicide*.

DISCONTINUED NAMES: FBHC* (Hooker Chemical); Dol*, Dolmix* (+ MTMC) (Nihon Nohyaku Co., Ltd.); Hexablanc*, Hexafor*, Hexamol*, Hexapoudre* (Rhône-Poulenc Ag Co.); Benzahex*, Benzex* (Woolfolk Chemical).

Chemistry

COMPOSITION: 1,2,3,4,5,6-Hexachlorocyclohexane; also known as benzene hexachloride.



BHC

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

PROPERTIES: White-colored powder. Five isomers have been found in technical BHC, of which the gamma isomer is the only one having more than slight activity against insects. That grade of BHC obtained by extraction (re-crystallization) steps to produce the gamma isomer at least 99% pure is known as lindane. The gamma isomer does have some fumigant action; however, residual action is less than DDT since it is more volatile. Soluble in benzene and chloroform.

Action/Use

ACTION: Insecticide.

USE: Agrocide[®] 6G, Lindol[®] 6G for leafhoppers, stem borers, etc. in lowland rice. Kotol[®] liquid seed treatment for reduction of wireworm damage in winter and spring sown cereals. Lindocol[®] for pests of cereals, sugar beets, oilseed rape.

FORMULATIONS: Dusts, oil solution, wettable powders. Emulsifiable concentrates require BHC of intermediate gamma content (high gamma, 36-45%) to obtain solutions of high enough gamma content.

Registration Notes

U.S.: BHC no longer produced or sold for domestic use.

Environmental Guidelines

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Alpha-isomer. Poisoning may occur by ingestion, inhalation, or percutaneous absorption. Topical use may cause local sensitivity reactions. Vapors may irritate eyes, nose, throat.

See Gamma-BHC.

Bi 58 EC — see Dimethoate.

Bi 3411-NEU (chloral hydrate + methyl) — Discontinued by Chemiekombinat Bitterfeld VEB.

Biabrinex^{*} — see Heptachlor.

Bi-Cal^{*}

Chemistry

COMPOSITION: Ratio 2:1 calomel, corrosive sublimate.

Action/Use

ACTION: Fungicide.

USE: For turf.

Bicep^{*}

BP: Ciba (Bicep[®], Bicep II[®], Bicep Lite[®])

Ciba, Ltd. (Primagram[®], Primextra[®])

Chemistry

COMPOSITION: Atrazine + metolachlor. Bicep II[®] contains the safener benoxacor.

PROPERTIES: Off-white liquid; faint ester-like odor; boiling point, 100°C.

FAMILY: Triazine/chloracetamide.

Action/Use

ACTION: Selective herbicide.

USE: Early preplant incorporated, preemergence, and postemergence (Bicep[®] only) weed control in corn. In sorghum only in conjunction with sorghum seed treated with the safener Concep[®] II or III.

FORMULATIONS: Liquid.

Registration Notes

U.S.: RUP. Ratio varies by trade name.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4680 mg/kg. Inhalation LC₅₀ >14.4 mg/l.

(Rabbit): Dermal LD₅₀ >2000 mg/kg. Mild eye, moderate skin irritation.

HANDLING AND STORAGE CAUTIONS: Avoid eye and skin contact. Store in well-ventilated, secure area out of reach of children and domestic animals.

PROTECTIVE CLOTHING: Safety glasses and goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemical, foam or carbon dioxide.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Apply artificial respiration, if necessary. Ingestion, drink one or two glasses of water and induce vomiting.

Bicep II^{*} — see Bicep[®].

Bicep Lite^{*} — see Bicep[®].

Bichloride of Mercury — see Corrosive Sublimate.

Bidisin^{*}

(Discontinued by Bayer AG)

Identification

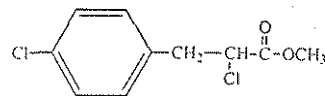
COMMON NAME: Chlorfenprop-methyl (BSI, ISO); methachlorphenprop (abandoned).

EXP. CODE NUMBERS: Bay 70533 (Bayer AG); W 5769.

OTHER CODE NUMBERS: CAS 14437-17-3; SHA 557200.

Chemistry

COMPOSITION: Methyl (±)-2-chloro-3-(4-chlorophenyl) propionate.



Chlorfenprop-methyl

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Bidrin^{*} — see Dicrotophos.

Biennial Weed

A weed which requires two years to mature, as common burdock. The first year's growth is usually confined to a rosette of leaves and a fleshy taproot. The second year a flower stalk rises from the crown, produces seed, and the plant then dies.

See Annual Weed, Perennial Weed.

Bifenix^{*} — see Isoproturon.

Bifenox^{*}

BP: Rhone-Poulenc Ag Co. (Modown[®])

Identification

COMMON NAME: Bifenox (ISO, BSI, ANSI, WSSA).

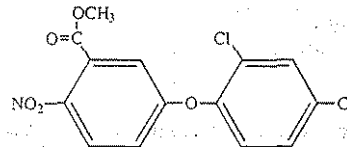
EXP. CODE NUMBER: MC-4379 (Rhone-Poulenc Ag Co.).

OTHER CODE NUMBERS: CAS 42576-02-3; SHA 104301.

Chemistry

COMPOSITION: Methyl 5-(2,4-dichlorophenoxy)-2-nitrobenzoate.

PROPERTIES: Non-volatile crystalline solid. Relatively stable in ultraviolet light. Moderately soluble in organic solvents.



Bifenox

Action/Use

ACTION: Herbicide.

USE: For broadleaf control, preplant incorporated (surface mix) and preemergence in soybeans; preemergence in double crop soybeans, preemergence in grain sorghum and field corn; postemergence in small grains; preemergence and postemergence for direct-seeded rice and forest tree nursery seedbeds.

FORMULATIONS: Flowable.

COMBINATION: Foxpro D^{*} (+ ioxynil + D-MCPP), Foxtar^{*} (+ isoproturon + MCPP), Foxtar D^{*} (+ isoproturon + D-MCPP), Foxta^{*} (+ isoproturon + neburon) (Rhone-Poulenc Ag Co.).

Registration Notes:

U.S.: Modown[®] discontinued.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.87 (trout); 0.64 ppm (4 days) (bluegill). Bird:

LD₅₀ >5000 ppm (8 days) (duck, pheasant).

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (4F).

TOXICITY CLASS: IV.

TOXICITY: 4F (Rat): Oral LD₅₀ >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Handle carefully. Do not contaminate water, food, or feed by storage or disposal of this chemical. If exposed to freezing temperatures, store at temperatures >55°F for 24 hours or until completely thawed. Shake well before using.

Emergency Guidelines

FIRST AID: Eyes, immediately flush with plenty of water for at least 15 minutes. Get medical aid. Skin, wash with plenty of soap and water.

Bifenthrin

BP: FMC Corp. (Biflex[®], Brigade[®], Capture[®], Talstar[®])

Identification

COMMON NAMES: Bifenthrin (ISO-E draft, ANSI, BSI); bifenthrine (ISO-F draft).

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

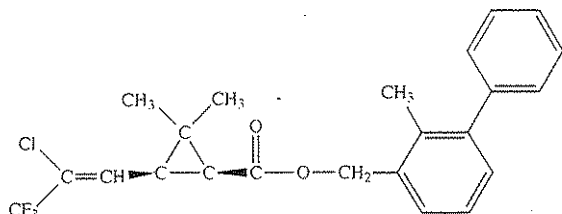
EXP. CODE NUMBER: FMC 54800 (FMC Corp.).
OTHER CODE NUMBERS: CAS 82657-04-3; SHA 128825.

Chemistry

COMPOSITION: [1 α ,3 α -(Z)]-(\pm)-(2-methyl[1,1'-biphenyl]-3-yl) methyl 3-(2-chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate (CAS).

FAMILY: Pyrethroid.

PROPERTIES: Off-white to pale tan waxy solid; very faint slightly sweet odor. Melting point 57-64°C. Vapor pressure 1.81×10^{-7} mm Hg (25°C); specific gravity 1.212 g/ml (25°C). Soluble in acetone, chloroform, ether, methylene chloride, and toluene.



Bifenthrin

Action/Use

ACTION: Broad spectrum insecticide, miticide, termiticide.

FORMULATIONS: Emulsifiable concentrate, wettable powder.

Registration Notes

U.S.: Biflex* as termiticide. Talstar* for fire ants and greenhouse grown ornamentals. Capture* for cotton.

OUTSIDE U.S.: Talstar* for cereals, cotton, field corn, fruits, nuts, vine crops.

Environmental Guidelines

HAZARDS: Tech: Fish: LC₅₀ 0.15 ppb (96 h) (rainbow trout); 0.35 ppb (bluegill). Bird: (Oral) LD₅₀ >2150 mg/kg (mallard); 1800 mg/kg (bob-white). (Dietary) LC₅₀ 1280 ppm (8 days) (mallard); 4450 ppm (bob-white).

SOLUBILITY: In water <0.1 ppb.

Safety Guidelines

SIGNAL WORD: WARNING: (Biflex* TC, Biflex* FT, Biflex* 1.75 FT, Capture* 2EC, Talstar* 10WP).

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 375 mg/kg. (Rabbit): Dermal >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children and animals. Store in original containers only. Store in cool, dry place and avoid excess heat. Carefully open containers. After partial use, replace lids and close tightly. Do not put concentrate or diluted material into food or drink containers. Do not contaminate other pesticides, fertilizers, water, food or feed by storage or disposal.

Emergency Guidelines

FLASHPOINT: Tech: 165°F. Biflex* FT, Biflex* 1.75 FT >141°F.

FIRE EXTINGUISHING MEDIA: Foam, carbon dioxide and dry chemical.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Ingestion, drink one or two glasses of water and induce vomiting. Inhalation, remove to fresh air.

EMERGENCY TELEPHONE: 800-331-3148 (FMC Corp.).

Bifenthrine — see Bifenthrin.

Biflex* — see Bifenthrin.

Big Daddy* Insecticide (chlordane + DDT + methyl parathion) — Discontinued by Velsicol Chemical Corp.

Big Dipper* — see Coraza*.

Big Sur* 90

BP: Brewer International Inc.

Chemistry

COMPOSITION: Alkylarylpolyoxyethylene glycols, free fatty acids and isopropanol non-ionic surfactant.

PROPERTIES: Clear, yellow; specific gravity, 8.7lbs/gal; vapor pressure, 58°F; mild chemical odor.

Action/Use

ACTION: Wetter, spreader adjuvant.

USE: With insecticides, fungicides, growth regulators and biostimulants.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

PROTECTIVE CLOTHING: Full face shield or goggles, and gloves.

HANDLING AND STORAGE CAUTIONS: Avoid overheating or freezing; avoid open fire or flames.

Emergency Guidelines

FLASHPOINT: 150°F.

FIRE EXTINGUISHING MEDIA: Foam, water fog, dry chemical, or ABC fire extinguisher.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing. Inhalation, remove to fresh air. Ingestion, induce vomiting.

EMERGENCY TELEPHONE: 800 255-3924 (Chem Tel).

Big Wet*

BP: Brewer International Inc.

Identification

COMMON NAME: Alkylarylsulfonates + selected chelating agents.

Chemistry

PROPERTIES: Nonionic-anionic blend.

Action/Use

ACTION: Deposition aid, spreader, surfactant.

USE: With fungicides for preplant, preemergent, and emergent weed control; aquatic weed control. With liquid fertilizer to enhance penetration, deposition.

Emergency Guidelines

EMERGENCY TELEPHONE: 800 255-3924 (Chem Tel).

Billy* Rodenticide (zinc phosphide) — Discontinued by Shroffs Indus. Chemical.

Bim* — see Tricyclazole.

Bimeton* — see Ametryn; Diuron.

Binapacryl — see Morocide*.

Binex* — see Pinnacle*; Pyridate.

Binnell* Herbicide (benfluralin) — Discontinued by Elanco Products.

Bio-88*

BP: Kalo, Inc. (Bio-88*)

Chemistry

COMPOSITION: Principal function agents: Alkylarylpolyoxy ethan-ol + free fatty acids + isopropanol + dimethylpolysiloxane.

PROPERTIES: Nonionic, water miscible spray adjuvant with an anti-foam system.

Action/Use

ACTION: Spray adjuvant, spreader-activator.

USE: Use with acaricides, defoliants, desiccants, fungicides, herbicides, insecticides.

FORMULATIONS: Liquid.

Environmental Guidelines

SOLUBILITY: Complete in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Causes eye irritation. Avoid prolonged contact with skin.

Emergency Guidelines

FIRST AID: Eyes, immediately flush with water.

Bioaccumulative

Substances that increase in concentration in living organisms (that are very slowly metabolized or excreted) as they breathe contaminated air, drink contaminated water, or eat contaminated food.

See Biological Magnification.

Bioallethrin — see Allethrin, d-trans.

S-Bioallethrin

BP: McLaughlin Gormley King Co.

Roussel Uclaf Corp. (EsbioI*, Esbiothrin*)

Identification

COMMON NAME: Esdepalléthrine (France).

TRIVIAL NAME: S-Bioallethrin.

CODE NUMBER: CAS 28434-00-6.

Chemistry

COMPOSITION: d-2-allyl-4-hydroxy-3-methyl-2-cyclopenten-1-one ester of d-trans chrysanthemumic monocarboxylic acid.

PROPERTIES: Yellow colored viscous liquid with a slight aromatic odor. Specific gravity of MGK* EsbioI* Concentrate 90% is typically 0.980 at 20°C. Stable under normal conditions of storage and use. Avoid highly acidic or alkaline situations. Miscible with acetone, benzene, ethanol, hexane, refined kerosene, isoparaffinic solvents, and other organic solvents.

Action/Use

ACTION: Insecticide.

Information is presented herein for preliminary planning only.

Exclusive reliance must be placed on information/directions supplied by manufacturer.

USE: Several times as effective as racemic allethrin against flying and crawling insects. Used mainly in sprays and aerosols against insects in industrial situations. Responds well to synergists.

FORMULATIONS: In aerosols and sprays, usually with synergists for use in industry and homes.

COMBINATIONS: Usually with synergists piperonyl butoxide and N-octyl bicycloheptene dicarboximide (MGK* 264). Also combined with residual insecticides as a knockdown or flushing agent for crawling insects. Esbiol* intermediates and concentrates for manufacturing insecticides (MGK Co.).

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING (Min. 90% tech.). CAUTION (Formulations).

TOXICITY CLASS: II (Min. 90% tech.) III (Formulations).

TOXICITY: (Rat): Oral LD₅₀ 784 mg/kg (male); 680 mg/kg (female). Can be used on no residue basis in edible product-areas of food processing and food warehousing situations. No food additive tolerances exist for it. No tolerances exist for its use on meat and milk animals. No recommendations exist for use on food crops.

PROTECTIVE CLOTHING: Goggles, gloves, and respirator should be used when handling tech. 90% or more. None required for handling usual products for home and industry.

HANDLING AND STORAGE CAUTIONS: Ordinary good manufacturing practices and sanitation. Ventilate well. Store in closed drums in a cool, dry place.

Bioassay

The term bioassay is used to describe the technique by which a toxic agent, as an insecticide, is detected and measured for potency. The technique involves testing at different dosage levels of the toxicant for ability to cause a physiological response, often death in a test organism, i.e., insect, rat. In bioassay chemicals are not identified individually. Bioassay may be used to determine: the rate of loss after application of an insecticide to crop or soil, as confirmation of chemical assays of residues, detection of insecticides as cause of honey bee losses, etc.

Biobit* — see *Bacillus thuringiensis* var. *kurstaki*.

Biocattura* — see Trapping Systems.

Biochemical Oxygen Demand (BOD)

A measure of amount of oxygen consumed in biological processes that break down organic matter in water. The greater the BOD, the greater degree of pollution.

Biocide — see Poison.

Biocontrol* — see Trapping Systems.

Biodac*

BP: Edward Lowe Industries, Inc., Gran Tech Products

Chemistry

COMPOSITION: Cellulosic wood pulp complex.

PROPERTIES: Non-dusting, chemically inert, neutral.

Action/Use

ACTION: Pesticide barrier.

Registration Notes

U.S.: FIFRA Exempt.

Biodegradable

Ability to break down or decompose rapidly under natural conditions or processes.

Bio-Film*

BP: Kalo, Inc. (Bio-Film*)

Chemistry

COMPOSITION: Principal functioning agents: Alkylaryl/polyethoxy ethanol + free and combined fatty acids + phosphatic acids + isopropanol.

PROPERTIES: Ionic-nonionic blend.

Action/Use

ACTION: Spreader-sticker.

USE: In fungicide and insecticide sprays for fruit, vegetable, and tree crops.

FORMULATIONS: Liquid.

Environmental Guidelines

SOLUBILITY: Complete in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Causes eye irritation. Avoid prolonged contact with skin.

Emergency Guidelines

FIRST AID: Eyes, immediately flush with water.

Bio-Guard*

(Discontinued by Nutrilite Products)

Chemistry

COMPOSITION: *Bacillus thuringiensis* + pyrethrins in petroleum distillate.

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

Bioguard* Fungicide (thiabendazole) — Discontinued by Merck & Co., Inc.

Biolinfa*

BP: Biochem S.R.L. (Biolinfa*)

Chemistry

COMPOSITION: L cysteine derivatives: 5% N-acetyl-thiazolidin-4 carboxylic acid (ATCA) 0.1% folic acid (stabilized buffered solution).

Action/Use

ACTION: Stimulates vegetation and fruiting processes of plants.

USE: Seed dressing and foliar spray at various stages of plant growth.

Biolinfa Plus A*

BP: Biochem S.R.L. (Biolinfa Plus A*)

Chemistry

COMPOSITION: L cysteine derivatives: N-acetyl-thiazolidin-4 carboxylic acid (ATCA) 2.5%, folic acid 0.2%, aminoacids 23% + micronutrients: 1% B; 1% Fe; 5% Mg.

Action/Use

ACTION: Stimulates vegetation and fruiting processes of plants.

USE: Seed dressing and foliar spray at various stages of plant growth.

Biological Control

Parasitic and predaceous insects and insect disease organisms are vital factors in natural control of insect pests. Such forms may also often be reared and disseminated artificially. Biological control also includes the use of insects to control certain weeds as well as the use of any other living organism in fighting pests. The biological control agent *Entomophthora grylli* (a fungus) has shown considerable mortality to grasshoppers after a period of moist weather.

Biological Magnification

Process whereby certain substances such as pesticides or heavy metals move up the food chain, work their way into a river or lake and are eaten by aquatic organisms such as fish which in turn are eaten by large birds, animals or humans. The substances become concentrated in tissues or internal organs as they move up the chain.

See Bioaccumulative.

BioLure*

BP: Consep, Inc.

Action/Use

ACTION: Controlled release dispensers containing synthetic sex pheromone and/or attractant for monitoring pest populations throughout the growing season.

USE: Available for the following pests: aphid/whitefly/thrips/leafminer, apple maggot, boll weevil, codling moth, European pine shoot moth, flour beetles (red, confused), fruit flies, gypsy moth, Mediterranean fruit fly, melon fly, obliquebanded leafroller, omnivorous leafroller, Oriental fruit fly, Oriental fruit moth, peach twig borer, pink bollworm, spruce budworm (eastern), stored product moths (almond, Indian meal, Mediterranean flour, raisin, tobacco), tomato pinworm, warehouse and Khapra beetles.

Registration Notes

U.S.: No EPA restrictions on use.

Safety Guidelines

TOXICITY: Nontoxic.

HANDLING AND STORAGE CAUTIONS: Store sealed packets in a cool, dry place.

Bionex* — see Azinphos-Ethyl.

Biopermethrin — see Pyrethroids.

Bioquin* — see Copper 8-Quinolinate; 8-Quinolinol.

Biorational Pesticides

Defined as including pest control agents and chemical analogues of naturally occurring biochemicals. Viruses, bacteria, protozoa, and fungi are considered biorational pesticides.

Bioresmethrin — see Pyrethroids.

Bio-Sect*

BP: Chemol Trading Limited Co. (Bio-Sect*)

Chemistry

COMPOSITION: Mixture of fatty acid potassium salts: CH₃-(CH₂)₁₄-COOK (potassium palmitate); CH₃-(CH₂)₁₃-COOK (potassium margarate); CH₃-(CH₂)₁₈-COOK (potassium stearate).

PROPERTIES: Pale yellow to brown solid with characteristic soap odor. Setting point of fatty acids, min. 35° C. Soluble in water and alcohols.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Insecticide with contact action.
USE: Against sucking pests in ornamental and house plants, and in vegetables, mainly against mites, plant louses, and moth louses. Can also be applied in houses, hospitals, schools, and hotels.
FORMULATIONS: Spray, concentrate.

Environmental Guidelines

HAZARDS: Not harmful to wildlife, fish, bees.
SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: Practically non-toxic.
TOXICITY: (Male rat): Oral LD₅₀ 10,000 mg/kg. (Female rat): 10,000 mg/kg. (Rabbit): eye irritant; not irritating to the intact skin, slightly irritating to scarf-skinless surface for one day.
PROTECTIVE CLOTHING: Overalls, hat, gloves.
HANDLING AND STORAGE CAUTIONS: Can be stored in original closed packing in a dry, cool place in standard pesticide storage for 2 years. Do not empty product, its unused residues or packing materials into rivers, water reservoirs, or still water.

Emergency Guidelines

FLASHPOINT: N/A.
FIRST AID: Eyes, wash with plenty of water. Skin, wash thoroughly with soap, detergents, and warm water. Inhalation, remove to fresh air. Get medical attention. Ingestion, give 306 dl water containing medicinal carbon. Induce vomiting by sticking finger down throat or by giving strong soaps or salty water. Repeat until vomit is clear, then give water containing some salt, activated carbon or purgative. DO NOT give milk, grease, oil or alcohol.

Biostat* PA — see Terramycin*.

Biostimulant

A particular plant growth regulator which stimulates activity.

Bio-Tac*

F: Ecogen Inc.

Identification

COMMON NAME: Polybutene.

Chemistry

PROPERTIES: Soluble in petroleum solvents, chlorinated hydrocarbons. Insoluble in ketones, alcohols, water.

Action/Use

ACTION: Adhesive.
USE: For pheromone dispensers.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.

See Sticky Trapping Materials.

Biotechnology

Techniques that use living organisms or parts of organisms to produce a variety of products (from medicines to industrial enzymes) to improve plants or animals or to develop microorganisms for specific uses such as removing toxics from bodies of water, or as pesticides.

Biothion* Larvicide (temephos) — Discontinued by American Cyanamid Co.

Biotrol* 16K Insecticide (*Bacillus thuringiensis* var. *kurstaki*) — Discontinued by Nutrilite Products.

Biotrol* BTV Insecticide (*Bacillus thuringiensis* var. *kurstaki*) — Discontinued by Nutrilite Products.

Biotrol* K Insecticide (*Bacillus thuringiensis* var. *kurstaki*) — Discontinued by Nutrilite Products.

Biotrol-Plus* — Discontinued by Nutrilite Products.

Biotrol* VHZ Insecticide (Heliothis Nuclear Polyhedrosis Virus) — Discontinued 1991 by Zoecon.

Bioxone* — see Probe*.

Biphenyl — see Diphenyl.

Bird Repellent

A substance which drives away birds or discourages them from roosting. Anthraquinone and thiram have some bird repellent activity. A few examples are: Avitrol* (Avitrol Corp.), Bird Stop* (Animal Repellents, Inc.), Red Shield Crow Repellent* (Borderland Products, Inc.).

Bird Stop* — see Bird Repellent.

Birgin* — see Propham.

Birlane* — see Chlorfenvinphos.

Bismuth Subsalicylate

(Discontinued 1969 by Mallinckrodt, Inc.)

Chemistry

MOLECULAR FORMULA: C₇H₅(OH)CO₂BiO.

Action/Use

ACTION: Fungicide.

Safety Guidelines

TOXICITY: Toxic to warm-blooded animals.

Bitertanol — see Baycor*.

Bitrex*

BP: Macfarlan Smith Ltd. (Bitrex*)

Identification

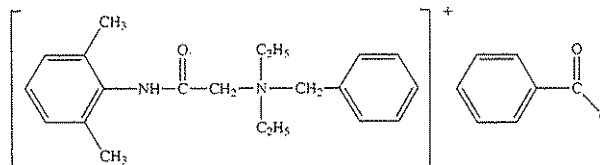
COMMON NAME: Denatonium benzoate.

CODE NUMBERS: CAS 3734-33-6.

Chemistry

COMPOSITION: Benzyldiethyl [(2,6-xylylcarbonyl)methyl] ammonium benzoate.

PROPERTIES: White odorless granules (99.5-100%). Melting point 163-170°C. Solubility (gm/100 ml at 20°C) acetone 1.40, isopropanol 10.5, methanol 69.0, water 4.50, xylene 0.028. Molecular weight 446.6.
MOLECULAR FORMULA: C₂₀H₂₀N₂O₃.



Denatonium Benzoate

Action/Use

ACTION: Animal repellent and product ingestion deterrent.

USE: Repels animals such as deer, rabbits, and birds. Also used as an aversion agent in rodenticides.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 1000 mg/l (rainbow trout), LC₅₀ 400 mg/l (shrimp).

Safety Guidelines

TOXICITY: (Rat): Oral LD₅₀ approx. 612 mg/kg; Dermal LD₅₀ >2000 mg/kg. Skin irritation (human) and eye irritation (rabbit) none at 0.05% w/v.

HANDLING AND STORAGE CAUTIONS: Package in sealed tins.

SPILL CONTROL/CLEAN UP: Wash area with water, absorb with absorbant such as kitty litter, pick up and place in sealed drums.

Emergency Guidelines

FIRST AID: Eyes, flush with plenty of water. Skin, wash thoroughly. Inhalation, remove to fresh air. Ingestion, strong aversion agent and emetic.

EMERGENCY TELEPHONE: 800-635-3558.

Bitterwood — see Quassia.

Bitumen

Any natural mixture of heavy hydrocarbons in viscid or solid form, as mineral pitch and asphalt.

Bivert*

F: Wilbur-Ellis Co.

Identification

DISCONTINUED NAMES: TMP* (Wilbur-Ellis).

Chemistry

COMPOSITION: Principal function agents: amine salts of vegetable fatty acids + organic aromatic acid + aromatic + aliphatic petroleum distillate.

Action/Use

ACTION: Deposition and retention agent, sticker, spreader, drift retardant.

USE: Bivert* for use with conventional mixtures of fungicides, herbicides, insecticides, and harvest aid chemicals, to increase deposition, retention of chemicals on target area. Suspension compatibility agent for chemicals in liquid fertilizer.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY: Exempt.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Bla-S* — see Blasticidin-S.

Black Leaf 40* Insecticide (nicotine) — Discontinued 1992 by Black Leaf Products Co., Div. Wilbur-Ellis Co.

Bladafum*

BP: Bayer AG (Bladafum*)

Identification

COMMON NAME: Sulfotep (ISO, BSI).

CODE NUMBERS: CAS 3689-24-5 (sulfotep); SHA 079501; ENT 16273; EINECS 222-995-2.

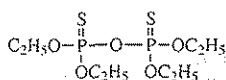
DISCONTINUED NAMES: Dithio, Dithione, Thiotepp.

Chemistry

COMPOSITION: Tetraethyl thiodiphosphate.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

PROPERTIES: Pale yellow liquid. Vapor pressure 1.4×10^{-4} mbar at 20°C. Miscible in n-hexane, dichloromethane, 2-propanol, toluene.



Sulfotep

Action/Use

ACTION: Acaricide, insecticide.

USE: Greenhouse fumigant to control aphids, spider mites, thrips, whiteflies.

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Not marketed in Canada.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96 h) 3.61 µg/l (rainbow trout).

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ approx. 10 mg/kg; Dermal LD₅₀ 65 mg/kg.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Atropine, PAM.

Bladan* Insecticide (parathion) — Discontinued 1992 by Bayer AG.

Bladan*M — see Methyl Parathion.

Bladex* — see Cyanazine; Eradicane*.

Blasin* — see Ferimzone.

Blastaf* — see IBP.

Blasticidin-S

BP: Kaken Pharmaceutical Co., Ltd.

Identification

COMMON NAME: Blasticidin-S (JMAF).

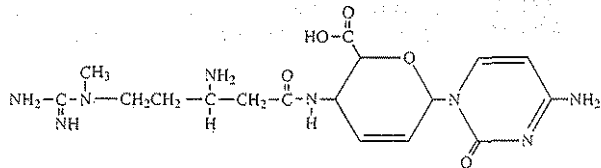
CODE NUMBER: CAS 2079-00-7.

ADDITIONAL TRADE NAMES: Bla-S*, Blasticidin-S-3 (benzyl 4-aminobenzenesulfonate).

Chemistry

COMPOSITION: 1-(4-amino-1,2-dihydro-2-oxopyrimidin-1-yl)-4-[(S)-5-amino-5-(1-methyl-guanidino)valeramido]-1,2,3,4-tetraoxo-β-D-erythro-hex-2-enopyranuronic acid.

PROPERTIES: Pure blasticidin-S-3 is a colorless crystal. Tech is a light brown solid. Decomposes at 253-255°C. Soluble in acetic acid. Insoluble in common organic solvents.



Blasticidin-S

Action/Use

ACTION: Fungicide.

USE: Foliar application to control rice blast (*Pyricularia oryzae*).

FORMULATIONS: Dust, emulsifiable concentrate, wettable powder.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (eye).

TOXICITY CLASS: I.

TOXICITY: Blasticidin-S-3: (Mouse): Oral LD₅₀ 51.9 mg/kg (male); 60.1 mg/kg (female). (Rat): Oral LD₅₀ 56.8 mg/kg (male); 55.9 mg/kg (female); Dermal LD₅₀ >500 mg/kg. Severe eye irritant.

HANDLING AND STORAGE CAUTIONS: When handling, wear goggles, respirator, rubber gloves, protective clothes.

Emergency Guidelines

FLASHPOINT: Nonflammable.

ANTIDOTE: Unknown.

FIRST AID: Eyes, Skin, flush with plenty of water for at least 15 minutes. Ingestion, induce vomiting, treat symptomatically.

Blasticidin-S-3 — see Blasticidin-S.

Blattanex* — see Propoxur.

Blazer*

BP: BASF Corp. (Blazer*)

Identification

COMMON NAMES: Acifluorfen-sodium (ISO-E, ANSI, WSSA, BSI); acifluorfene-sodium (ISO-F).

EXP. CODE NUMBERS: RH-6201 (Rohm and Haas), LS 80 1213.

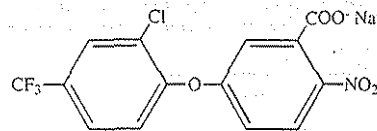
OTHER CODE NUMBERS: CAS 62476-59-9; SHA 114402.

DISCONTINUED NAMES: MC 10978 (Murphy Chemical), Tackle* (Rhône-Poulenc Ag Co.).

Chemistry

COMPOSITION: Sodium 5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-nitrobenzoate.

PROPERTIES: Yellow/dark brown liquid (tech.), with melting point >212°F.



Sodium Salt of Acifluorfen

Action/Use

ACTION: Herbicide.

USE: Blazer* postemergence for annual broadleaf weeds (some side effects on some grasses) on soybeans, peanuts, rice. Controls weeds such as annual morningglory species, cocklebur, jimsonweed, hemp sesbania, nightshade, pigweed (*Amaranthus* spp.), smartweed, tropic croton, velvetleaf, and certain other weeds.

FORMULATIONS: Liquid concentrate of the sodium salt.

COMBINATIONS: Storm* (+ bentazone) (BASF AG).

Registration Notes

U.S.: Storm*.

OUTSIDE U.S.: Blazer*, Galaxy* and Galaxy Top* (BASF AG). Brazil: Doble* (BASF AG).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 54 mg/l (96 h) (rainbow trout); 31 mg/l (bluegill).

Bird: (Oral): 4187 mg/kg (mallard).

SOLUBILITY: In water >25%, photodegradation half life of about 4.5 days.

Safety Guidelines

SIGNAL WORD: DANGER. (Eye).

TOXICITY CLASS: I.

TOXICITY: Aqueous tech: (Rat): Oral LD₅₀ 1540 mg/kg. (Rabbit): Dermal LD₅₀ 3680 mg/kg.

Tackle* (Rat): Oral LD₅₀ 2025 mg/kg (male); 1370 mg/kg (female). (Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Goggles, impermeable gloves and apron when handling undiluted product. Protective clothing and boots when handling undiluted and diluted product.

HANDLING AND STORAGE CAUTIONS: Do not contaminate water, food, or feed by storage or disposal.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. Treat symptomatically. Ingestion, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800 424-9300 (CHEMTREC).

Bleaching Powder — see Chloride of Lime.

Blendex*

BP: Helena Chemical Co. (Blendex*, Blendex* VHC)

Chemistry

COMPOSITION: Proprietary blend of alkylaryl polyethoxy ethanol phosphate esters.

Action/Use

ACTION: Spray adjuvant.

USE: Stabilizing, compatibility agent used with fertilizers, nutritionals, pesticides.

Safety Guidelines

TOXICITY: Warning (Blendex* VHC).

Blendex* VHC — see Blendex*.

Blex* — see Actellic*.

Blight

A general term that may include spotting, discoloration, sudden wilting, or death of leaves, flowers, fruit, stems, or the entire plant.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/T/M BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Blitox* — see Copper Oxchloride.
Block Penta* — see PCP.
Blockade* (prodiamine) — Discontinued.
Blotic* — see Propetamphos.
Blue Copperas — see Copper Sulfate.
Blue Diamond* — see Copper Oxchloride.
Blue Shield* DF — see Copper Hydroxide.
Blue Viking* — see Copper Sulfate.
Blue Vitriol — see Copper Sulfate.
Blue-Ox* Rodenticide (zinc phosphide) — Discontinued by Hopkins Agricultural Chemical Co.
Buestone — see Copper Sulfate.
Biuan* (benfluralin) — Discontinued by Elanco Products.
BMP 123* — see *Bacillus thuringiensis* var. *kurstaki*.
BMP 144* — see *Bacillus thuringiensis* var. *israelensis*.
B-Nine* — see Daminozide.
BNOA — see Beta-Naphthoxy Acetic Acid.
BO Q 5812315 — see Propoxur.
Bocep* Viti — see RAK*1 Plus.
Bolate* Defoliant/Herbicide (cacodylic acid + sodium cacodylate) — Discontinued by Cumberland International Corp.
Bolda* Fungicide (carbendazim + maneb + sulfur) — Discontinued by Farm Protection Ltd.
Bolero* — see Saturn*.
Boliden Salts
Action/Use
 ACTION: Wood preservative.
 FORMULATIONS: Boliden salt BIS (zinc chrome arsenate). Boliden salt BIS copperized (zinc copper chrome arsenate). Boliden salt K33 (nonionic copper chrome arsenate).
 See Chromated Copper Arsenate, Copperized Boliden Salts.

Boll Popper*

BP: Western Nutrients Corp.

Action/Use

ACTION: Defoliant additive.

USE: Activant to be applied with defoliant to increase open bolls on cotton.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Temperature variations will not harm product; shelf life indefinite.

Bollex*

(Discontinued by Bio-Systems Research)

Chemistry

COMPOSITION: Methyl alpha-eleostearate; methyl ester of (Z,E,E,) 9,11,13-octadecatrienoic acid.

Action/Use

ACTION: Biorational feeding deterrent.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Bolls-Eye* Herbicide (cacodylic acid + sodium cacodylate)

— Discontinued by Drexel Chemical Co.

Bolstar*

BP: Bayer AG (Bolstar*)

Identification

COMMON NAME: Sulprofos (ISO, BSI, ESA).

EXP. CODE NUMBER: Bay NTN 9306 (Bayer AG).

OTHER CODE NUMBERS: CAS 35400-43-2 (sulprofos); SHA 111501; EINECS 252-545-0.

ADDITIONAL TRADE NAME: Bolstar* 6 (Miles, Inc.).

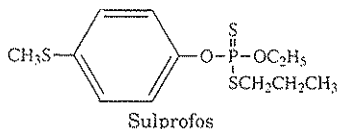
DISCONTINUED NAMES: Helothion* (Bayer AG).

Chemistry

COMPOSITION: O-Ethyl O-[4-(methylthio)phenyl] S-propyl phosphorodithioate (CAS).

FAMILY: Organophosphorous pesticide.

PROPERTIES: Colorless oil, typical sulfide odor. Density 1.20 at 20°C. Stable under normal storage conditions. Subject to hydrolysis under alkaline conditions. Boiling point 125°C at 1 Pa. Vapor pressure 0.084 mPa at 20°C. Readily soluble in organic solvents.

**Action/Use**

ACTION: Insecticide.

USE: Foliar insecticide controls certain lepidopterous and hemipterous insects on cotton.

FORMULATIONS: Emulsifiable concentrate (6 pounds/gallon).

COMBINATIONS: Bolstar* Combi (+ triflumuron) (Bayer AG).

Registration Notes

U.S.: Some or all applications of Bolstar* may be classified as RUP.

Environmental GuidelinesHAZARDS: Tech: Fish: LC₅₀ 11-14 mg/l (bluegill); LC₅₀ 23 mg/l (rainbow trout). Birds: LC₅₀ 99 mg/kg (bobwhite quail).

SOLUBILITY: Nearly insoluble in water: 0.31 mg/l at 20°C.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 200 mg/kg; Dermal LD₅₀ >1000 mg/kg.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from food, feed.

Emergency GuidelinesFIRE EXTINGUISHING MEDIA: Water spray, DCP, Foam, CO₂.

ANTIDOTE: Administer atropine sulfate in large therapeutic doses. Repeat as necessary to the point of tolerance. 2-PAM is also antidotal and may be administered in conjunction with atropine.

FIRST AID: **Eyes**, flush with water for at least 15 minutes. **Skin**, wash immediately with soap and water. **Inhalation**, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. **Ingestion**, (Tech) administer water freely and induce vomiting by giving one dose of syrup of ipecac. If vomiting does not occur within 10-20 minutes, administer second dose. If syrup not available, induce vomiting by sticking finger down throat. Repeat until fluid is clear. Get immediate medical aid.

Bolstar* 6: If swallowed, do NOT induce vomiting. Drink promptly a large quantity of egg white or gelatin solution, or if these are not available, large quantities of water. Avoid alcohol.

EMERGENCY TELEPHONE: 49-2173-38-3030 (Bayer AG); 816-242-2582 (Miles Inc.).

Bolstar* 6 — see Bolstar*.

Bolstar* Combi — see Alysystin*; Bolstar*.

Boltage* — see Voltage*.

Bomyl**Identification**

TRIVIAL NAME: Bomyl.

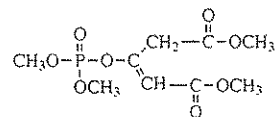
EXP. CODE NUMBER: GC-3707.

OTHER CODE NUMBERS: CAS 122-10-1; SHA 084201.

DISCONTINUED NAME: Fly Bait Gait* (IACQ, Inc.).

Chemistry

COMPOSITION: dimethyl 3-hydroxyglutaconate dimethyl phosphate or 3-Hydroxy-2-pentenedioic acid dimethyl ester dimethyl phosphate. PROPERTIES: Practically insoluble in petroleum ether, and kerosene. Miscible in acetone, alcohol, propylene glycol, xylene.



Bomyl

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: Tech: DANGER—POISON. Fly bait: WARNING.

TOXICITY CLASS: I (tech); II (fly bait).

TOXICITY: Tech (Rat): Oral LD₅₀ 31 mg/kg. Highly toxic to humans and animals by ingestion, inhalation, or skin contact. Rapidly absorbed through skin.**Environmental Guidelines**

SOLUBILITY: Practically insoluble in water.

Emergency Guidelines

ANTIDOTE: Atropine sulfate is antidotal, 2-PAM may be administered in conjunction with atropine.

Bonalan* Herbicide (benfluralin) — Discontinued by Elanco Products.

Bonus* — see Pyramin*.

Bonzi* — see Paclbutrazol.

Booster*

BP: Budget Chemicals, Inc.

Chemistry

COMPOSITION: Organic formulation of polymeric polyhydroxy acids, non-adjuvant ingredients.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Activator adjuvant.

USE: Foliar or root uptake with fertilizers 6 pH and above. Use in each application. High cation exchange with fertilizers, etc. Enhances activity of most herbicides for postemergence weed control. Compatible with most insecticides and fertilizers 6 pH and higher. Always mix water and Booster[®] in equal amounts before blending with fertilizer. Call 800-765-5790 for detailed information.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Keep away from children. Not compatible with oil sprays or very low pH materials (paraquat, arsenic acid). If compatibility questioned, use quart jar method for test.

Emergency Guidelines

FIRST AID: Contains caustic mixture. **Ingestion**, drink large quantities of water or milk. Further dilution may be accomplished by ingestion of dilute vinegar or fruit juice. Get medical aid.

Boot (Booting) — see Growth Stages for Cereal Crops.

Boot Hill^{*} — see Bromadiolone.

Bophy^{*} Defoliant/Herbicide (cacodylic acid + sodium cacodylate) — Discontinued by Cumberland International Corp.

Boracic Acid — see Boric Acid.

Borates

Includes borax (sodium tetraborate), sodium pentaborate, boron trioxide, and anhydrous sodium baborate.

Borax**Identification**

COMMON NAME: Borax.

CODE NUMBERS: CAS 1303-96-4; SHA 011102.

DISCONTINUED NAMES: Pyrobora[®], Tronabor[®], Three Elephant[®], V-Bor[®] (Kerr-McGee Chemical Corp.).

Chemistry

COMPOSITION: Sodium tetraborate decahydrate.

FORMULA: Na₂B₄O₇·10H₂O.

PROPERTIES: White crystalline solid.

Action/Use

ACTION: Larvicide, nonselective herbicide.

USE: Now largely supplanted by more economical sodium borate ore concentrates of which borax is the refined product. Confine applications to the areas from which growths are to be eliminated. Larvicide includes control of the common house fly. Spray applications of sodium borate are more effective. Borax in partially dehydrated and anhydrous forms, as sodium tetraborate pentahydrate, Na₂B₄O₇·5H₂O and Na₂B₄O₇. Other highly soluble compounds for spraying weeds include sodium metaborate, sodium pentaborate, and a series of sodium polyborates.

Environmental Guidelines

SOLUBILITY: In water 5.14 g/100 ml at 20° C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2660-5190 mg/kg.

HANDLING AND STORAGE CAUTIONS: Borate ores are safe to handle.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes**, immediately flush with plenty of water for at least 15 minutes. **Skin**, flush with plenty of water and then wash thoroughly with soap or mild detergent and water. **Inhalation**, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. **Ingestion**, induce vomiting immediately by giving 2 glasses of water and sticking finger down throat. Never give anything by mouth to an unconscious person.

Bordeaux Mixture

BP: Caffaro S.p.A.

Chemol Trading Ltd. Co.

ELF Atochem North America, Inc.

HELM AG

Ingenieria Industrial, S.A. de C.V. (Bordocop[®])La Cornubia S.A. (Comac[®])**Identification**

CODE NUMBER: CAS 8011-63-0.

Chemistry

COMPOSITION: Hydrated lime + copper sulfate. For example, a fixed copper fungicide with 27.5% elemental copper content.

Action/Use

ACTION: Fungicide.

USE: First used in France as a spray for the control of downy mildew on grapes. Primarily a fungicide, acts as a repellent against many in-

sects; applied for control of the potato leafhopper. An ovidote to some extent. Bordeaux as an emulsifier in dormant oil sprays. Broad usage on vegetables, tree fruits, nuts. Example: A 4-4-50 mixture contains 4 pounds each hydrated lime and copper sulfate in 50 gal. of water. An excess of calcium hydroxide prevents the mixing of Bordeaux with soaps or organic insecticides that are decomposed by free alkali. Poisoned Bordeaux has been prepared by adding 2-4 pounds of lead arsenate to a 6-10-100 mixture.

COMBINATIONS: Comac Bordeaux M[®] (Sulfoma[®] in France) (+ maneb), Comac Bordeaux MZ[®] (Super X Macclesfield[®] in France) (+ maneb + zineb), Comac Macuprax[®] (+ cufranab) (all La Cornubia S.A.).

Registration Notes

OUTSIDE U.S.: Comac Macuprax[®] in several countries including Ecuador, Ghana, Greece, Kenya, Lebanon, U.K. In Latin America to control banana leafspot, although now largely replaced by organic chemicals. Now under test in many other areas for use in cocoa, coffee, citrus, vines, vegetables.

Bordermaster^{*} — see MCPA.

Bordocop^{*} — see Bordeaux Mixture; Copper, Fixed.

Borea^{*} — see Bromacil; Sodium Metaborate.

Borresperse^{*} — see Dispersant; Ligosulfonates.

Boric Acid**Identification**

OTHER NAME: Boracic acid.

CODE NUMBERS: CAS 10043-35-3; SHA 011001.

Action/Use

ACTION: Insecticide, larvicide.

USE: Cockroach baits, ant poisons; larvae harboring in manures.

Borocil[®] IV

(Discontinued by J.R. Simplot Co.)

Chemistry

COMPOSITION: Sodium metaborate + bromacil.

Action/Use

ACTION: Nonselective herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3500 mg/kg. (Rabbit): Dermal LD₅₀ >10,000 mg/kg.

Emergency Guidelines

ANTIDOTE: Unknown.

FIRST AID: Get medical aid as necessary. **Eyes**, flush with a directed stream of water for at least 15 minutes, holding eyelids apart to ensure complete irrigation of all eye and lid tissue. **Skin**, remove contaminated clothing. Wash with plenty of soap and water. **Ingestion**, do NOT induce vomiting. Dilute by drinking water. If vomiting occurs, administer more water. Never give anything by mouth to an unconscious person.

See Sodium Chlorate.

Borolin^{*} Herbicide (picloram) — Discontinued by Dow Chemical Co.

Boscor^{*} — see Fenpropidin; Fenpropimorph.

Botanical Insecticides

Insecticides derived from plant materials. Ground plant parts (flowers, leaves, stems, roots) may be used directly or their extracts employed after more or less refinement. Essential oils from plant sources often are used as attractants or repellents. Vegetable oils often are ingredients of pesticide preparations. Plant gums and finely ground waste products such as walnut shells have miscellaneous uses in such preparations.

Botec^{*} — see Captan; DCNA.

Botran^{*} 30C — see DCNA.

Botrilex^{*} Fungicide (PCNB) — Discontinued 1989 by Bayer AG.

Botrizol^{*} Herbicide (chloridazon + diallate) — Discontinued 1989 by BASF AG.

Bottled Gas — see LP-Gas.

Bouillie Bordelaise RSR^{*} — see Copper Sulfate.

Bovinox^{*} — see Trichlorfon.

Boxer^{*} — see Pyrifenoxy.

BPMC

BP: Hubei Sanonda Co., Ltd.

Jin Hung Fine Chemicals Co., Ltd.

Kuo Ching Chemical Co., Ltd.

Mitsubishi Kasei Corp. (BPMC, Bassa^{*})

PT. Petrosida Gresik

Shinung Corp.

Taiwan Tainan Giant Industrial Co., Ltd.

Identification

COMMON NAMES: BPMC (JMAF), fenobucarb (ISO draft, BSI).

CODE NUMBER: CAS 3766-81-2; EINECS 223-188-8.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

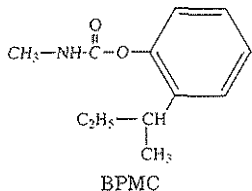
Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

ADDITIONAL TRADE NAMES: Carvil* (Planters Products); Hopcin*.
DISCONTINUED NAMES: Baycarb* (Bayer AG); Geocarb* (Chemol Trading Ltd. Co.).

Chemistry

COMPOSITION: 2-(1-methylpropyl)phenyl methylcarbamate (CAS); 2-sec-butylphenyl methylcarbamate (IUPAC).

PROPERTIES: Pale yellow or pale red liquid, melting point 34.7°C. Vapor pressure 48 mPa at 20°C. Readily soluble in dichloromethane, 2-propanol, toluene. Soluble in n-hexane.



Action/Use

ACTION: Contact insecticide. Nonsystemic translocation.

USE: For leafhoppers, planthoppers, rice stem-borers, rice bugs on rice. Bollworms, aphids on cotton.

FORMULATIONS: Emulsifiable concentrate, dust, micro granules, ULV liquid.

COMBINATIONS: Mitecudin* B (+ polynactins complex); Osbac* (+ fenitrothion) (Sumitomo Chemical Co.).

Environmental Guidelines

HAZARDS: Fish: TLM₁₅ 12.6 ppm (carp).

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING; POISON (moderately toxic).

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ approx. 640 mg/kg.

PROTECTIVE CLOTHING: Rubber gloves, gas mask or respirator, rubber boots, thick long-sleeved shirt/jacket, long pants.

HANDLING AND STORAGE CAUTIONS: Store in original container, preferably in a locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Atropine sulfate.

BPPS — see Propargite.

Brace* — see Isazofos.

Brand

The AAPCO has adopted this definition: "The name, number, trade-mark, or designation applied to an economic poison of any particular description by the manufacturer, distributor, importer, or vender thereof. Each economic poison differing in the ingredient statement, analysis, manufacturer, or distributor, name, number or trade-mark shall be considered as a distinct and separate brand."

Brasoran* — see Mesorani*.

Brassicol* Fungicide (PCNB) — Discontinued 1985 by Hoechst AG.

Brassinolide

A new growth regulator which causes unique plant growth responses. Active ingredient is brassins, an extract from pollen of the rape plant. It stimulates elongation, swelling, and splitting of bean internodes. Brassinolide represents the first steroid type molecule to show growth-promoting activity in plants.

Brassins — see Brassinolide.

Brassisan*

Chemistry

COMPOSITION: 1,2,4-Trichloro-3,5-dinitrobenzene (German).

Bravo* — see Chlorothalonil.

Bravo* C/M — see Chlorothalonil; Copper oxychloride; Maneb.

Bravo* S — see Chlorothalonil; Sulfur.

Bravo* Zn — see Chlorothalonil; Zinc.

Bravocarb* — see Carbendazim; Chlorothalonil.

Bravonil* — see Chlorothalonil.

Break-Thru* Herbicide (chlorflurenol) — Discontinued 1993 by The Andersons Industrial Products Group.

Break-Thru*

BP: Goldschmidt Chemical Corporation (Break-Thru*, Tegopren* 5840, Tegopren* 5878)

Chemistry

COMPOSITION: Polyether-polymethyl-siloxane copolymer.

FAMILY: Silicones.

PROPERTIES: Clear liquid, slight yellow color, low viscosity, specific gravity 1.02.

Action/Use

ACTION: Nonionic wetter/spreader/penetrant spray adjuvant.

USE: Improves rapid absorption and spreading of pesticides into plant leaves and stems.

Brenntox* — see Tartar Emetic.

Brestan* — see Triphenyltin Acetate.

Brestanid* — see Triphenyltin Hydroxide.

Brigade* — see Bifenthrin.

Brij*

BP: ICI Surfactants

Action/Use

ACTION: Series of surfactants.

USE: Used as emulsifier in formulation of pesticides.

Brimstone — see Sulfur.

Briotril* — see Bromoxynil; Ioxynil.

Bripoxur* — see Propoxur.

Briten* Insecticide (trichlorfon) — Discontinued 1987 by Quimica Estrella.

Brittox* — see Bromoxynil; Ioxynil; Mecoprop.

Broad Spectrum Pesticide

A general purpose pesticide which can be used against a large number of pests on one or more crops.

Broad Spectrum Weed & Feed with CFD* — see Chlorflurenol.

Broadcast Application

Application of a pesticide uniformly over the area to be treated without regard to arrangement of crop as in rows. Other methods are band application along rows, spot treatment of certain trees, etc.

Broadleaf Plant

Any plant with a flat leaf. In weed control refers to non-grassy type of herbaceous plants.

Broadside* Herbicide (sodium cacodylate + MSMA) — Discontinued by Drexel Chemical Co.

Broadstrike*

BP: DowElanco (Broadstrike*, Preside*, Scorpion*)

Identification

COMMON NAME: Flumetsulam.

OTHER CODE NUMBER: CAS 98967-40-9.

Chemistry

COMPOSITION: 2-(2,6-difluorophenylsulphamoyl)-5-methyl[1,2,4]-triazolo[1,5-a]pyrimidine (IUPAC). N-(2,6-difluorophenyl)-5-methyl[1,2,4]triazolo[1,5-a]pyrimidine-2-sulfonamide (CAS 9CI).

Action/Use

ACTION: Herbicide.

Registration Notes

OUTSIDE U.S.: Broadstrike*, Preside*, Scorpion*.

Broadstrike* + Dual*

BP: DowElanco

Chemistry

COMPOSITION: Flumetsulam + metolachlor.

Action/Use

ACTION: Herbicide.

USE: Preemergence control of annual grasses and broadleaf weeds in field corn and soybeans. Soil applied.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 3115 mg/kg male, 1338 mg/kg female; inhalation LC₅₀ >4.4 mg/l (4 h). (Rabbit): Dermal LD₅₀ >2000 mg/l. Moderate eye irritant, skin irritant.

PROTECTIVE CLOTHING: Protective eyewear, gloves, coveralls, headgear, apron when mixing/loading.

Emergency Guidelines

FLASHPOINT: >200°F, 93.3°C. (TCC).

FIRE EXTINGUISHING MEDIA: Water fog, CO₂, dry chemical.

FIRST AID: **Eyes**, flush with water for 15 minutes. Get medical attention. **Skin**, wash with plenty of soap and water. Get medical attention if irritation develops. **Inhalation**, remove to fresh air. Get medical attention if breathing difficulty occurs. **Ingestion**, do NOT induce vomiting. If conscious, administer activated charcoal (6-8 heaping teaspoons) with large quantity of water. Get immediate medical attention. EMERGENCY TELEPHONE: 517-636-4400 (DowElanco).

Broadstrike* + Treflan*

BP: DowElanco

Chemistry

COMPOSITION: Flumetsulam + trifluralin.

Action/Use

ACTION: Herbicide.

USE: Selective, soil-applied preemergence control of annual grasses and broadleaf weeds in soybeans.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I

TOXICITY: (Rat): Oral LD₅₀ 3162 mg/kg; inhalation LC₅₀ >5.92 mg/l (4 h). (Rabbit): Dermal LD₅₀ >2000 mg/kg. Moderate eye irritant, skin irritant.

PROTECTIVE CLOTHING: Protective eyewear, long-sleeved shirt and pants, gloves, shoes plus socks.

Emergency Guidelines

FLASHPOINT: >200°F 93.3°C. (PMCC).

FIRE EXTINGUISHING MEDIA: Water fog, foam, CO₂.

FIRST AID: **Eyes**, flush with water for 15 minutes. Get medical attention if irritation develops. **Inhalation**, remove to fresh air. Get medical attention if breathing difficulty occurs. **Ingestion**, do NOT induce vomiting. If conscious, administer activated charcoal (6-8 heaping teaspoons) with large quantity of water. Get immediate medical attention. EMERGENCY TELEPHONE: 517-636-4400 (DowElanco).

Broadstrike* Plus

BP: DowElanco

Chemistry

COMPOSITION: Flumetsulam + clopyralid.

PROPERTIES: Tan to brown granules; no appreciable odor.

Action/Use

ACTION: Herbicide.

USE: Preemergence control of broadleaf weeds in field corn.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Severe eye irritant, nonirritating to skin.

PROTECTIVE CLOTHING: Protective eyewear, long-sleeved shirt and pants, gloves, shoes plus socks.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water fog, foam, CO₂, dry chemical.

FIRST AID: **Eyes**, flush with water for 15 minutes. Get medical attention if irritation develops. **Inhalation**, remove to fresh air. Get medical attention if breathing difficulty occurs. **Ingestion**, do NOT induce vomiting. If conscious, administer activated charcoal (6-8 heaping teaspoons) with large quantity of water. Get immediate medical attention. EMERGENCY TELEPHONE: 517-636-4400 (DowElanco).

Brodal* — see Diflufenican.

Brodan* — see Chlorpyrifos.

Brodifacoum

BP: ZENECA Agrochemicals (Lim-N8*, Ropax*, WeatherBlok*)

ZENECA Professional Products (Talon*, WeatherBlok*)

ZENECA Public Health (Klerat*, Matikus*, Ratak* Plus, Volid*)

Identification

COMMON NAME: Brodifacoum (ISO, BSI).

EXP. CODE NUMBERS: PP581 (ICI), WBA8119 (Ward Bienkingsop).

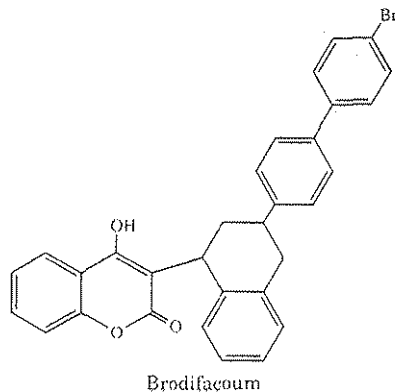
OTHER CODE NUMBERS: CAS 56073-10-0; SHA 112701.

ADDITIONAL TRADE NAMES: Havoc* (Pitman-Moore); Nofar* (VAPCO); Talon* (ZENECA Professional Products).

Chemistry

COMPOSITION: 3-[3-(4'-bromo[1-1'-biphenyl]-4-yl)-1,2,3,4-tetrahydro-1-naphthalenyl]-4-hydroxy-2H-1-benzopyran-2-one (CAS).

PROPERTIES: Off-white powder. Stable as a solid under normal storage conditions. Soluble in chloroform. Moderately soluble in benzene, acetone, and ethanol. Insoluble in petroleum ether.



Action/Use

ACTION: Anticoagulant rodenticide.

USE: For rodents, including strains resistant to conventional anticoagulants. Single feeding causes rodent death.

FORMULATIONS: Ready-to-use grain-base bait in pellets, mini pellets and wax blocks.

Registration Notes

U.S.: For Norway rats, roof rats, house mice (including warfarin resistant strains) in public, industrial, commercial buildings; residential and urban indoor/outdoor use by professional pest control personnel. Commercial rodent control in and around farm buildings. Talon* for professional operators.

OUTSIDE U.S.: In many other countries for agricultural and urban rodent control.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 0.27 mg/kg. Dermal: dust non-irritating in Vermac tests.

HANDLING AND STORAGE CAUTIONS: Keep away from children, domestic animals, wildlife, food, feed or water supplies. Wash hands after handling bait. Avoid all contact by mouth. After treatment, remove and bury rodent bodies and uneaten bait. Keep container closed to maintain bait freshness. Do not re-use empty container.

Emergency Guidelines

ANTIDOTE: Vitamin K₁.

Brofene* Insecticide (bromophos) — Discontinued by Shell Agrar GmbH & Co. KG.

Brogdex 594-F — see Thiabendazole.

Brogdex 597-F — see Thiabendazole.

Brogdex 598-F — see Thiabendazole.

Bromacil

BP: Du Pont Agricultural Products (Hyvar*)

HELM AG

Makhteshim-Agan (Uragan*)

Identification

COMMON NAME: Bromacil (BSI, ISO, ANSI, WSSA, JMAF).

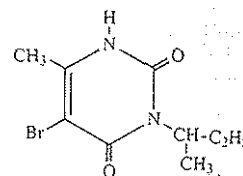
CODE NUMBERS: CAS 314-40-9; SHA 012301.

DISCONTINUED NAMES: Borea*, Bromax*, Urox* B, Urox* HX (HACO, Inc.); Steriweed* (+ dalapon + 2,4-D) (ICI Australia Ltd.); Uradex* (+ diuron), Cynogan* (Makhteshim-Agan); Hibor* C (+ sodium chlorate + sodium metaborate) (Occidental Chemical); Chlorvar* (+ sodium chlorate + sodium metaborate), Weed Broom* (+ 2,4-D + DSMA) (Rhône-Poulenc Ag Co.); Borocil* IV (+ sodium metaborate) (J.R. Simplot).

Chemistry

COMPOSITION: 5-Bromo-3-sec-butyl-6-methyluracil (IUPAC).

PROPERTIES: Crystalline solid, melting point 158-159° C. Moderately soluble in acetone, strong aqueous bases, acetonitrile, and ethyl alcohol; sparingly in hydrocarbons.



Action/Use

ACTION: Herbicide.

USE: General weed, brush control in noncrop areas. Especially for perennial grasses. Selective weed control in pineapple, citrus.

FORMULATIONS: Granular, liquid, water soluble liquid, wettable powder.

COMBINATIONS: Dakar* (+ diuron + terbutryn) (Aragonesas Agro, S.A.); Krovar* (+ diuron) (Du Pont); BareSpot* Ureabor (+ sodium metaborate) (J.R. Simplot).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 28 ppm (rainbow trout); 71 ppm (bluegill). Bee:

Nontoxic.

SOIL PARTICLE ADSORPTION: Bromacil can seep or leach through soil and can enter groundwater which may be used as drinking water. Correct use rates by geographical area and proper mixing-loading site precautions and procedures must be followed to minimize potential bromacil movement into groundwater. See label.

SOLUBILITY: In water. 815 ppm at 25°C.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

SIGNAL WORD: WARNING (Liquid); CAUTION (Dry).
 TOXICITY CLASS: II (Liquid); III (Dry).
 TOXICITY: (Rat): Oral LD₅₀ 5200 mg/kg.
 PROTECTIVE CLOTHING: Use good sanitary practices.
 HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place. Causes eye irritation. May irritate nose, throat, and skin. Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Wash thoroughly after handling. Keep away from heat and open flame.

Emergency Guidelines

FLASHPOINT: Combustible.
 FIRST AID: Symptomatic treatment. Eyes, Skin, flush with plenty of water and get medical aid.
 EMERGENCY NUMBER: 800-441-3637 (Du Pont).

Bromadiolone

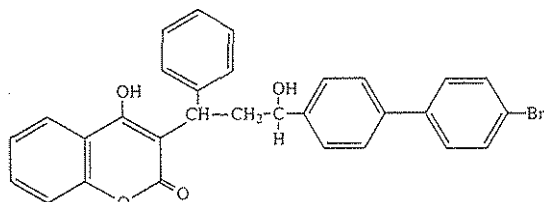
BP: Cequisa (Cekurat*)
 Lipha S.A. (Maki*, SuperCaid*)
 LiphaTech, Inc. (Boot Hill*, Maki*)
 Motomco Ltd. (Hawk*)
 Point Enterprise S.A. (Bromapoint*)
 Sanex Inc. (Bromone*)

Identification

COMMON NAMES: Bromadiolone (ISO, BSI); broprodifacoum (South Africa).
 CODE NUMBERS: CAS 28772-56-7; SHA 112001.
 ADDITIONAL TRADE NAMES: Lafar* (VAPCO); Canadien 2000*, Contrac*, Sup'operats*, Temus*.
 DISCONTINUED NAME: Ratimus* (Tamogan).

Chemistry

COMPOSITION: 3-[3-(4'-Bromo[1,1'-biphenyl]-4-yl)-3-hydroxy-1-phenylpropyl]-4-hydroxy-2H-1-benzopyran-2-one (CAS).
 PROPERTIES: Tech: White odorless powder. Pure: Melting point 200-210°. Solubility of Tech: In acetone, 22.30 g/l; hexane, 0.20 g/l.



Bromadiolone

Action/Use

ACTION: Anticoagulant rodenticide.
 USE: Concentrates used in preparation of rodent baits. Maki* and Hawke* for house mice, roof rats, Norway rats (including warfarin resistant strains).

FORMULATIONS: Concentrates, meal baits, paraffin blocks, pellets.

Registration Notes

U.S.: Classified as General Use Pesticide.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 1.4 mg/l (96 h) (rainbow trout).
 SOLUBILITY: Tech: In water, 0.019 g/l.

Safety Guidelines

SIGNAL WORD: CAUTION (all formulations).
 TOXICITY CLASS: III.
 TOXICITY: Pure (Rat): Oral LD₅₀ 0.56-0.84 mg/kg. 0.005% Formulation (Rat): Oral LD₅₀ 11.0-17.0 g/kg.
 HANDLING AND STORAGE CAUTIONS: Consult label for cautions specific to product being used and for protective clothing for concentrate >1%. Protect from extreme temperatures.

Emergency Guidelines

ANTIDOTE: Vitamin K₃. Consult physician.

Bromapoint* — see Bromadiolone.

Bromax* — see Bromacil.

Bromazil* Fungicide (imazalil) — Discontinued by Brogdex Corp.

Bromchiophos — see Naled.

Bromethalin

BP: Roussel Uclaf Corp. (Vengeance*)

Identification

COMMON NAMES: Bromethalin (ISO-E, ANSI, BSI), brométhaline (ISO-F).
 CODE NUMBERS: CAS 63333-35-7; SHA 112802; OMS-3020 (WHO).
 DISCONTINUED NAME: Gold Crest Vengeance*.

Chemistry

COMPOSITION: N-Methyl-2,4-dinitro-N-(2,4,6-tribromophenyl)-6-(tri-

fluoromethyl)benzenamine (CAS).

FAMILY: Diphenylamine.

PROPERTIES: Free flowing meal with slight yellow color. No noticeable odor.

Action/Use

ACTION: Rodenticide

FORMULATIONS: Pellets packaged in bulk and bait packs.

Environmental Guidelines

SOLUBILITY: Not water soluble.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): LD₅₀ 201 mg/kg. Inhalation LC₅₀ 0.685 mg/l (1 hr).

HANDLING AND STORAGE CAUTIONS: Store in dry place. May be harmful if swallowed. Keep away from children, wildlife, domestic animals, and pets. Avoid eye and skin contact. Wash skin and clothing after handling.

Emergency Guidelines

FIRST AID: Treat with standard anticonvulsant therapy. Eyes, Skin, flush with water. Ingestion, drink 1-2 glasses of water and induce vomiting. Call a physician or local poison control center. Vengeance* is not an anticoagulant type of rodenticide.

Brométhaline — see Bromethalin.

Bromex* Insecticide/Acaricide (naled) — Discontinued by Makhateshim-Agan.

Brominal* Herbicide (bromoxynil) — Discontinued by Rhone-Poulenc Ag Co.

Brominal Plus* — see MCPA.

3+3 Brominal* — see Bromoxynil.

Brominex* — see Bromoxynil.

Bromobutide — see Sumiherb*

Bromocoop* — see Chloropicrin; Methyl Bromide.

Bromocyclen — see Bromodan*.

Bromocyclene — see Bromodan*.

Bromodan*

(Discontinued 1988 by Hoechst AG).

Identification

COMMON NAMES: Bromocyclen (ISO), bromocyclene (France).

DISCONTINUED NAME: Alugan* (Hoechst AG).

Chemistry

COMPOSITION: 5-(Bromomethyl)-1,2,3,4,7,7-hexachloro-2-norbornene

Action/Use

ACTION: Insecticide.

Bromodane* Defoliant — Discontinued 1978 by C & B Development

Bromoethane — see Methyl Bromide.

Bromofenoxim — see Faneron*.

Bromofume* (ethylene dibromide) — Discontinued.

Brom-O-Gas* — see Chloropicrin; Methyl Bromide; Terr-O-Gas*.

Brom-O-Sol* — see Chloropicrin; Methyl Bromide; Terr-O-Gas*.

Bromomethane — see Methyl Bromide.

Bromone — see Bromadiolone.

Bromophénoxime — see Faneron*.

Bromophos**Identification**

COMMON NAME: Bromophos (BSI, ISO, ESA).

EXP. CODE NUMBERS: Cela S-1942 (Celamerck GmbH).

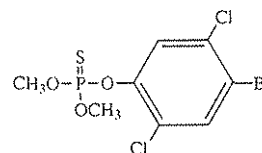
OTHER CODE NUMBERS: CAS 2104-96-3; SHA 008706; ENT 27162; OMS 658.

DISCONTINUED NAMES: Brofene*; Nexion* (Shell Agrar GmbH & Co. KG).

Chemistry

COMPOSITION: O-(4-Bromo-2,5-dichlorophenyl)-O,O-dimethylphosphorothioate (CAS).

PROPERTIES: Soluble in most organic solvents.



Bromophos

Action/Use

ACTION: Insecticide.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.05-0.5 mg/l (rainbow trout). Bee: Toxic.

SOLUBILITY: In water 40 ppm.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3750-8000 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine sulfate.

Bromophos-Ethyl

Identification

COMMON NAME: Bromophos-ethyl (BSI, ISO, ESA).

INP. CODE NUMBERS: Cela S-2225 (Celamerck GmbH).

OTHER CODE NUMBERS: CAS 4824-78-6; SHA 214500; ENT

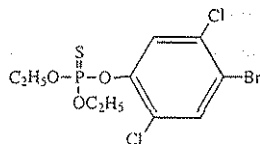
27258; OMS 659; EINECS 225-399-0.

DISCONTINUED NAMES: Filariol* (Celamerck GmbH); Nexagan* (Shell Agrar GmbH & Co. KG).

Chemistry

COMPOSITION: O-(4-Bromo-2,5-dichlorophenyl) O, O-diethylphosphorothioate.

PROPERTIES: Soluble in all organic solvents.



Bromophos-ethyl

Action/Use

ACTION: Acaricide, insecticide, larvicide.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 52-127 mg/kg. (Mouse): Oral LD₅₀ 210-550 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine in combination with Toxogonin or PAM.

Bromopropylate* — see Acarol*.

Bromosan-F — see Thiophanate; Thiram.

Brom-O-Sol* — see Chloropicrin; Methyl Bromide.

Bromoterb* — see Bromoxynil; Terbutylazine.

Bromotril* — see Bromoxynil.

Bromotril-T* — see Bromoxynil; Terbutylazine.

Bromoxynil

BP: CFPI (Emblem*, Koril*, Korilene*, Merit*, Sabre*)
Makhteshim-Agan (Bromotril*)
Rhône-Poulenc Ag Co. (Combine*, Pardner*)
Sanachem (Pty) Ltd. (Sanoxynil*)

Identification

COMMON NAMES: Bromoxynil (ANSI, BSI, ISO, WSSA). Bromoxynil octanoate, octanoic acid ester of bromoxynil, bromoxynil heptanoate, heptanoic acid ester of bromoxynil.

CODE NUMBERS: (Phenol): CAS 1689-84-5; SHA 035301. (Octanoate): CAS 1689-99-2.

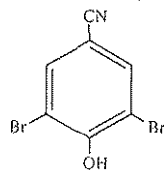
ADDITIONAL TRADE NAME: Brominex* (Jewin-Joffe Industry Ltd.).

DISCONTINUED NAMES: Tetroxone* M (+ ioxynil + dichlorprop + MCPA) (ICI Agrochemicals); Brominal*, Chipco* Bucril*, Harness* (+ MCPA + mecoprop) (all Rhône-Poulenc); ME4 Brominal* (Union Carbide Corp.); Chipco* Crab Kleen* (+ DSMA) (Vineland Chemical); Torch*.

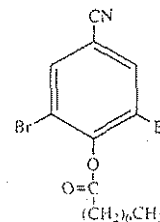
Chemistry

COMPOSITION: (Phenol): 3,5-Dibromo-4-hydroxybenzonitrile. (Octanoate) 2,6-dibromo-4-cyanophenyl octanoate.

PROPERTIES: (Phenol): White odorless solid, melting point 194-195°C. (Octanoate): Clear, amber colored liquid, characteristic odor. Vapor pressure 0.1 mm/Hg (20°C); melting point 45-46°C. Readily hydrolyzed to bromoxynil at pH>9. Solubility: (Pure, 25°C): in acetone 170 g/l, methanol 90 g/l. (Octanoate): (20-25°C): In acetone, ethanol 100 g/l, benzene, xylene 70 g/l, chloroform, dichloromethane 800 g/l, cyclohexanone 550 g/l.



Bromoxynil as phenol



Bromoxynil Octanoate

Action/Use

ACTION: Selective contact herbicide with some systemic activity for postemergence control of annual broadleaved weeds.

USE: For mint, barley, flax, forage grasses and alfalfa on Conservation Reserve Acres, seedling alfalfa, field corn, popcorn, garlic, grass for sod and seed protection, oats, onions, rye, sorghum, triticale, wheat. Postemergence control of common cocklebur, common ragweed; seedling broadleaf weeds such as blue (purple) mustard, corn groundwell, cowcockle, fiddleneck, field pennycress, green smartweed, groundsel, jimsonweed, lambsquarters, London rocket, nightshade, shepherds-purse, tartary buckwheat, tarweed, tumble mustard, velvetleaf, volunteer sunflower, wild buckwheat, and wild mustard.

FORMULATIONS: Water soluble packs (Bucril* Gel).

COMBINATIONS: Extoll* (+ bentazone) (BASF AG); 2,5 Certrol* Bromoxynil MCPA Broadleaf Herbicide (+ MCPA) (CFPI); Briotril* (+ ioxynil), Bromoterb* and Bromotril-T* (+ terbutylazine) (Makhteshim-Agan); Actril S* (+ ioxynil + dichlorprop + MCPA), Axall* and Brittox* and Maytril* (+ ioxynil + MCPP esters), Bucril D* (+ MCPA + dicamba), Bucril* M (+ MCPA esters), Bronate*, Doublet*, Tromb*, Twin-Tak* (+ isoproturon + ioxynil), Oxytril CM* (+ ioxynil esters), Oxytril M* (+ ioxynil + mecoprop), Terset* (+ isoproturon + ioxynil + mecoprop), Trio* (+ 2,4-D + propanil), (all Rhône-Poulenc Ag Co.); Duogran* (+ pyridate); Farmco Sure-Shot* (+ MCPA + dicamba); Nortron* Leyclene (+ ethofumesate + ioxynil).

Registration Notes

U.S.: EUP pending for use of Bucril* on BXN bromoxynil-resistant cotton varieties.

OUTSIDE U.S.: Bucril* M in Canada. Axall* in New Zealand. Brittox* in Ireland. Maytril* in Ethiopia and Kenya. Duogran*.

Environmental Guidelines

HAZARDS: (Pure): Fish: LC₅₀ 0.05 mg/l (rainbow trout). Bee: Nontoxic.

SOLUBILITY: (Pure, 25°C): In water 130 mg/l. Octanoate: Virtually insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING (U.S. only).

TOXICITY CLASS: II (U.S. only).

TOXICITY: Tech (Rat): Oral LD₅₀ 260 mg/kg; Dermal >2000 mg/kg.

Bromoxynil octanoate: (Rat): Oral LD₅₀ 365 mg/kg; Dermal >2000 mg/kg.

Bucril* (Rat): Oral LD₅₀ 779 mg/kg.

Bronate* (Rat): Oral LD₅₀ 691 mg/kg.

Certrol*: (Rat): Oral LD₅₀ 423 mg/kg. Inhalation LC₅₀ 8.8 mg/l (4 h).

(Rabbit): Dermal LD₅₀ >2000 mg/kg. Moderate eye, slight skin irritation.

PROTECTIVE CLOTHING: Wear rubber gloves and double-layer protective clothing when handling concentrate.

HANDLING AND STORAGE CAUTIONS: Handle carefully. Avoid contact with fish and wildlife. Do not use or store near heat or open flame. Store at temperatures above 3° F. If allowed to freeze, remix before using. Do not contaminate water, food, or feed by storage or disposal of this chemical.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Carbon dioxide or dry chemical for small fires. Water spray or alcohol-type foam for large fires.

FIRST AID: Get medical aid. Eyes, hold lids open and flush with a steady, gentle stream of water for at least 15 minutes. Skin, immediately wash with plenty of soap and water, if available, while removing contaminated clothing and shoes. Ingestion, induce vomiting unless aromatic solvent present. Inhalation, remove to fresh air. Give artificial respiration or administer oxygen if needed.

See BXN Cotton Varieties.

Bromoxynil Octanoate — see Bromoxynil.

Brompyrazon

Identification

COMMON NAMES: Brompyrazon (ISO-E, BSI); brompyrazone (earlier BSD).

CODE NUMBERS: CAS 3042-84-0; SHA 208200.

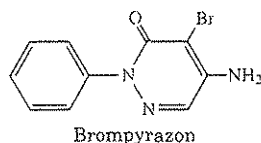
Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: 5-Amino-4-bromo-2-phenylpyridazin-3-one.



Action/Use

ACTION: Herbicide.

Brompyrazone — see Brompyrazone.**Bromsalans** — see Diaphene®.**Bronate*** — see Bromoxynil; MCPA.**Bronco***

BP: Monsanto Co., The Agricultural Group (Bronco®)

Chemistry

COMPOSITION: Alachlor + isopropylamine salt of glyphosate.

Action/Use

ACTION: Herbicide.

USE: Preemergence, postemergence control of many annual grasses, broadleaf weeds in soybeans and corn grown under no-till or other minimum tillage practices.

FORMULATIONS: Suspension emulsion.

Registration Notes

U.S.: Classified as RUP.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

PROTECTIVE CLOTHING: Goggles or face shield, rubber gloves, long trousers, long sleeved shirt or jacket of tightly woven material along with boots high enough to cover ankles when transferring and mixing, or adjusting, repairing or cleaning equipment. Wear rubber boots when pouring from open containers. Clothing which comes in contact with Bronco* must be washed before reuse. Clothing or other materials which become drenched with the concentrated pesticide must be disposed of in a sanitary landfill, by incineration or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

HANDLING AND STORAGE CAUTIONS: Store above 40° F to keep product in solution. Do not contaminate water, foodstuffs, seed, or feed by storage or disposal. Open dumping is prohibited.

Emergency Guidelines

FLASHPOINT: 105°F (tag closed cup).

FIRE EXTINGUISHING MEDIA: Water spray, foam, dry chemical, CO₂, or other Class B extinguishing agent.FIRST AID: Get medical aid. **Eyes**, flush with plenty of water for at least 15 minutes. **Skin**, wash with plenty of water and remove contaminated clothing. Sensitized persons should avoid further contact and reuse of contaminated clothing.

EMERGENCY TELEPHONE: 314-694-4000 (Monsanto Co.).

Broncot* — see Bronopol.**Bronopol**

F: Schering Agrochemicals Ltd., Subsidiary of Schering AG (Bronotak®)

Identification

COMMON NAME: Bronopol.

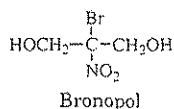
CODE NUMBERS: CAS 52-51-7; SHA 216400.

ADDITIONAL TRADE NAME: Broncot*.

Chemistry

COMPOSITION: 2-Bromo-2-nitropropan-1,3-diol.

PROPERTIES: Colorless to pale brownish yellow, odorless crystalline solid. Melting point approx. 130° C.



Action/Use

ACTION: Bactericide, bacteriostat.

USE: For *Xanthomonas campestris* pv malvacearum. Seed treatment to cotton for bacterial blight, blackarm disease.

FORMULATIONS: Powder for dry application.

Registration Notes

U.S.: Not available. Soluble powder (80%) experimental.

Environmental Guidelines

SOLUBILITY: In water at 22° C, 25% w/v.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 180-400 mg/kg. Dermal LD₅₀ >1600 mg/kg.**Bronotak*** — see Bronopol.**Bronox* Herbicide** (trietazine + linuron) — Discontinued 1992 by Schering AG.**Broot*** — see Trimethacarb.**Broxolon* Herbicide** (bromoxynil + mecoprop) — Discontinued 1985 by Farm Protection, Ltd.**Brozone* Herbicide/Insecticide** (methyl bromide + chlorpyrifin) — Discontinued by Dow.**Brush Bullet* Herbicide** (tebuthiuron) — Discontinued by Elanco Products Co.**Brush Control**

Control of woody plants such as brambles, sprout clumps, shrubs, trees, and vines.

Brush Killer* Herbicide (2,4,5-T) — Discontinued by TH Agricultural & Nutrition.**Brush Killer 2D + 2DP*** — see 2,4-D; Dichlorprop.**Brush-Off*** — see Metsulfuron methyl.**Brush-Rhap* Herbicide** (2,4-D + 2,4,5-T) — Discontinued by Vertac Chemical.**Brushtox* Herbicide** (2,4,5-T) — Discontinued by Union Carbide, Australia.**B.S. 500***

BP: Drexel Chemical Co. (B.S. 500®)

Chemistry

COMPOSITION: Ammonium salts of polyacrylic + hydroxycarboxylic + phosphoric acid.

PROPERTIES: Clear liquid, mild odor.

Action/Use

ACTION: Water conditioner.

USE: Add to poor quality water to enhance herbicide performance by correcting elements such as pH and hard water cations.

FORMULATION: Liquid.

Environmental Guidelines

SOLUBILITY: Very soluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

BSI

Designates the British Standards Institution.

See Common Name.

BSP Lime-Sulfur Solution* — see Lime Sulfur.**BSZ*** — see Zinc Sulfate, Basic.**BT (butrizol)** — Discontinued by Rohm and Haas Co.**BT 320 Sulfur 25 Dust** — see *Bacillus thuringiensis* var. *kurstaki*; Sulfur.**BT 320 Sulfur 50 Dust** — see *Bacillus thuringiensis* var. *kurstaki*; Bentonite; Sulfur.**BTC** — see Benzalkonium Chloride.**BTS 27419** — see Amitraz.**BTS 40542** — see Prochloraz.**Buban 37***

(Discontinued by Buckman Laboratories, Inc.)

Chemistry

COMPOSITION: 3',5'-Dinitro-4'-(di n-propylamino)acetophenone.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat) Oral LD₅₀ 825 mg/kg (male); 750 mg/kg (female).**Bubblegon*** — see Foam Suppressant.**Bucarpolate***

(Discontinued by Bush Boake Allen, Inc.)

Chemistry

COMPOSITION: 2-(2-Butoxyethoxy) ethyl piperonylate.

Action/Use

ACTION: Pyrethrum synergist.

Bucket Pump

The simplest hydraulic sprayer is the bucket pump. It is a plunger attached by a clamp or otherwise for use in an open pail and delivering the liquid through a spray nozzle at the end of a hose.

Buckle* — see Far-Go®; Trifluralin.**Bucril*** — see Atrazine; Bromoxynil.**Bud Nip* Herbicide/Plant Growth Regulator** (chlorpropham) — Discontinued by Chevron Chemical Co.**Bueno* 6** — see MSMA.Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Bufencarb — see Bux*.

Bufencarbe — see Bux*.

Buffer

Action/Use

ACTION: Increases efficiency of pH sensitive agricultural chemicals; reduces pH in aqueous systems.

USE: For highly alkaline water.

Buffer P.S.*

BP: Helena Chemical Co. (Buffer P.S.*, Buffer Xtra Strength*)

Chemistry

COMPOSITION: Alkyl aryl polyethoxy ethanol phosphates + organic phosphoric acids.

Action/Use

ACTION: Spreader-buffering agent, conditioning agent (Buffer Xtra Strength*).

USE: To adjust the pH of alkaline waters and minimize hydrolysis of those pesticides which tend to decompose in alkaline spray solutions, and affect the wetting and spreading characteristics of a spray solution.

Safety Guidelines

TOXICITY: Nontoxic.

Buffer Xtra Strength* — see Buffer P.S.*.

Buffercide*

BP: Custom Chemicides (Buffercide*)

Chemistry

COMPOSITION: Phosphoric acid. 10% a.i. as buffer.

Action/Use

ACTION: Acidifying/buffering agent.

USE: Lowers pH of spray solution, aids in preventing decomposition of alkaline sensitive insecticides due to hydrolyzation.

FORMULATION: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Keep away from children.

Avoid skin, eye contact.

Bufferplus*

BP: Custom Chemicides (Buffer-Plus*)

Chemistry

COMPOSITION: Alkylaryl polyoxyethylene glycols + isopropanol, and phosphoric acid. 40% a.i. + nonionic surfactant + 8% a.i. as buffer.

PROPERTIES: Non-foaming.

Action/Use

ACTION: Adjuvant; spreader-activator; buffer.

USE: For wetting, pH adjustment and as an anti-foaming agent with miticides; insecticides; fungicides; herbicides; defoliant. Contains phosphates, improving plant response to foliar micronutrients.

Buffer-X*

BP: Kalo, Inc. (Buffer-X)*
Proficol El Carmen S.A.

Chemistry

COMPOSITION: Principal function agents: alkylaryl polyethoxy ethanol + free and combined fatty acids + glycolethers, di-alkyl benzenedicarboxylate + isopropanol.

PROPERTIES: Anionic-nonionic, water miscible.

Action/Use

ACTION: Adjuvant. Spreader-activator; buffer.

USE: Reduces pH in aqueous systems. As a buffer in highly alkaline water.

FORMULATION: Liquid.

Environmental Guidelines

SOLUBILITY: Complete in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Avoid prolonged contact with skin.

Emergency Guidelines

FIRST AID: Eyes, immediately flush with water.

Bug Gum*

Discontinued 1985 by Flora & Fauna Labs)

Action/Use

ACTION: Insect mastic barrier, rodent repellent.

Bug Master* — see Carbaryl.

Bug Time* Insecticide (*Bacillus thuringiensis* var. *kurstaki*)

— Discontinued 1984 by Biochem Products.

Bugle* — see Fenoxaprop-P-ethyl.

Bulan* — see Dilan*.

Bulbosan*

Chemistry

COMPOSITION: 1,3,5-Trichloro-2,4,6-trinitrobenzene (Germany).

Action/Use

ACTION: Fungicide.

Bulldock* — see Beta-cyfluthrin.

Bullet*

BP: Monsanto Co., The Agricultural Group (Bullet*)

Chemistry

COMPOSITION: Alachlor + atrazine.

Action/Use

ACTION: Selective herbicide.

USE: Early preplant, preplant incorporated, preemergence in corn.

FORMULATIONS: Microencapsulated liquid.

Registration Notes

U.S.: RUP.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOIL PARTICLE ADSORPTION: Possible leaching, especially where soils are coarse and ground water is near the surface.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 8900 mg/kg. (Rabbit): Dermal: >5000 mg/kg; Slight eye, skin irritant.

PROTECTIVE CLOTHING: Long sleeved shirt, long pants, chemical resistant gloves, socks, chemical resistant footwear and protective eyewear. Discard, and do not reuse clothing and other absorbent materials that have been drenched or heavily contaminated with product concentrate.

Buminafos

BP: CHEMIE AG Bitterfeld-Wolfen (Trakephon*)

Identification

COMMON NAME: Buminafos (ISO, BSD).

CODE NUMBER: CAS 51249-05-9.

Chemistry

COMPOSITION: 1-butylaminocyclohexane phosphonic acid dibutyl ester; dibutyl 1-butylaminocyclohexyl phosphonate.

PROPERTIES: Yellowish-to-yellowish brown liquid.

Action/Use

ACTION: Herbicide; Desiccant (Siccant).

USE: Preemergence control of annual grasses. Postemergence to coniferous seedlings grown under plastic, cleaning and shot removal in hops, and defoliation of potatoes. For desiccation of leguminosae and placentas of special cultures, and for killing onion stalks.

FORMULATION: Emulsion concentrate.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 7 mg/l (96 h) (guppy). Bee: Nontoxic.

SOLUBILITY: Emulsifiable in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 5000 mg/kg. Dermal LD₅₀ 12,000-15,000 mg/kg.

PROTECTIVE CLOTHING: Wear protective clothing and goggles.

Emergency Guidelines

ANTIDOTE: Atropine, followed by a cholinesterase activator where appropriate (obidoxime, pralidoxime). Do NOT administer castor oil, milk, butter, eggs or alcohol.

Bumper* — see Propiconazole.

Bunema*

(Discontinued 1984 by Buckman Laboratories, Inc.)

Chemistry

COMPOSITION: Potassium N-hydroxymethyl-N-methyl-dithiocarbamate.

Action/Use

ACTION: Bactericide, fungicide, nematocide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1032 mg/kg (male); 590 mg/kg (female).

Bupirimate — see Nimrod*.

Buprofezin — see Applaud*.

Buprofézine — see Applaud*.

Burgundy Mixture

Chemistry

PROPERTIES: Similar to Bordeaux mixture but washing soda (sodium carbonate decahydrate) replaces lime.

Action/Use

ACTION: Fungicide.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Burtolin* — see Maleic Hydraside.

Busan 30A* — see TCMTB.

Busan 72A* Fungicide (TCMTB) — Discontinued by Buckman Laboratories, Inc.

Busan 1020* — see Metam-sodium.

Buster* — see Glufosinate-ammonium.

Butacarb

(Discontinued by Boots Co. Ltd.)

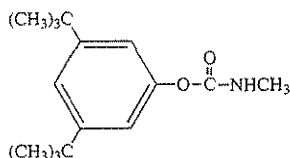
Identification

COMMON NAME: Butacarb (BSI, ISO-E), butacarbe (ISO-F).

CODE NUMBERS: CAS 2655-19-8; SHA 291300.

Chemistry

COMPOSITION: 3,5-Di-t-butylphenyl N-methylcarbamate.



Butacarb

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >4000 mg/kg.

Butacarbe — see Butacarb.

Butachlor

BP: Comlets Chemical Industrial Co., Ltd.

Crystal Chemical Inter-America (Butanox*)

HELM AG

Hindustan Insecticides Ltd. (Hiltaklor*)

Hubei Sanonda Co., Ltd. (Farmachlor*)

Krishi Rasayan (Rasayanchlor*)

Makhteshim-Agan (Butanex*)

Monsanto Co., The Agricultural Group (Machete*)

Pilarquim Corp. (Pilarsete*)

Rallis India Ltd. (Teer*)

Shen Hong Chemical Corp.

Shnung Corp.

Sudarshan Chemical Industries Ltd. (Widkil*)

Sundat (S) Pte. Ltd.

Identification

COMMON NAME: Butachlor (ISO, ANSI, BSI, JMAF, WSSA).

EXP. CODE NUMBER: CP 53619 (Monsanto).

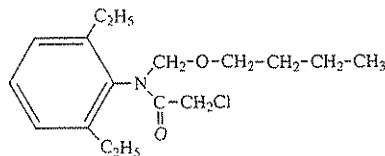
OTHER CODE NUMBERS: CAS 23184-66-9; SHA 112301.

ADDITIONAL TRADE NAMES: Aimchlor* (All India Medical Corp.); MACH-MACH* (Bharat Pulverising Mills Ltd.); Nirmul* (Lupin Agrochemicals (I) Ltd.); Lambast* (Planters Products); Weedout* (Sulphur Mills Ltd.).

Chemistry

COMPOSITION: N-(butoxymethyl)-2-chloro-2',6'-diethyl-acetanilide.

PROPERTIES: Amber-colored liquid. Density: 1.070 g/ml at 25°C.



Butachlor

Action/Use

ACTION: Selective herbicide.

USE: Preemergence control of most annual grasses, certain broadleaf weeds in seeded and transplanted rice grown in certain Asian, South American, European, and African countries.

FORMULATIONS: Emulsifiable concentrate, granules.

COMBINATIONS: Kusakarín 25* GR and Kusakarín 35* GR (+ pyrazolynate) (Sankyo Co., Ltd.).

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

SOLUBILITY: Solubility in water 23 ppm at 24°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2000 mg/kg. (Rabbit): Dermal LD₅₀ 13,000 mg/kg. (Rat): Inhalation LC₅₀ (4h) >4.7 mg/kg.

PROTECTIVE CLOTHING: Rubber gloves, respirator, boots, long-sleeved shirt or jacket, long pants.

HANDLING AND STORAGE CAUTIONS: Avoid contact with mouth, skin or eyes, washing all parts with plenty of soap and water after handling. Keep away from children. Store in cool, dry place away from feed and foodstuffs.

Emergency Guidelines

ANTIDOTE: None, due to minimum acute toxicity.

FIRST AID: Get medical attention. Eyes, Skin, flush with water. Ingestion, induce vomiting as directed by medical personnel.

Butacume* — see Piperonyl Butoxide.

Butafume* Fungicide (2-aminobutane) — Discontinued by BASF AG.

Butanex* — see Butachlor.

Butanox* — see Butachlor.

Buthidazole — see Ravage*.

Butifos — see DEF 6*.

Butilate — see Butylate.

Butilato Estrella*

(Discontinued by Quimica Estrella SAC)

Identification

COMMON NAME: Butylate + TI-35 antidote.

Chemistry

COMPOSITION: S-Ethyl diisobutylthiocarbamate + HEXIM/dichloroacetyl-hexamethyleneimide.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4000-4660 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

Butilichlorofos — see Butonate.

Butilglicolico* — see MCPA.

Butinox*

(Discontinued by M & T Chemicals)

Identification

OTHER NAME: Bio Met. TBTO*.

Chemistry

COMPOSITION: (tri-n-butyltin) oxide.

Action/Use

ACTION: Fungicide, preservative.

Butisan S*

BP: BASF AG (Butisan S*)

Identification

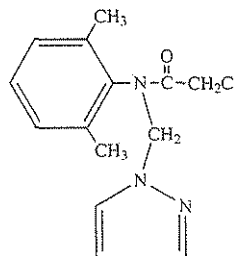
COMMON NAMES: Metazachlor (ISO-E, BSI); metazachlore (ISO-F).

CODE NUMBERS: CAS 67129-08-2; EINECS 266-583-0.

Chemistry

COMPOSITION: 2-chloro-N-(2,6-dimethylphenyl)-N-(1H-pyrazol-1-ylmethyl)acetamide (CAS).

PROPERTIES: Beige solid, melting point 85°C. Solubility: Tech at 20°C: acetone >43.5; ether 6.3g/100g.



Metazachlor

Action/Use

ACTION: Herbicide.

USE: Preemergence, early postemergence control of annual grasses, broadleaf weeds and suppression of yellow nutgrass in potatoes, rape seed, soybeans, tobacco, transplanted cabbage, leeks, celery, chives, sugarcane, turnips; with safener in corn.

FORMULATIONS: Suspension concentrate.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

COMBINATIONS: Pree* (+ safener); Butisan Star* and Novall* (+ quinmerac) (BASF AG).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 4 mg/l (96/h) (trout). Bird: Oral LD₅₀ >2000 mg/kg body wt (bobwhite quail). Bee: Nontoxic.

DEGRADATION AND METABOLISM: Half-life of 1-23 days (laboratory soils); 3-9 days (field soils); 4-5 weeks (water/sediment). Lysimeter studies clearly show that metazachlor does not leach.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2150 mg/kg. Dermal: LD₅₀ >6810 mg/kg.

PROTECTIVE CLOTHING: Goggles, impermeable gloves and apron, protective clothing and boots when handling undiluted product.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, clothing. Store at 30°C in dry, well-ventilated, secure area out of reach of children and animals.

SPILL CONTROL/CLEANUP: Large liquid (Butisan S*) spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid (metazachlor) spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (e.g. suitable incineration), in accordance with local regulations.

Emergency Guidelines

FIRST AID: Get medical aid. Treat symptomatically. Ingestion, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC).

Butisan Star* — see Butisan S*; Quinmerac.

Butocarboxim

BP: Wacker-Chemie GmbH (Afilene*, Drawin 755*, Systemschutz D*)

Identification

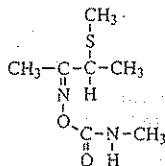
COMMON NAMES: Butocarboxim (ISO-E, BSD); butocarboxime (ISO-F).

CODE NUMBER: CAS 34681-23-7; EINECS 2521393.

Chemistry

COMPOSITION: 3-(methylthio)butanone O-methylcarbamoyloxime.

PROPERTIES: Crystalline white, melting point 32-37°C. Water ca. 3%, stable at pH 4-7. Soluble in most organic solvents.



Butocarboxim

Action/Use

ACTION: Systemic insecticide.

USE: For sucking insects, especially *Aleurotrixus floccosus* in citrus, *Bemisia tabaci* in cotton, aphids in vegetables, fruit trees, ornamentals in hydro culture.

FORMULATIONS: Emulsifiable concentrates.

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 38 mg/l (24 h) (rainbow trout); 56 mg/l (goldfish); 70 mg/l (guppy). Bee: Toxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 153-215 mg/kg. (Rabbit): Dermal LD₅₀ 360 mg/kg.

HANDLING AND STORAGE CAUTIONS: Slightly irritating to skin, moderately irritating to eyes. Keep out of the reach of children. Avoid contamination of food and feedstuffs.

Emergency Guidelines

ANTIDOTE: Atropine sulfate.

Butocarboxime — see Butocarboxim.

Butoflin* — see Deltamethrin.

Butonate

(Discontinued 1960s by Prentiss Drug & Chemical)

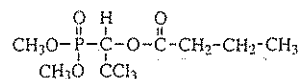
Identification

COMMON NAMES: Butonate (BSI, ISO), butilchlorofos (USSR).

CODE NUMBERS: CAS 126-22-7; SHA 035701; ENT-20852.

Chemistry

COMPOSITION: Dimethyl 1-butyryloxy-2,2,2-trichloroethylphosphonate.



Butonate

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1100-1600 mg/kg. Dermal LD₅₀ 7000 mg/kg.

Butopyronoxyl — see Indalone*.

Butox* — see Deltamethrin.

Butoxone* — see 2,4-DB.

Butoxycarboxim — see Plant Pin*.

Butoxycarboxime — see Plant Pin*.

Butralin

BP: CFPI (Amex*, Linamex*, Monamex*, Tabamex*, Tamex*)

Identification

COMMON NAMES: Butralin (ISO-E, BSI, ANSI, WSSA); butraline (ISO-F).

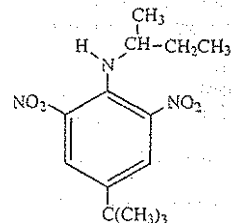
EXP. CODE NUMBER: A-820 (Amchem).

OTHER CODE NUMBER: CAS 33629-47-9.

Chemistry

COMPOSITION: 4-(1,1-dimethylethyl)-N-(1-methylpropyl)-2,6-dinitrobenzenamine (CAS).

PROPERTIES: Yellow-orange granular solid; melting point, 135-136°C. Soluble in alcohol, acetone, benzene, xylene.



Butralin

Action/Use

ACTION: Preemergent herbicide, plant growth regulator.

USE: Amex* for annual broadleaf weeds, grasses in beans, cotton, rice, soybeans, upland rice, young orchards. Leaves no persistent soil residue. Tamex* for sucker control of tobacco.

FORMULATIONS: Emulsifiable concentrate.

COMBINATIONS: Linamex* (+ linuron) for carrot, soybeans, sunflower. Monamex* (+ monolinuron) for beans.

Environmental Guidelines

SOLUBILITY: Practically insoluble in water (1 mg/l at 24°C).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 12,600 mg/kg; (Rabbit): Dermal LD₅₀ 10,200 mg/kg.

Butraline — see Butralin.

Butrizol — see Indar* (Registration Notes).

Butrolactone Solvent — see Dispersant.

Butter of Zinc — see Zinc Chloride.

Buturon — see Eptapur*.

Butylamine — see Deccotane*.

Butylate

BP: Chemol Trading Ltd. Co. (Anelda* Plus) ZENEGA Ag Products (Sutan*+)

Identification

COMMON NAMES: Butylate (ISO-E, BSI, WSSA); butilate (ISO-F).

CODE NUMBERS: CAS 2008-41-5; SHA 041405.

DISCONTINUED NAME: Genate* Plus (Valent).

Chemistry

COMPOSITION: S-Ethyl diisobutylthiocarbamate.

Chemicals are cross-referenced by common and trade name

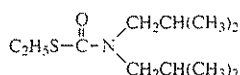
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Butylate Plus R-25788

PESTICIDE DICTIONARY

PROPERTIES: Clear amber-to-yellow liquid. Specific gravity 0.939-0.942 at 20°/20°C. Miscible with acetone, ethanol, kerosene, 4-methylpentan-2-one, xylene.



Butylate

Action/Use

ACTION: Selective herbicide.

USE: Incorporated preplant controls most grassy weeds, including nutgrass, in corn. Do not apply on milo or sorghum.

FORMULATIONS: Emulsifiable concentrate, granules.

COMBINATIONS: Aneldazin* (+ atrazine), Anelirox* (+ EPTC) (Chemol Trading Ltd. Co.); Sutazine* (+ atrazine) (ZENECA Ag Products); Rhino* (+ atrazine), Tomahawk* (+ atrazine).

Environmental Guidelines

HAZARDS: Fish: Toxic. LC₅₀ 5.2 mg/l (96 h) (rainbow trout). Bee: Non-toxic.

SOIL PARTICLE ADSORPTION: Breaks down in soil relatively soon so harmless to crops following corn.

SOLUBILITY: In water (20°C), 46 mg/l.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 3500-5431 mg/kg. (Rabbit): Dermal LD₅₀ >4640 mg/kg.

PROTECTIVE CLOTHING: Safety glasses, goggles, or faceshield; impervious gloves and apron.

Emergency Guidelines

FLASHPOINT: 240°F, 116°C (Tag CC).

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion,** drink one or two glasses of water and induce vomiting. **Inhalation,** remove to fresh air.

Butylate Plus R-25788 — see Butylate.

Butylate Plus T1-35 — see Butilato Estrella.

Butylchlorofos — see Butonate.

Butyrac* — see 2,4-DB.

Butyrolactone Solvent — see Dispersant; Wetting Agent.

Butyron* Herbicide (buturon) — Discontinued by BASF AG.

Bux*

(Discontinued 1984 by Chevron Chemical Co.)

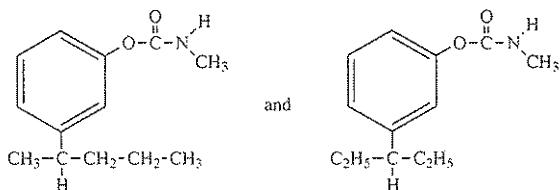
Identification

COMMON NAMES: Bufencarb (ANSI, ISO-E, BSI, ESA); bufencarbe (ISO-F)

EXP. CODE NUMBER: Ortho 5353 (Chevron Chemical).

OTHER CODE NUMBERS: CAS 2282-34-0; SHA 059302.

DISCONTINUED NAME: Metalkamate (abandoned common name).



Bufencarb

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 85-105 mg/kg. (Rabbit): Dermal LD₅₀ 680 mg/kg. Toxic to fish.

BW-21-Z* — see Permethrin.

BX-2 Coated Granules — see Fenthion.

BXN Cotton Varieties

Varieties of cotton developed by Stoneville Seed Co. that are not affected by bromoxynil herbicide when applied over-the-top to the emerged crop. The varieties encode an enzyme that degrades the active ingredient bromoxynil, thus making the crop plant more tolerant of that herbicide.

See Bromoxynil.

Byram* Herbicide — Discontinued by ICI Americas.

C 570 — see Phosphamidon.

C 709 — see Dicrotophos.

C 1414 — see Monocrotophos.

C 1983 — see Chloroxuron.

C 2242 — see Chlorotoluron.

C 2446 — see Thiocron*.

C 3126 — see Metobromuron.

C 3470 — see Lironion*.

C 6313 — see Maloran*.

C 6989 — see Preforan*.

C 7019 — see Mesoranil*.

C 8353 — see Elocron*.

C 8514 — see Chlordimeform.

C 8949 — see Chlorfenvinphos.

C 9122 — see Faneron*.

C 9491 — see Nuvanol* N.

C 10015 — see Saprecon C*.

C 18898 — see Avirosan*.

C 19490 — see Avirosan*.

Cab-O-Sil* — see Fumed Silica.

Cacodylate* — see Cacodylic Acid; Sodium Cacodylate.

Cacodylic Acid

BP: Luxembourg Industries (Pamol) Ltd.

Identification

COMMON NAME: Cacodylic acid.

CODE NUMBERS: CAS 75-60-5; SHA 012502.

ADDITIONAL TRADE NAME: Phytar* (Monterey Chemical).

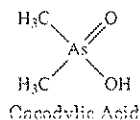
DISCONTINUED NAMES: Silvisar 510* (Ansul Co.); Bolate* and Bophy* (+ sodium cacodylic) (Cumberland International Corp.); Bolls-Eye*, Clean-Boll*, Ezy Pickin*, Kack*, Phytar 560* (all + sodium cacodylate), Broadside* (+ MSMA) (Drexel Chemical); Phytar 138* (Inter-Ag Corp.); Dilic* (Vertac); Dutch Treat*, Rad-E-Cate*25 (+ sodium cacodylate) (Vineland Chemical).

Chemistry

COMPOSITION: Hydroxydimethylarsine oxide or dimethylarsinic acid.

FAMILY: Organo-arsenical.

PROPERTIES: Forms water-soluble sodium and potassium salts.



Cacodylic Acid

Action/Use

ACTION: Nonselective herbicide; cotton defoliant; silvicide.

USE: Silvicide (tree killer) for forestry use.

FORMULATIONS: Concentrated solution.

COMBINATIONS: Cacodylate* (+ sodium cacodylate), Leaf-All* (+ sodium cacodylate), Herb-All* (+ monosodium methanearsonate + sodium cacodylate) (Luxembourg Industries (Pamol) Ltd.); Cotton Aide HC*, Montar* (+ sodium cacodylate), Moncide* (+ MSMA + sodium cacodylate) (Monterey Chemical).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2756 mg/kg.

PROTECTIVE CLOTHING: Rubber gloves, goggles or face shield; rubber apron.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. Harmful if swallowed. Avoid inhalation of spray mist. Avoid spray drift to desirable plants. Do not store near fertilizers, seeds, insecticides, fungicides.

Emergency Guidelines

FLASHPOINT: Nonflammable.

FIRST AID: Get medical aid. **Eyes, Skin,** flush with flowing water immediately and continuously for 15 minutes. **Inhalation,** materials non-volatile but if spray drift is inhaled, treat as ingestion. **Ingestion,** induce vomiting. May be treated as for general arsenic poisoning.

Caddy*

(Discontinued by W.A. Cleary Chemical Corp.)

Identification

COMMON NAME: Cadmium chloride.

CODE NUMBERS: CAS 10108-64-2; SHA 012902.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes**, immediately flush with plenty of water. **Ingestion**, give raw egg white. Induce vomiting with a mixture of salt, soap or mustard in warm water. Give teaspoon of salt in a glass or warm water and repeat until vomit fluid is clear. Then give 2 table-spoonsful Epsom salt or Milk of Magnesia in water along with plenty of milk or water. NOTE: Some physicians may discourage use of saline emesis.

Cadminate*

Discontinued by W.A. Cleary Chemical Corp.)

Identification

CODE NUMBERS: CAS 141-00-4; SHA 012904.

Chemistry

COMPOSITION: Cadmium succinate (metallic basis).

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 600 mg/kg. (Rabbit): Dermal >200 mg/kg.

Cadmium Calcium Copper Zinc Chromate Complex**Identification**

CODE NUMBERS: CAS 12001-20-6; SHA 021006.

ADDITIONAL TRADE NAMES: Crag Turf Fungicide 531* (Union Carbide Corp.).

DISCONTINUED NAMES: Miller 531* (Miller Chemical & Fertilizer Corp.).

Chemistry

COMPOSITION: Approx. 6CdO, 10CaO, 25CuO, 10ZnO, 25SO₃.

10CrO₃, 170H₂O.

Action/Use

ACTION: Turf fungicide.

Cadmium Chloride — see Caddy*.

Cadmium Sebacate — see Kromad*.

Cadmium Succinate — see Cadminate*.

Cadmium Sulfate**Identification**

CODE NUMBERS: CAS 10124-36-4; SHA 012905.

Action/Use

ACTION: Fungicide.

USE: For painting bark surface in infected areas of apple, pear trees.

FORMULATIONS: Solution.

Cad-Trete* (thiram + cadmium chloride hydrate) — Discontinued by W.A. Cleary Chemical Corp.

Cadusafos — see Rugby*.

Caid* — see Chlorophacinone.

Calar* — see Calcium Acid Methanearsonate.

Calcite — see Calcium Carbonate, Surface-Treated.

Calcium Acid Methanearsonate

BP: Drexel Chemical Co. (Calar*)

Identification

COMMON NAME: CAMA.

CODE NUMBER: CAS 5902-95-4.

DISCONTINUED TRADE NAMES: Super Crab-E-Rad-Calar*, Super Dal-E-Rad-Calar* (Vineland Chemical).

Chemistry

FAMILY: Organo-arsenical.

Action/Use

ACTION: Herbicide.

USE: Contact herbicide used postemergence for selective control of weeds in turfgrass. Controls barnyardgrass, crabgrass, dallisgrass, goosegrass, nutgrass, and foxtail.

FORMULATIONS: Solution.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: LD₅₀ 4000 mg/kg.

Emergency Guidelines

FLASHPOINT: Nonflammable.

FIRST AID: **Eyes**, wash copiously with warm water for at least 15 minutes. **Skin**, wash with warm water using mild soap. **Ingestion**, give glass of warm water containing a tablespoon of common table salt, and repeat to induce vomiting until vomit fluid is clear.

Calcium Arsenate**Identification**

CODE NUMBERS: CAS 7778-44-1; SHA 013501.

ADDITIONAL TRADE NAMES: Spra-cal*, Turf-Cal* FL (Security).

DISCONTINUED NAMES: Chip-Cal* (Rhône-Poulenc Ag Co.); Pen-cal* (Pennwalt).

Chemistry

COMPOSITION: CA₃(AsO₃)₂.

FAMILY: Inorganic arsenicals.

PROPERTIES: Turf-Cal* flowable (26% tricalcium arsenate, equiv. to 10% arsenic as metallic). Water soluble (no more than 5% arsenic).

Action/Use

ACTION: Herbicide; insecticide.

USE: Controls Poa annua, crabgrass, other annual grasses, weeds in turf. Controls insect grubs.

FORMULATIONS: Flowable.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bird: Moderately toxic.

SOLUBILITY: Slight in water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

HANDLING AND STORAGE CAUTIONS: Fatal if swallowed. Do not breathe spray mist. Avoid contact with skin, eyes, or clothing. Protect from excessive heat or cold. Store in original container in locked storage area.

Emergency Guidelines

ANTIDOTE: Give several glasses of water and induce vomiting. Repeat until vomit fluid is clear, then give 2 tablespoons Epsom Salts or Milk of Magnesia in water and plenty of milk and water.

FIRST AID: **Eyes, Skin**, flush with plenty of water. **Ingestion**, have patient lie down and keep quiet. Get immediate medical aid.

Calcium Arsenite**Identification**

CODE NUMBERS: CAS 53404-59-4; SHA 0136026.

OTHER NAME: Mono-calcium arsenite.

Action/Use

ACTION: Insecticide.

USE: Apply dormant or delayed dormant to apricots, cherries, peaches.

Calcium Carbonate

BP: J.M. Huber Corp., Calcium Carbonate Div. (Hubercarb*)

Identification

CODE NUMBERS: CAS 471-34-1; SHA 073502.

OTHER NAME: Ground limestone.

Chemistry

PROPERTIES: Bulk density 40-100 lb./cu. ft.; oil absorption 5-15%; pH 8-9; screen analysis, usually 200-325 mesh.

Action/Use

ACTION: Highly dispersed conditioner/extender.

USE: Precipitated calcium carbonate (ground limestone) used to increase the density of dust formulations for those pesticides not affected by alkaline diluents.

Safety Guidelines

SIGNAL WORD: Nontoxic.

HANDLING AND STORAGE CAUTIONS: Atomite*: Non-hazardous, inert nuisance dust.

Calcium Carbonate, Surface-Treated

BP: J.M. Huber Corp., Calcium Carbonate Div. (Hubercarb*)

Identification

COMMON NAMES: Calcite, ground limestone, whiting.

OTHER NAMES: Marble dust, putty powder.

DISCONTINUED NAMES: CCC* Diluent, CCC* Diluent-New.

Chemistry

PROPERTIES: Bulk density 40-100 lb./cu. ft.; oil absorption 5-15%; non-water wettable; pH 8-9; screen analysis 200-325 mesh, very flowable.

Non-corrosive, high purity, calcitic limestone, surface treated with fatty acids, hydrophobic. TLV = 10 mg/m³ as a nuisance dust (ACGIH limit).

Action/Use

ACTION: Highly dispersed conditioner-extender.

USE: Used in the formulation of quality dust pesticides. A specially treated calcium carbonate is marketed as an insecticide diluent. A grinding aid for waxy toxicants being ground with absorbent carriers.

Most common insecticides are stable in this material. Practically all commonly used toxicants including sensitive chlorinated hydrocarbons and phosphates are stable in finished pesticide dusts.

FORMULATIONS: Dispersible, nonwetttable.

COMBINATIONS: Hubercarb* may be blended with 40-80% attapulgitite or montmorillonite, kaolin, talc, phyrophyllite clays etc., to make up the extender portion of the pesticide dusts.

Safety Guidelines

SIGNAL WORD: Nontoxic.

HANDLING AND STORAGE CAUTIONS: Nonhazardous, inert nuisance dust. Indefinite shelf-life.

Calcium Caseinate — see Casein.

Calcium Cyanamide — see Cyanamid.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Calcium Cyanide**Identification**

CODE NUMBERS: CAS 592-01-8; SHA 074001.

DISCONTINUED NAMES: Cyanogas* (American Cyanamid); Degesch Calcium Cyanide A-Dust*, Degesch Calcium Cyanide G* (Degesch America, Inc.); A-Dust* (Detia Degesch GmbH).

Chemistry

COMPOSITION: Ca(CN)₂.

Action/Use

ACTION: Fumigant.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Calcium cyanide is extremely toxic if ingested. Hydrogen cyanide is a highly toxic, quick-acting gas. May be absorbed through skin. TLV/TWA/Ceiling: 10 ppm. Immediately dangerous to life or health level: 50 ppm.

Calcium Formiate — see Amasil P*.

Calcium Hydroxide — see Hydrated Lime.

Calcium Hypochlorite — see Chloride of Lime.

Calcium Oxide (CaO)

Identification

COMMON NAME: Quicklime.

CODE NUMBERS: CAS 1305-78-8; SHA 075604.

Calcium Phosphate

Identification

CODE NUMBERS: CAS 7758-87-4; SHA 076401.

Action/Use

ACTION: Dust conditioner.

USE: Makes ground sulfur free-flowing.

Calcium Polysulfide — see Lime Sulfur.

Calcium Propaneearsonate

Identification

CODE NUMBERS: CAS 126-94-3; SHA 077701.

DISCONTINUED NAME: No-Crab* (Amchem Products).

Action/Use

ACTION: Herbicide.

USE: Crabgrass.

Calcium Propionate — see Amasil P*.

Calcium Silicates (Synthetic) — see Silicates (Synthetic Dry).

Calcium Sulfate

BP: United States Gypsum Co. (Aqua Cal*, Ben Franklin*)

Identification

COMMON NAME: Gypsum.

CODE NUMBERS: CAS 7778-18-9; SHA 005602.

Chemistry

COMPOSITION: CaSO₄·2H₂O.

FAMILY: Calcium sulfate dihydrate.

PROPERTIES: Off-white to white powder or lumb rock with low odor. Bulk density 55-80 lb./cu. ft.; screen analysis 80%-100 mesh, 25%-100 mesh, 8x16 mesh, and other custom particle size ranges available from certain plants.

Action/Use

ACTION: Heavy clay soil conditioner, carrier, available source elemental calcium and sulfur.

FORMULATIONS: Flowable.

Safety Guidelines

TOXICITY: Nontoxic.

PROTECTIVE CLOTHING: Goggles.

HANDLING AND STORAGE CAUTIONS: Keep dry.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Inhalation, remove to fresh air.

Calcium Sulfide

Chemistry

COMPOSITION: CaS.

PROPERTIES: Calcium sulfide is not phytotoxic.

Action/Use

ACTION: Fungicide.

USE: Controls apple scab.

Caldan* — see Cartap Hydrochloride.

Caldon* Herbicide/Desiccant (dinoseb) — Discontinued 1987 by Hoechst AG.

Caliber* 90 — see Simazine.

Calibration

A method of determining the amount of pesticide that will be applied to the target area.

Calirus* Fungicide (benodanil) — Discontinued by BASF AG.

Calixin*

BP: BASF AG (Calixin*)

BASF India Ltd. (Calixin*)

Identification

COMMON NAMES: Tridemorph (BSI, ISO-E); tridémorphe (ISO-F).

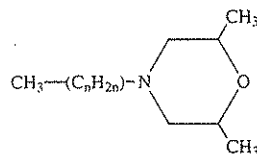
CODE NUMBERS: CAS 81412-43-3; SHA 121401; EINECS 246-347-3.

DISCONTINUED NAMES: Bavical* and Bavical* F (+ carbendazim + maneb), Calixin* M (+ maneb) (BASF AG).

Chemistry

COMPOSITION: Reaction mixture of C₁₁-C₁₄ 4-alkyl-2,6-dimethylmorpholine homologues containing 60 to 70% of 4-tridecyl isomers.

PROPERTIES: Yellow, odorless liquid. Boiling point 134°C/0.5 mm Hg (Perkow). Flashpoint 142°C.



Tridemorph

Action/Use

ACTION: Systemic fungicide with protective, curative properties.

USE: Controls wide range of diseases (yellow and black sigatoka, pink disease, powdery mildew, etc.), of economic importance to plantation (rubber, tea, etc.), field (barley, wheat, etc.), fruit (bananas, mango, etc.), vegetables (cucurbits).

FORMULATIONS: Emulsifiable concentrate.

COMBINATIONS: Cosmic* FL (+ maneb + carbendazim), Cerelux* and Meld* (+ flusilazole), Evrest* (+ fenpropimorph + flusilazole), Gemini* and Rockett-Ultra* (+ fenpropimorph), Opus* Duo, Opus* Forte, Opus* Plus, and Tango* (all + epoxiconazole) (all BASF AG); Aurore* (+ tebuconazole) (Bayer AG).

Registration Notes

OUTSIDE U.S.: U.K.: Gemini*, Meld*. France: Cerelux*.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 3.3 mg/l (96 h) (trout). Bird: Oral LD₅₀ 1388 mg/kg body wt (bobwhite quail). Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Calixin* (Rat): Oral LD₅₀ 980 mg/kg. Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Goggles, impermeable gloves, protective clothing and boots when handling undiluted product. Protective clothing and boots when handling diluted product.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes, skin, clothing, foodstuffs.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: Tech: 142°C (ca.).

ANTIDOTE: Unknown.

FIRST AID: Get medical aid, symptomatic treatment. Ingestion, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800 424-9300 (CHEMTREC).

Calixin M* Fungicide (maneb + tridemorph) — Discontinued 1994 by BASF AG.

Calmathion* Insecticide (malathion) — Discontinued by Excel Industries Ltd.

Calo-Clor*

BP: Grace-Sierra Crop Protection Co.

Identification

CODE NUMBERS: CAS 7487-94-7; SHA 052001.

Chemistry

COMPOSITION: Mercurous chloride + mercuric chloride + inert ingredients.

PROPERTIES: Corrosive, poisonous.

Action/Use

ACTION: Fungicide.

USE: For snow mold in turf on golf course greens, tees, approaches only.

FORMULATIONS: Wettable powder.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 55.2 mg/kg.

HANDLING AND STORAGE CAUTIONS: Hazardous to humans, domestic animals.

Calocure* — see Corrosive Sublimate.**Calo-Gran***

BP: Grace-Sierra Crop Protection

Chemistry

COMPOSITION: Mercurous chloride + mercuric chloride on calcined clay carrier.

PROPERTIES: Corrosive, causes eye damage or skin irritation.

Action/Use

ACTION: Fungicide.

USE: For snow mold on turf.

FORMULATIONS: Granules.

Safety Guidelines

SIGNAL WORD: DANGER (eye, skin).

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1800 mg/kg.**Calomel****Identification**

COMMON NAME: Mercurous chloride.

CODE NUMBER: CAS 7546-30-7.

ChemistryCOMPOSITION: Hg₂Cl₂.**Action/Use**

ACTION: Fungicide.

USE: For brown patch, dollar spot. Formerly as gladiolus corms dip for dry rot, Fusarium yellows, scab.

Environmental Guidelines

HAZARDS: Fish: Toxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 210 mg/kg. Less toxic to warm blooded animals than corrosive sublimate (mercuric chloride).

CAMA — see Calcium Acid Methanearsonate.

Camphéchlor — see Toxaphene.

Camphéchloré — see Toxaphene.

Camphochlor* Insecticide (toxaphene) — Discontinued.

Camphofene Huileux* Insecticide (toxaphene) — Discontinued.

Camphor Oil

The oil is obtained along with gum camphor. It is a mixture comparable to turpentine and from which special solvents are fractionated. Oil camphor sassafrassy with the odor of sassafras is one of these which has been used as a solubilizer for rotenone resins in petroleum fractions.

Campogran* — see Bentazone; 2,4-DB.

Campogran* D Herbicide (bentazone + 2,4-DB) — Discontinued 1994 by BASF AG.

Campogran* M — Discontinued by BASF AG.

Camposan* — see Éthephon.

Canadien 2000* — see Bromadiolone.

Cancellation

Refers to Section 6 (b) of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) which authorizes cancellation of a pesticide registration if unreasonable adverse effects to the environment and public health develop when a product is used according to widespread and commonly recognized practice, or if its labeling or other material required to be submitted does not comply with FIFRA provisions.

Candex* — see Asulam; Atrazine.

Candidin**Action/Use**

ACTION: Antibiotic fungicide.

USE: Dip for peach brown rot before storage.

Cannon*

Discontinued 1993 by Monsanto Co., The Agricultural Group)

Chemistry

COMPOSITION: Alachlor + trifluralin.

Action/Use

ACTION: Selective herbicide.

Registration Notes

U.S.: RUP.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 3150 mg/kg. Inhalation 3.4 mg/l (4 hr.)(gravimetric). (Rabbit): Dermal LD₅₀ >5000 mg/kg. Moderate eye, slight skin irritation.

Canogard* — see DDVP.

Canopy*

BP: Du Pont Agricultural Products

Chemistry

COMPOSITION: Metribuzin + chlorimuron-ethyl.

Action/Use

ACTION: Herbicide.

USE: Preplant incorporated, preemergence to control annual broadleaf weeds in soybeans.

FORMULATIONS: Dry flowable.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1500 mg/kg (male); 1600 mg/kg (female).(Rabbit): Dermal LD₅₀ >2000 mg/kg.

EMERGENCY NUMBER: 800-441-3637 (Du Pont).

Can-Trol* Herbicide (MCPB) — Discontinued 1993 by Rhone-Poulenc Ag Co.

Caocobre* — see Copper Oxides.

Caparol* — see Prometryn.

Capfos* — see Dyfonate*.

Capsaicin* — see Hot Sauce Animal Repellent.

Capsules — see Encapsulated Pesticides.

Captab — see Captan.

Captaf* — see Captan.

Captafol

BP: All India Medical Corp.

Gilmore, Inc.

Rallis India Ltd. (Foltaf*)

Identification

COMMON NAMES: Captafol (ANSI, BSI, ISO); difolatan (JMAF).

CODE NUMBERS: CAS 2939-80-2; SHA 081701.

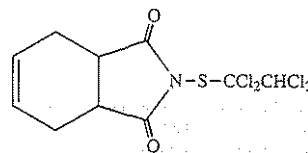
ADDITIONAL TRADE NAME: Haipen*.

DISCONTINUED NAMES: Crisfolatan* (Crystal Chemical Inter-America); Difolatan*; Folcid* (SOPRA); Merpafol* (Makhteshim-Agan); Sanspor* (ICI Agrochemicals).

Chemistry

COMPOSITION: N-[(1,1,2,2-tetrachloroethyl)thio]-4-cyclohexene-1,2-dicarboximide (CAS-8CI).

PROPERTIES: Melting point, 159-161°C. Only slightly soluble in organic solvents.



Captafol

Action/Use

ACTION: Fungicide.

USE: Controls fungal diseases in cereals, particularly Rhynchosporium in barley, Septoria in wheat. Haipen* as a wood preservative.

Sanspor* controls potato blight, especially tuber blight.

FORMULATIONS: Wettable powder, flowable.

Registration Notes

U.S.: Not marketed.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ 0.5 (rainbow trout); 3.0 mg/l (goldfish). Bee:

Nontoxic.

SOLUBILITY: Practically insoluble in water; Sanspor* 1.4 mg/l water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: IV.

TOXICITY: a.i. (Rat): Oral LD₅₀ 5000-6200 mg/kg.

HANDLING AND STORAGE CAUTIONS: May cause allergic skin reactions. Sanspor*: Wear protective gloves when handling. Do not eat, drink, or smoke while using. Wash concentrate from skin or eyes immediately. Do not breathe spray mist. Wash hands and exposed skin before meals and after work. Do not harvest leeks for human or animal consumption for at least 2 weeks after last application. Keep away from food, drink and animal feeding stuffs. Keep out of reach of children. Do not contaminate ponds, waterways, or ditches with chemical or used container. Keep in original container, tightly closed, in a safe place. Wash out container thoroughly and dispose of safely. Stable for at least 2 years under normal storage conditions in unopened container.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Emergency Guidelines

FIRST AID: Treat symptomatically.

Captagil* — see Captan.

Captan

BP: All India Medical Corp.
Crystal Chemical Inter-America (Captanex*)
Drexel Chemical Co. (Drexel* Captan)
Gilmore, Inc.
Helm AG
Kuo Ching Chemical Co., Ltd.
Makhteshim-Agan (Merpan*)
Rallis India Ltd. (Captan*)
ZENECA Ag Products (Captan*)

Identification

COMMON NAMES: Captan (ISO-E, BSI, JMAF); captane (ISO-F); captab (South Africa).

CODE NUMBERS: CAS 133-06-2; SHA 081301; ENT 26538.

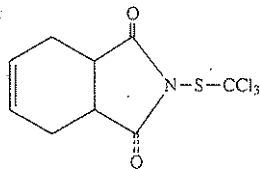
ADDITIONAL TRADE NAMES: Orthocide* (Chevron Chemical Co.); Captagil* (Chimac-Agriphar S.A.); Seed Shield* Potato Seed Treater 7.5, Seed Shield* Potato Seed Treater with Captan (Cornbelt Chemical); Clomitan* (Diachem S.P.A.); Captan 300*, Captan 30DD*, Captan 400*, Captan 400D* (Gustafson Inc.); Criptan* (VAPCO).

DISCONTINUED NAMES: Vondcaptan* (Atochem Agri BV); Agrosol* S (+ maneb), Agrox* 3-Way (+ lindane + diazinon) (Chipman Chemicals); Seed Shield* Potato Seed Treater with Captan/Streptomycin (+ streptomycin) (Cornbelt Chemical); Double-Noctin* (Gustafson); Bean Seed Protectant* (+ diazinon + streptomycin) (Hopkins Agricultural Chemical Co.); Milcap* (+ ethirimol) (ICI Agrochemicals); Capthion* (+ malathion + sulfur) (ICI, Australia); Res-Q* (+ hexachlorobenzene + maneb) (PBI/Gordon).

Chemistry

COMPOSITION: N-Trichloromethylthio-4-cyclohexene-1,2-dicarboximide (CAS-8CD).

PROPERTIES: Pure is a white solid; melting point, 175°C. Tech guaranteed 90% (92%). Very low solubility in organic solvents. Insoluble in petroleum oils. At 25°C solubility in xylene is 20 g/kg; in chloroform 70 g/kg; in acetone 20 g/kg; in cyclohexanone 20 g/kg; in 2-propanol 1 g/kg.



Captan

Action/Use

ACTION: Protectant-eradicator fungicide.

USE: For scab, black rot, botrytis, sooty blotch, fly speck, summer rots on apples. Brown rot, leaf spots on stone fruits, almonds. Dead arm, downy mildew, black rot on grapes. Variety of fungus diseases on small fruits, berries, ornamentals, vegetables. Seed treatment by slurry, dry treatment, and plant-box application. Compatible with most commonly used insecticides, fungicides; incompatible with strong alkalies, oil sprays.

FORMULATIONS: Dust, flowables, wettable powder.

COMBINATIONS: Rondo* (+ pyrifenoxy) (Ciba, Ltd.); Seed Shield* Isopro* and Seed Shield* Protox* (+ lindane + graphite), Seed Shield* Vitavax/Captan 20-20 (+ carboxin) (Cornbelt Chemical); Captan Plus Molybdenum Flowable* (+ molybdenum) (Drexel Chemical); Botec* (+ DCNA) (Gowan); Captan-Streptomycin 7.5-0.1 Potato Seed Piece Protectant* (+ streptomycin) (HACO, Inc.); Apron* + Captan (+ metalaxyl), Capt'n Moly* (+ molybdenum), Captan-DCNA (+ DCNA), Captan T (+ thiabendazole), Enhance* (+ carboxin), Rival* (+ PCNB + thiabendazole), 4-Way* (+ maneb + PCNB + etridiazole) (Gustafson); Bean Guard* (+ carboxin + molybdenum), Captan-Vitavax 20/20* (+ carboxin), Hi Moly Captan* and Hi Moly Captan D* (+ molybdenum), Kernel Guard* (+ diazinon + lindane), Sorghum Guard* (+ lindane) (Trace Chemicals, Inc.); Agrosol* (+ thiabendazole + molybdenum), Agrosol* Flowable (+ thiabendazole), Agrox* 2-Way (+ diazinon), Agrox* D-L Plus (+ diazinon + lindane), Gammasan* (+ lindane), Granox* P-F-M (+ maneb + molybdenum) (Wilbur-Ellis); Agrox* (+ diazinon + lindane), Meteor* (+ hexaconazole) (ZENECA Ag Products).

Registration Notes

OUTSIDE U.S.: Captanex* (Crystal Chemical).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.066-0.080 ppm (96 h) (rainbow trout); 0.047-0.111 ppm (bluegill). Bird: LC₅₀ >2400 ppm (quail).

SOLUBILITY: Solubility in water at room temperature <5 mg/l.

Safety Guidelines

SIGNAL WORD: DANGER (due to potential for eye damage).

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 9000 mg/kg.

PROTECTIVE CLOTHING: Tech: Wear respirator, goggles, and gloves when handling.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin or clothing. Wash hands and face thoroughly with soap and water after use and before eating or smoking. Store in a cool, dry place.

Emergency Guidelines

FIRST AID: Get medical aid if irritation persists. Eyes, flush immediately with running water for 15 minutes. Skin, wash affected area thoroughly with soap and water.

Captan 30DD* — see Captan.

Captan 300* — see Captan.

Captan 400* — see Captan.

Captan 400D* — see Captan.

Captan Plus Molybdenum Flowable* — see Captan.

Captan T — see Captan; Thiabendazole.

Captan-DCNA — see Captan; DCNA.

Captan-Vitavax 20/20* — see Captan; Carboxin.

Captane — see Captan.

Captanex* — see Captan.

Capthion* Insecticide/Fungicide (captan + malathion + sulfur) — Discontinued 1989 by ICI, Australia.

Capt'n Moly* — see Captan.

Capture* — see Bifenthrin.

Cara* — see Clofentezine.

Caragard* — see Terbumeton.

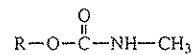
Carbacryl* Fumigant (acrylonitrile + carbon tetrachloride) — Discontinued by American Cyanamid.

Carbam — see Metam-Sodium.

Carbamate Fungicides — see Dithiocarbamates.

Carbamate Herbicides

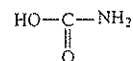
Includes barban, chlorpropham, diallate, pebulate, propham, vernole. The characteristic carbamate has the chemical structure where R represents any larger or smaller organic radical.



Carbamate Herbicides

Carbamate Insecticides

Includes aldicarb, carbofuran, carbaryl, formetamate, methomyl, proprocur. They are esters of carbamic acid. Like the organophosphorus compounds, the carbamates inhibit cholinesterase.



Carbamic Acid

Carbamate WDG* — see Ferbam.

Carbamate* 76WP — see Dithiocarbamates.

Carbamine* — see Carbaryl.

Carbamorph

Identification

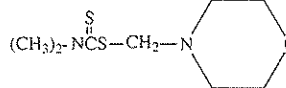
COMMON NAMES: Carbamorph (ISO-E, BSI); carbamorphe (ISO-F).

EXP. CODE NUMBER: MC-833 (Murphy Chemical).

OTHER CODE NUMBER: CAS 31848-11-0.

Chemistry

COMPOSITION: N-(Dimethyldithiocarbamoylmethyl)morpholine or morpholinomethyl dimethyldithiocarbamate.



Carbamorph

Action/Use

ACTION: Fungicide.

Carbamorphe — see Carbamorph

Carbamult*

BP: Hoechst Schering AgrEvo GmbH (Carbamult*)

Identification

COMMON NAMES: Promecarb (BSI, ISO-E, JMAF, ESA); promecarbe (ISO-F).

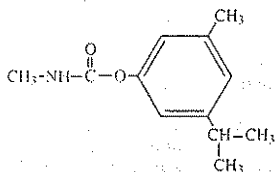
Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

EXP. CODE NUMBERS: EP 316, OMS 716, SN 34615 (Schering AG).
OTHER CODE NUMBERS: CAS 2631-37-0; SHA 271400; ENT 27300.

Chemistry

COMPOSITION: 3-isopropyl-5-methylphenyl methylcarbamate.

PROPERTIES: Colorless crystals, melting point 87-88°C. Solubility in xylene 10-20%; methanol 20-40%; acetone 40-60%.



Promecarb

Action/Use

ACTION: Nonsystemic contact insecticide.

USE: For Colorado potato beetle, lepidopterous pests, leafminers of fruit, corn rootworm.

FORMULATIONS: Emulsifiable concentrate, wettable powder.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: In water, 91 mg/liter.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 74-118 mg/kg. (Rabbit): Dermal LD₅₀ >1000 mg/kg.

PROTECTIVE CLOTHING: Tight weave long-sleeve shirt and long pants, rubber gloves, boots, face shield. Wear clean clothing each day, launder before reusing. Remove contaminated clothing. Wash eyes with water. Immediately wash other affected parts of body with soap and water. If the extent of contamination is unknown, bathe entire body thoroughly, change clothing.

Emergency Guidelines

ANTIDOTE: Atropine.

Carbarex* — see Carbaryl.

Carbaryl

- BP: BASF Corp. (Adios*, Slam*);
Drexel Chemical Co. (Drexel* Carbaryl)
HELM AG
Hubei Sanonda Co., Ltd.
Jin Hung Fine Chemicals Co., Ltd. (Nac*)
Kuo Ching Chemical Co., Ltd.
Paushak Ltd. (Kilex* Carbaryl)
PT. Petrosida Gresik
Rhône-Poulenc Ag Co. (Sevin*, Sevimol*)

Identification

COMMON NAMES: Carbaryl (ISO, BSI, ANSI, ESA, BPC); NAC (JMAF); sevin (USSR).

EXP. CODE NUMBERS: UC 7744 (Rhône-Poulenc Ag Co.).

OTHER CODE NUMBERS: CAS 63-25-2; SHA 056801; OMS-629 (WHO); ENT-23969; EINECS 200-555-0.

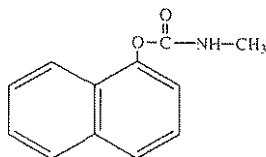
ADDITIONAL TRADE NAMES: Vanisect* (Agsin Pte. Ltd.); Bug Master*, Carbamine* (All India Medical Corp.); Carbarex*, Cekubarly* (Crystal Chemical Inter-America); Devicarb* (Devidayal (Sales) Pvt. Ltd.); Sedit F* 435 (Diachem S.P.A.); Sulfaril* (Sulphur Mills Ltd.); Sevin* 5 Bait, Sevin* 5 Dust, Sevin* 10 Dust (Wilbur-Ellis); Denapon*, Hexavin*, Karbaspray*, Septene*, Tercyl*, Tricarnam*.

DISCONTINUED NAMES: Dicarbam* (BASF AG); Crunch* (Crystal Chemical Inter-America); Savit* (Griffin Agricultural Chemicals Group); Ravyon* (Makhteshim-Agan).

Chemistry

COMPOSITION: 1-Naphthyl methylcarbamate.

FAMILY: Carbamates.



Carbaryl

PROPERTIES: 99% Tech: White crystals, melting point 142°C. Vapor pressure 0.002 mm Hg at 40°C; density 1.232 g/ml at 20/20°C. Soluble in most polar organic solvents such as acetone and mixed cresols: hy-

drolyzes rapidly in alkaline solutions. Non-corrosive to metals, packaging materials and application equipment.

Action/Use

ACTION: Broad spectrum insecticide.

USE: For use on many crops, including citrus, fruit, vegetables, forage crops, forests, field crops, lawns, nuts, ornamentals, rangeland, turf, shade trees.

FORMULATIONS: Aqueous dispersions, baits, dusts, emulsifiable concentrates, flowables, granules, oil based flowables, powder, soluble concentrate, suspension concentrate, wettable powders, water based flowables, water dispersible granules. Adios* and Slam* (+ cucurbita foetidissima root powder).

COMBINATIONS: Sevidol* (+ lindane) (Rhône-Poulenc Ag Co.).

Registration Notes

OUTSIDE U.S.: Sevidol* for rice and sugarcane in India and Vietnam.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 28 mg/l (24 h) (goldfish). Toxic to animals of fish diet. Adios*, Slam* nontoxic. Bird: Adios*, Slam* nontoxic. Bee: Varies by formulation. Toxic. Adios*, Slam* nontoxic. Sevin* XLR Plus essentially nontoxic.

SOLUBILITY: In water at 30°C, 40 ppm.

Safety Guidelines

SIGNAL WORD: POISON (Tercyl* 85 WP). WARNING (Sevin* 80 S). CAUTION (Adios*, Slam*).

TOXICITY CLASS: I (Tercyl* 85WP). II (Sevin* 80 S). III, IV (Adios*, Slam*).

TOXICITY: Tech (Rat): Oral LD₅₀ 246 mg/kg (female); 283 mg/kg (male).

Adios*, Slam*: (Rat): Oral LD₅₀ >5,000 mg/kg; Dermal LC₅₀ >2,000 mg/kg; Inhalation LC₅₀ >6.08 mg/l.

PROTECTIVE CLOTHING: Rubber gloves, respirator, rubber boots (depending on formulation), long-sleeved shirt or jacket, long pants.

HANDLING AND STORAGE CAUTIONS: Keep in cool, dry place. Store away from feed and foodstuffs. Keep out of reach of children. Avoid contact with mouth, eyes, and skin.

Emergency Guidelines

ANTIDOTE: Atropine. Do NOT use 2-PAM, opiates, or cholinesterase inhibiting drugs.

Carbatene — see Metiram Complex.

Carbathin — see Carboxin.

Carbazinc* Fungicide (ziram) — Discontinued by Rhône-Poulenc Ag Co.

Carben* — see Carbendazim.

Carbendazim

- BP: All India Medical Corp. (Aimcozim*)
Aragonesas Agro, S.A. (Carbendor*, Carbendazim 98%)
BASF AG (Bavistin*)
Chimac-Agriphar S.A. (Occidor*, Prodazim*)
Chinoin Pharmaceutical & Chemical Works Co. Ltd.
Ciech-Agrochemia (Pol-Funaben Technical*)
Clifton Chemicals Ltd.
Du Pont Agricultural Products (Delsene*)
Eurochem, S.A. (Eurozim-50*)
Fulon Chemical Industrial Co., Ltd. (Basagin*)
Gilmore, Inc.
HELM AG
Hoechst Schering AgrEvo GmbH (Derosal*)
Inquinosa
Kuo Ching Chemical Co., Ltd.
Paushak Ltd. (Paushazim*)
Pilarquim Corp. (Pilarstin*)
Rotam Group (Rodazim*)
Shinung Corp.
Sundat (S) Pte. Ltd.
Tecomag (Tecozi*)

Identification

COMMON NAMES: Carbendazim (BSI, ISO-E); carbendazime (ISO-F); carbendazol (JMAF/MAF).

TRIVIAL NAMES: BCM; BMC; MBC; MCB.

EXP. CODE NUMBER: CN 38082090 (Ciech-Agrochemia); Hoe 017411 (Hoechst AG).

OTHER CODE NUMBERS: CAS 83601-81-4; SHA 210500; EINECS 234-232-0.

ADDITIONAL TRADE NAMES: Acidazim* (Agro Chemicals Industries Ltd.); Equitdazim*, Fungistemic* (Agsin Pte. Ltd.); Cekudazim* (Cequisa); Devistin* (Devidayal (Sales) Pvt. Ltd.); Carzim* 50 (Lupin Agrochemicals (I) Ltd.); Carben* (Sulphur Mills Ltd.); Kemdazim* (Union Derivan S.A.).

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

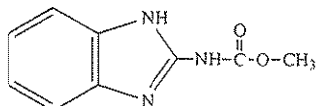
Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Carbendazime

DISCONTINUED NAMES: Bavical and Bavical F (+ maneb + tridemorph), Corbel* Duo (+ fenpropimorph), Mastiff* (+ chlormequat chloride), Ponnax* (+ chlormequat chloride + choline chloride) (BASF AG); Delsene M* (+ maneb) (Du Pont); Bolda* (+ maneb + sulfur) (Farm Protection Ltd.); Kombat* (Hoechst AG).

Chemistry

COMPOSITION: 2-(Methoxycarbonylamino)-benzimidazole (IUPAC). **PROPERTIES:** Tech: Nearly white, odorless solid. Tech: xylene <1g/100g (20°C); cyclohexanone <1g/100g.



Carbendazim

Action/Use

ACTION: Systemic fungicide.

USE: Controls wide range of Ascomycetes, Fungi Imperfecti, numerous Basidiomycetes on cereals, cotton, fruits, grapes, bananas, ornamentals, plantation crops, sugar beets, soybeans, tobacco, turf, vegetables, mushrooms, other crops, under most climatic conditions all over the world.

FORMULATIONS: Aqueous suspension, water dispersible granules, wettable powder.

COMBINATIONS: Bavistin M* (+ maneb), Corbel* Triple (+ chlorothalonil + fenpropimorph), Cosmic* FL (+ maneb + tridemorph), Konker* (+ vinclozolin) (all BASF AG); Occidor Plus* (+ mancozeb), Raydor* (+ maneb) (Chimac-Agriphar S.A.); Delsene MX 200* (+ mancozeb) (Du Pont); Sportak* Alpha and Sportak* PF (+ prochloraz) (Hoechst Schering AgrEvo GmbH); Planete* (+ hexaconazole), premixes with flutriafol (Impact*) and flutriafol + pyrazophos marketed under various trade names (ZENECA Agrochemicals); Riozeb* Fuerte WP (+ mancozeb); Vigil* K; Vigil* T.

Registration Notes

U.S.: Bavistin*, Delsene* are not registered.

OUTSIDE U.S.: U.K.: Clifton Carbendazim* for field beans, oilseed rape, onions, rye, winter barley, and winter wheat only.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 4 mg/l (96 h) (carp); 2.3 mg/l (rainbow trout). Derosal*: Fish: LD₅₀ 0.61 mg/l (96h) (carp); 0.83 mg/l (rainbow trout). Bird: Oral LD₅₀ 10996 mg/kg body wt (Japanese quail). Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >15,000 mg/kg (in sesame oil). Dermal LD₅₀ >2000 mg/kg. Kemdazin* (Rat): Oral LD₅₀ >10,000 mg/kg. Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Wear protective clothing and impermeable gloves.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, clothing, or foodstuffs.

SPILL CONTROL/CLEANUP: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Emergency Guidelines

FIRST AID: Get medical aid. Symptomatic treatment. Ingestion, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Carbendazime — see Carbendazim.

Carbendazol — see Carbendazim.

Carbendor* — see Carbendazim.

Carbetamex* — see Carbetamide.

Carbetamide

BP: Rhone-Poulenc Ag Co. (Carbetamex*, Legurame*)

Identification

COMMON NAME: Carbetamide (BSI, ISO, ANSI, WSSA).

EXP. CODE NUMBER: 11561 RP (Rhone-Poulenc Ag Co.).

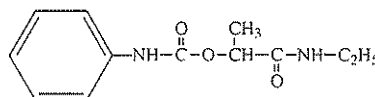
OTHER CODE NUMBERS: CAS 16118-49-3; SHA 259200.

Chemistry

COMPOSITION: N-ethyl-2-[(phenylamino)carbonyl]oxy]propanamide (D)-isomer (CAS).

PROPERTIES: Colorless crystals, melting point 119°C. Soluble in acetone, methylene chloride, dimethylformamide, methanol. Insoluble in cyclohexanone, petroleum ether.

PESTICIDE DICTIONARY



Carbetamide

Action/Use

ACTION: Herbicide.

USE: Controls grasses, some broadleaf weeds as preemergent or postemergent herbicide in alfalfa, chicory, clover, lettuce, orchards, rape, sunflower.

FORMULATIONS: Emulsifiable concentrate, wettable powder.

COMBINATIONS: Carbetamide/oxadiazon on sunflowers and ornamentals. Pradone Kombi*, Pradone Plus*, Pradone TS* (+ dimefuron) for winter oilseed rape.

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: Bee: Wettable powder nontoxic. Liquid nontoxic when used as directed.

SOLUBILITY: In water approximately 3-5 g/l at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 11,000 mg/kg.

PROTECTIVE CLOTHING: None.

Emergency Guidelines

FIRST AID: Treat symptomatically.

Carbexin* — see Oxycarboxin.

Carbicron* — see Dicrotophos.

Carbina TZ* Fungicide (thiram + zineb) — Discontinued 1994 by ISAGRO.

Carbocop* — see Copper Carbonate, Basic.

Carbodan* — see Carbofuran.

Carbofos — see Malathion.

Carbofuran

BP: Hubei Sanonda Co., Ltd.

Jin Hung Fine Chemicals Co., Ltd.

Kuo Ching Chemical Co., Ltd.

Makhteshim-Agan (Carbodan*)

Mitsubishi Chemicals

Pilarquim Corp. (Pilarfuran*)

P.T. Petrosida Gresik

Sanachem (Pty) Ltd. (Carbosan*, Terrafuran*)

Sanex Inc. (Furadex*)

Sundat (S) Pte. Ltd. (Sunfuran*)

Taiwan Tainan Giant Industrial Co., Ltd.

Identification

COMMON NAME: Carbofuran (ANSI, BSI, ISO, ESA).

EXP. CODE NUMBERS: FMC 10242, NIA 10242 (FMC); Bay 70143; D 1221.

OTHER CODE NUMBERS: CAS 1563-66-2; SHA 090601; OMS-864 (WHO); ENT 27164; EINECS 216-353-0.

ADDITIONAL TRADE NAMES: Futura* (Agsin Pte. Ltd.); Furacarb* (All India Medical Corp.); Curaterr* (Bayer AG); Furadan* (FMC Corp.); Furasun* GR (Gupta Chemicals Pvt. Ltd.); Vegfru Diafuran* (Pesticides India); Furasul* (Sulphur Mills Ltd.); Yaltox*.

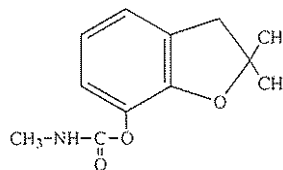
DISCONTINUED NAME: Chinufur* (Chemol Trading Ltd. Co.).

Chemistry

COMPOSITION: 2,3-Dihydro-2,2-dimethyl-7-benzofuranyl methyl-carbamate (CA).

FAMILY: Carbamate.

PROPERTIES: Tech, odorless, white crystalline solid, melting point 153-154°C. Specific gravity is 1.180 at 20°/20°C. Vapor pressure 3.1 × 10⁻² mbar at 20°C. Readily soluble in dichloromethane. Soluble in 2-propanol. Hardly soluble in toluene.



Carbofuran

Action/Use

ACTION: Systemic broad spectrum insecticide, nematicide.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

USE: Various soil, foliar pests. Aphids, lygus bugs, alfalfa weevil, rice water weevil. Corn rootworm in field corn. Nematodes, thrips in peanuts. Colorado potato beetle, leafhopper, flea beetles in potatoes. Grasshopper, cereal leaf beetle in small grains. Chinch bug, greenbug in sorghum. Nematodes, wireworms, sugarcane borer in sugarcane. Grasshopper, stem weevils, sunflower beetles in sunflowers. Nematodes, soil foliage feeding insects in tobacco.

FORMULATIONS: Granule, flowable, wettable powder, flowable concentrate for seed treatments.

COMBINATIONS: Curaterr[®] Forte (+ fenamiphos) (Bayer AG).

Registration Notes

U.S.: Some or all applications of FMC 10242, Furadan[®], NIA 10242 may be classified as RUP.

OUTSIDE U.S.: For bananas, coffee, sugar beets; granules for lowland rice.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.24 (96 h) (bluegill); 0.38 mg/l (rainbow trout). Bee: 5% granular nontoxic. Bird: LC₅₀ 438 mg/kg (diet) (Japanese quail).

SOLUBILITY: Water solubility 351 ppm.

Safety Guidelines

SIGNAL WORD: DANGER (Furadan[®] 4F); WARNING (Furadan[®] G).

TOXICITY CLASS: I (Furadan[®] 4F); II (Furadan[®] G).

TOXICITY: (Rat): Oral LD₅₀ approx. 8 mg/kg. Dermal LD₅₀ >3000 mg/kg.

PROTECTIVE CLOTHING: A hat or other suitable head covering, a long sleeved shirt and long legged trousers or a coverall type garment, shoes, and socks. See label.

HANDLING AND STORAGE CAUTIONS: Store in original container, preferably in locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Note to physician: Carbofuran is a reversible cholinesterase inhibitor. Do NOT use oximes such as 2-PAM. Start by giving 2 mg atropine intramuscularly. According to clinical response, continue until signs of atropinization occur (dry mouth or dilated pupils).

FIRST AID: Get immediate medical aid. **Eyes**, instill one drop of Homatropine. **Inhalation**, remove to fresh air. **Ingestion**, drink 1-2 glasses of water, induce vomiting by touching back of throat with finger.

Carbolineum — see Anthracene Oil.

Carbon Bisulfide — see Carbon Disulfide.

Carbon Dioxide, Gas

BP: BOC Gases

Identification

OTHER CODE NUMBERS: CAS 124-38-9; SHA 016501.

COMMON NAME: Carbon dioxide, gas; carbonic anhydride.

Chemistry

COMPOSITION: 99.8% to 99.999% by wt. CO₂.

FAMILY: Carbonate.

Action/Use

ACTION: Fumigant.

USE: Fumigation of raw and processed agricultural commodities. Can be used alone to kill insects by desiccation. When used with other fumigants, it increases their effectiveness by raising the rate of insect respiration.

Environmental Guidelines

SOLUBILITY: In water, very soluble.

Safety Guidelines

SIGNAL WORD: WARNING.

PROTECTIVE CLOTHING: Respiratory protection required for exposures above OSHA limits.

HANDLING AND STORAGE CAUTIONS: Ventilate use area before entering. CO₂ is heavier than air and will accumulate in low areas, causing suffocation due to oxygen displacement.

SPILL CONTROL/CLEAN UP: Provide adequate ventilation.

PRODUCT/WASTE DISPOSAL: Do not attempt to dispose of unused quantities. Return in shipping container properly labeled and capped.

Emergency Guidelines

COMBUSTION PRODUCTS: Certain reactive metals, hydrides, moist cesium monoxide, or lithium acetylene carbide diammino may ignite. Passing carbon dioxide over a mixture of sodium peroxide and aluminum or magnesium may explode.

FIRST AID: **Eyes**, open lids wide to allow liquid to evaporate. **Skin**, for dermal contact or frostbite, flush affected areas with large quantities of warm water. **Inhalation**, prompt medical attention is mandatory in all cases of overexposure. Rescue personnel should be equipped with self-contained breathing apparatus. **Ingestion**, seek medical attention as soon as possible.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Carbon Disulfide

Identification

CODE NUMBERS: CAS 75-15-0; SHA 016401.

OTHER NAME: Carbon bisulfide.

Chemistry

COMPOSITION: CS₂.

PROPERTIES: Boiling point 46.3°C.

Action/Use

ACTION: Fumigant.

USE: One of the most widely used fumigants for insect control in stored grain, usually in combination with carbon tetrachloride to reduce fire hazard. Soil fumigation to control soil fungi, deep-rooted perennial weeds.

Registration Notes

U.S.: Not for fumigation of stored beans, cowpeas or peas.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Inhalation: 200 ppm.

HANDLING AND STORAGE CAUTIONS: Hazardous by explosion of gas-forming liquid.

Emergency Guidelines

FLASHPOINT: Extremely flammable.

Carbon Tetrachloride

Identification

COMMON NAMES: Carbon tetrachloride (ISO-E, BSI, ESA); tétrachlorure de carbone (ISO-F).

CODE NUMBERS: CAS 56-23-5; SHA 016501.

DISCONTINUED NAME: Acrylon[®] and Carbacryl[®] (+ acrylonitrile) (American Cyanamid Co.).

Chemistry

COMPOSITION: Tetrachloromethane.

FAMILY: Chlorinated hydrocarbons.

PROPERTIES: Colorless liquid, boiling point 76°C.

Action/Use

ACTION: Fumigant.

USE: Used to reduce fire hazard in combinations with either carbon disulfide or ethylene dichloride intended as grain fumigants.

Registration Notes

U.S.: Mixtures with carbon disulfide or ethylene dichloride are not approved for fumigation of dry beans, peanuts or peas.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 7500 mg/kg. Vapor toxicity, 300 ppm.

Much less toxic to insects than carbon disulfide or other effective fumigant chemicals. Prolonged exposure is necessary to kill.

Emergency Guidelines

FLASHPOINT: Nonflammable.

See Carbon Disulfide

Carbonyl

A group having the structure:



Carbophenothion — see Trithion[®].

Carbosan[®] — see Carbofuran.

Carbosulfan

BP: FMC Corp. (Advantage[®], Gazelle[®], Marshal[®], Posse[®])
Kuo Ching Chemical Co., Ltd.

Identification

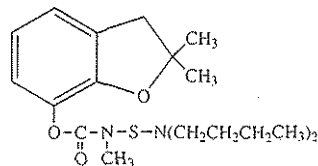
COMMON NAME: Carbosulfan (ISO, ANSI, BSD).

EXP. CODE NUMBER: FMC 35001 (FMC Corp.).

OTHER CODE NUMBERS: CAS 55285-14-8; OMS 3022 (WHO).

Chemistry

COMPOSITION: 2,3-dihydro-2,2-dimethyl-7-benzofuranyl [(dibutylamino)thio]methylcarbamate.



Carbosulfan

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

FAMILY: Carbamate.

PROPERTIES: Viscous brown liquid, vapor pressure $.31 \times 10^{-6}$ Torr; specific gravity 1.056 at 20°C. Miscible in organic solvents.

Action/Use

ACTION: Broad spectrum insecticide, nematocidal, miticide.

USE: Apply to alfalfa, apple, citrus, corn, deciduous fruit, potato, rice, sorghum, soybean, sugar beets, sugarcane, and other vegetable, field, tree, and orchard crops. Seed treatments.

FORMULATIONS: Emulsifiable concentrates, granules.

Registration Notes

U.S.: Currently not registered in the U.S.

OUTSIDE U.S.: Advantage*, Gazelle*, Marshal*, Posse*.

Environmental Guidelines

SOLUBILITY: In water 0.3 ppm.

Safety Guidelines

SIGNAL WORD: (Marshal*) DANGER (4EC); WARNING (2.5 EC).

TOXICITY CLASS: I (4 EC); II (2.5 EC).

TOXICITY: (Rat): Oral: LD₅₀ 209 mg/kg. Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Wear protective clothing and rubber gloves. If there is a possibility of inhalation or accidental contact with the eyes, wear a respirator and goggles or suitable eye shield. Remove contaminated clothing and wash with soap and water before reuse.

HANDLING AND STORAGE CAUTIONS: Avoid inhalation, ingestion, or contact with skin or eyes. Wash thoroughly with soap and water after handling and before eating or smoking.

Emergency Guidelines

FLASHPOINT: 205°F closed cup; Marshal* 115-117°F.

FIRE EXTINGUISHING MEDIA: Foam, carbon dioxide, dry chemical.

ANTIDOTE: Atropine.

FIRST AID: Get medical aid. **Eyes,** flush with plenty of water for at least 15 minutes. **Skin,** remove contaminated clothing and immediately wash skin with soap and water. **Inhalation,** remove to fresh air. If not breathing give artificial respiration. **Ingestion,** if victim is conscious, give 1-2 glasses of water and induce vomiting by touching back of throat with finger. Do NOT induce vomiting or give anything by mouth to an unconscious person.

EMERGENCY TELEPHONE: 716-735-3765 (FMC Corp.).

Carboxide*

(Discontinued by Union Carbide Corp.)

Identification

CODE NUMBER: CAS 75-21-8.

Chemistry

COMPOSITION: Ethylene oxide (10% by weight) in carbon dioxide.

Action/Use

ACTION: Fumigant.

Carboxin

BP: Jin Hung Fine Chemicals Co., Ltd. (Kisvax*)

Kemira Agro Oy (Kemikar*)

Sundat (S) Pte. Ltd.

Uniroyal Chemical Co., Inc. (Vitavax*)

Identification

COMMON NAMES: Carboxin (ANSI, BSI, ISO-E); carboxine (ISO-F); carbathiin (Canada).

EXP. CODE NUMBER: D735.

OTHER CODE NUMBERS: CAS 5234-68-4; SHA 090201.

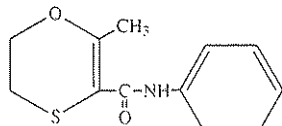
ADDITIONAL TRADE NAMES: Oxatin* (Diachem S.P.A.); Vitavax*-34, Vitavax*-30C (Gustafson Inc.), Vitavax* (Proficol El Carmen S.A.); DCMO.

DISCONTINUED NAME: Flo Pro V* (Cargill).

Chemistry

COMPOSITION: 5,6-dihydro-2-methyl-N-phenyl-1,4-oxathiin-3-carboxamide (CAS).

PROPERTIES: Off-white crystals, melting range (two crystal structures which revert to one in solution): A 91.5-92.5°C, B 98.0-100°C.



Carboxin

Action/Use

ACTION: Systemic fungicide, seed protectant.

USE: Seed treatment controls smuts on barley, oats, wheat and seedling diseases, such as *Rhizoctonia solani*, on barley, corn, cotton, oats, peanuts, rapeseed, rice, sorghum, soybeans, wheat, and other crops.

FORMULATIONS: Flowable concentrate, true solutions, wettable powder.

COMBINATIONS: Beret Universal* (+ imazalil + fenpiclonil) (Ciba-Geigy, Ltd); Seed Shield* Vitavax/Captan 20-20 (+ captan) (Cornbelt Chemical); Enhance* (+ captan), Enhance Plus* (+ maneb + lindane), Germate Plus* (+ diazinon + lindane), Prevail* (+ metalaxyl + PCNB), Pro-Gro*, RTU*-Vitavax*-Thiram, Vita-Flo* 280, Vitavax*-200, (all + thiram), Vitavax*-Extra (+ imazalil + thiabendazole), Vitavax*-PCNB (+ PCNB) (Gustafson); Kick-Start* (+ diazinon + lindane) (Helena Chemical Co.); Abavit*/Prelude* Universal (+ prochloraz) (Hoechst Schering AgrEvo GmbH); Vitavax*-200 (+ thiram) (Proficol El Carmen S.A.); Bean Guard* (+ captan + molybdenum), Captan/Vitavax 20/20 (+ captan), Vitavax T-L* (+ thiram) (Trace Chemicals, Inc.); Crown* (+ thiabendazole) (Uniroyal Chemical Co., Inc.).

Environmental Guidelines

HAZARDS: (Tech, 96 h) Fish: LC₅₀ 2 mg/l (rainbow trout); 2.3 mg/l (bluegill). Bird: Nontoxic. (Vitavax*-200). Fish: LC₅₀ 0.38 mg/l (rainbow trout); 0.56 mg/l (bluegill, sunfish). (75W) Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: DANGER (Enhance*, Pro-Gro*); WARNING (Enhance Plus*, Vitavax*-30C).

CAUTION (Tech, Germate Plus*, RTU*-Vitavax*-Thiram, Vitavax*-PCNB, Vitavax*-200, Vitavax*-34).

TOXICITY CLASS: I (Enhance*, Pro-Gro*); II (Enhance Plus*, Vitavax*-30C).

III (Tech, Germate Plus*, RTU*-Vitavax*-Thiram, Vitavax*-PCNB, Vitavax*-200, Vitavax*-34).

TOXICITY: (Rat): Oral LD₅₀ 3820 mg/kg. (Rabbit): Dermal LD₅₀ >8000 mg/kg. Slight eye irritant.

PROTECTIVE CLOTHING: Respirator, safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin or clothing. Wash hands and face thoroughly with soap and water after use and before eating or smoking. Do not consume alcohol (alcohol increases toxic effects of thiram). Launder clothing before reuse. Store in cool, dry area out of reach of children and animals.

Emergency Guidelines

FLASHPOINT: 203 °C.

FIRST AID: **Eyes,** flush immediately with running water. **Ingestion,** (Enhance*, Enhance Plus*, Pro-Gro*, Vitavax*-30C) give large quantity of milk. Do NOT induce vomiting. Get medical aid.

Carboxine — see Carboxin.

Carbyne*

(Discontinued 1980 by Gulf Oil)

Identification

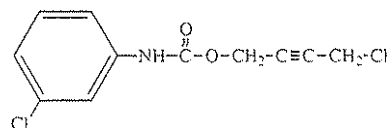
COMMON NAMES: Barban (ISO-E, BSI, ANSI, WSSA); barbanate (So. Africa); barbane (ISO-F), chlorinat (USSR); CBN (JMAF).

CODE NUMBERS: CAS 101-27-9; SHA 017601.

DISCONTINUED NAMES: Caryne* (FBC Ltd.); Fisons B25*, Neoban*, Wheatylene* (Schering AG); Oatax* (Shell Chemicals UK Ltd.).

Chemistry

COMPOSITION: 4-Chloro-2-butynyl m-chlorocarbanilate (CAS 8CI). 4-chloro-2-butynyl (3-chlorophenyl)carbamate (9CI).



Barban

Action/Use

ACTION: Selective herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1350 mg/kg. (Rabbit): Dermal LD₅₀ >20,000 mg/kg.

Carcinogen

A substance that can produce cancer (malignant tumors) in experimental animals or is known to do so in humans. Epigenetic carcinogens promote tumor formation and genotoxic carcinogens initiate tumors.

Carcinogenic

The property of a substance or agent to produce cancer.

Carcinogenicity Categorization

EPA uses the following "weight of evidence" categorization for carcinogen risk assessment:

Group A — Human carcinogen.

Group B1 — Probable human carcinogen based on laboratory animal and epidemiological studies.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Group B2 — Probable human carcinogen based on laboratory animal studies.

Group C — Possible human carcinogen.

Group D — Not classifiable as to human carcinogenicity.

Group E — Evidence of noncarcinogenicity for humans.

Reference: Guidelines for Carcinogen Risk Assessment. Federal Register 51(185):33992-34003, September 24, 1986.

Caresine* 200 — see Bentazone; Ioxynil

Caresine* 2000 — see Bentazone; Dichlorprop; Isoproturon.

Carfene* — see Azinphos-Methyl.

Carpamone* (sodium beta-naphthoxyacetate) — Discontinued by ICI Australia.

Carpene* — see Dodine.

Carpidor* Herbicide (benfluralin) — Discontinued by Elanco Products Co.

Carri-All* — see Fuller's Earth.

Carrier

An inert material added to a technical poison, to facilitate later dilution to field strength in simple blending equipment. Solid carriers are used in the preparation of wettable powders, dust concentrates and granules, and must be compatible with the toxicant, have good adsorption or absorption properties, be free-flowing, non-abrasive, of fine particle size and, for wettable powders, be easily dispersed in water with high suspension value. Although generally considered inert, they have a definite effect on potency and efficiency of dusts and sprays since most formulations contain from 80 to 99% carrier-diluent. In producing dust bases and wettable powders, adsorptivity and/or absorptivity of a carrier influences its ability to take up the toxicant and maintain a free-flowing state. In adsorption, the toxicant is held entirely on the carrier particle surface and is readily available for action. At least a portion of the toxicant, in absorption, is held within the carrier. Although absorptive carriers usually have higher liquid-holding capacities, they may tie up some of the toxicant, thus reducing its efficiency. Among the carriers now used are certain kaolin clays, attapulgites, diatomites and several highly-absorbent synthetic pigments. See Diluents, Dust Bases, Granular Formulation.

Cartap Hydrochloride

BP: Kuo Ching Chemical Co., Ltd.
Sundat (S) Pte. Ltd. (Suntap*)
Takeda Chemical Industries, Ltd. (Padan*, Sanvex*)

Identification

COMMON NAME: Cartap Hydrochloride.

CODE NUMBER: CAS 15263-53-3.

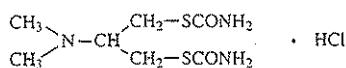
ADDITIONAL TRADE NAMES: Caldan*, Patap*, Thiobel*.

DISCONTINUED NAME: Vegetox*.

Chemistry

COMPOSITION: S,S'-2-dimethylaminotrimethylene bis(thiocarbamate) hydrochloride.

PROPERTIES: Pure: White crystalline solid, slight odor, melting point 179-181°C (dec.). Stable in acidic conditions. Slightly soluble in methanol, ethanol. Insoluble in acetone, diethyl ether, ethyl acetate, chloroform, benzene and n-hexane.



Cartap Hydrochloride

Action/Use

ACTION: Insecticide.

USE: Effective against lepidopterous, coleopterous insects, etc. Especially for Colorado potato beetle, rice stem borers, grass leafrollers, diamondback moth, thrips, etc.

FORMULATIONS: 2% dust, 4% granule, 50% water-soluble powder, 95% water-soluble powder.

Environmental Guidelines

SOLUBILITY: Hydrolyzed in neutral or alkaline solution.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 345 mg/kg (male).

PROTECTIVE CLOTHING: Rubber gloves, mask or respirator, rubber boots, long-sleeved shirt or jacket, long pants.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eye and skin. Store in original containers in a cool, dry place away from foodstuffs and animal feeds.

Emergency Guidelines

ANTIDOTE: Intravenous injection of 100-200 mg of L-cysteine or an intramuscular injection of 20-60 mg of BAL (dimercaprol or 2,3-dimercapto-l-propanol).

Cartox*

Chemistry

COMPOSITION: Ratio 1:5 ethylene oxide, carbon dioxide (German).

Action/Use

ACTION: Fumigant.

Carvil* — see BPMC.

Caryne* Herbicide (carbyne) — Discontinued by FBC Ltd.

Carzim* 50 — see Carbendazim.

Carzol*

BP: AgrEvo USA Co. (Carzol*)
Hoechst Schering AgrEvo GmbH (Dicarzol*)

Identification

COMMON NAME: Formetanate hydrochloride (ANSI, BSI, ISO, ESA).

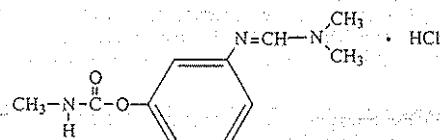
EXP. CODE NUMBERS: EP-332, SN 36056 (formetanate) (Schering AG).

OTHER CODE NUMBERS: CAS 23422-53-9; SHA 097301; ENT 27566.

Chemistry

COMPOSITION: (IUPAC): 3-dimethylaminomethyleneaminophenyl methylcarbamate hydrochloride; N, N-dimethyl-N'-[3-[[[(methylamino) carbonyl]oxy]phenyl]methanimidamide monohydrochloride.

PROPERTIES: White crystals, melting point 200-202°C (with decomposition). Slight solubility in organic solvents.



Formetanate Hydrochloride

Action/Use

ACTION: Acaricide-insecticide.

USE: Controls consperse stink bug, lygus bugs, mites, spotted tentiform leafminer, thrips, white apple leafhopper in alfalfa, apples, citrus, nectarines, peaches, pears, plums, prunes, and vegetables.

FORMULATIONS: Soluble powder.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 2.8 (4 days) (rainbow trout); 20.0 mg/l (bluegill).

Bee: Moderately toxic. Bird: Toxic.

SOLUBILITY: More than 50% in water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 21 mg/kg. (Rabbit): Dermal LD₅₀ >10,200 mg/kg.

PROTECTIVE CLOTHING: Tight weave long-sleeve shirt and long pants, rubber gloves, boots, face shield. Wear clean clothing each day, launder before reusing. Remove contaminated clothing. Wash eyes with water. Wash other affected parts of the body with soap and water. If the extent of contamination is unknown, bathe entire body thoroughly, change clothing.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place in original container. Keep out of reach of children or unauthorized persons. Do not inhale dust or spray mist.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Any except water (to avoid possible run-off).

ANTIDOTE: Atropine. Do NOT use 2-PAM.

FIRST AID: Get medical aid. Eyes, flush with water for 15 minutes. Skin, wash with soap and water. Ingestion, give water and induce vomiting.

EMERGENCY TELEPHONE: 302-892-3000 (AgrEvo USA Co.).

CAS — see Chemical Abstracts Service.

Cascade*

BP: American Cyanamid Co.

Identification

COMMON NAME: Flufenoxuron (draft ISO, BSI).

EXP. CODE NUMBER: WL115110.

OTHER CODE NUMBER: CAS 101463-69-8.

Chemistry

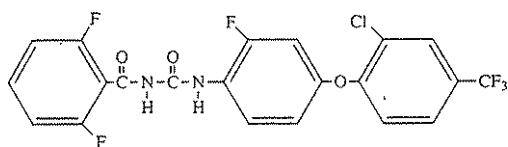
COMPOSITION: 1-[4-(2-chloro-α,α-trifluoro-p-tolyloxy)-2-fluorophenyl]-3-(2,6-difluorobenzoyl)urea.

FAMILY: Acylurea.

PROPERTIES: White crystalline solid, melting point 169-172°C. Vapor pressure 4.55 × 10⁻⁹ mPa at 20°C. Chemically and thermally stable. Solubility: 0.023 g/l in hexane; 6 g/l in xylene at 20°C.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.



Cascade*

Action/Use

ACTION: Acaricide; insecticide; chitin synthesis inhibitor.
USE: Controls mites, insects in a wide range of crops.
FORMULATIONS: Dispersible, emulsifiable and suspension concentrates.

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: Fish: Low toxicity. Toxic to some aquatic invertebrates.
 Bee: Low toxicity. Bird: Low toxicity.
SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >3000 mg/kg. Dermal >2000 mg/kg.

PROTECTIVE CLOTHING: Wear overalls, gloves.

HANDLING AND STORAGE CAUTIONS: Avoid exposure. Store under cool, dry conditions. Low acute toxicity makes poisoning unlikely.

Casein**Chemistry**

COMPOSITION: Phospho-protein which occurs 3% in all milk as calcium caseinate in colloidal suspension.

PROPERTIES: Although water-insoluble, the addition of an alkali permits it to disperse readily. This is usually done by adding lime, the resulting mixture being known as calcium caseinate.

Action/Use

ACTION: Wetting, sticking agent.

Casoron* — see Dichlobenil.

Casoron 133* Herbicide (dichlobenil) — Discontinued by Duphar B.V.

Castellan* — see Fluquinconazole.

Castor Oil, Sulfonated — see Turkey Red Oil.

Castrix*

(Discontinued by Bayer AG)

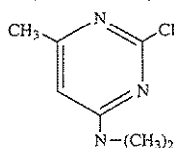
Identification

COMMON NAME: Crimidine (BSI, ISO).

CODE NUMBERS: Crimidine: CAS 535-89-7; SHA 288200.

Chemistry

COMPOSITION: 2-chloro-N,N,6-trimethyl-4-pyrimidin-4-amine.



Crimidine

Action/Use

ACTION: Rodenticide.

COMBINATIONS: Castrix D* (+ difenacoum) (Bayer AG).

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 1-2 mg/kg. Intensely poisonous to mammals.

Emergency Guidelines

ANTIDOTE: Vitamin B₆ (10-25 mg/kg).

Castrix D* — see Castrix*; Ratak*.

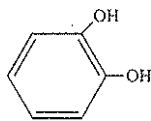
CAT — see Simazine.

Catechol

(Discontinued 1984 by Crown Zellerbach)

Identification

OTHER NAME: Pyrocatechol.



Catechol

Chemistry

COMPOSITION: o-Dihydroxybenzene.

Action/Use

ACTION: Postharvest aid.

Cathomycin — see Novobiocin.

Cationic

An ion having a positive charge is a cation. When the surface active portion of a surfactant molecule possesses a positive charge, it is termed a cationic surfactant.

Contrast with Anionic.

Catt* — see Galtak*.

Causal Organism

An organism (pathogen) that produces a given disease.

Caution — see Signal Words (under Toxicity-Human).

Cayuse* — see Ammonium Sulfate.

Cayuse* Plus — see Ammonium Sulfate.

CCC — see Chlormequat Chloride.

CCC* — see Chlormequat Chloride.

CCC* Diluent-New (calcium carbonate) — Discontinued 1984 by J.M. Huber Corp., Calcium Carbonate Div.

CCN52 — see Cypermethrin.

CDA — see Radox*.

CDEA**Chemistry**

COMPOSITION: 2-Chloro-N,N-diethylacetamide.

Action/Use

ACTION: Herbicide.

CDEC — see Vegadex*.

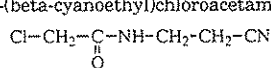
CECA**Identification**

COMMON NAME: CECA (JMAF).

DISCONTINUED NAME: Udonkor* (Nippon Soda Co., Ltd.).

Chemistry

COMPOSITION: N-(beta-cyanoethyl)chloroacetamide.



CECA

Action/Use

ACTION: Selective fungicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 410-420 mg/kg.

CeCeCe* — see Chlormequat Chloride.

Cedar Propanil* 4 — see Propanil.

Cefro***Chemistry**

PROPERTIES: A chlorinated ethyl fuoroate.

Action/Use

ACTION: Rodenticide.

Cekiuron* — see Diuron.

Ceku C.B. Seed Protectant (hexachlorobenzene) — Discontinued 1993 by Cequisa.

Ceku-CCC* — see Chlormequat Chloride.

Cekubacilina* Insecticide (Bacillus thuringiensis var. kurstaki) — Discontinued by Cequisa.

Cekubaryl* — see Carbaryl.

Cekucap* — see Dinocap.

Cekudazim* — see Carbendazim.

Cekudifol* — see Dicofol.

Cekufon* — see Trichlorfon.

Cekugib* — see Gibberellic Acid.

Cekumeta* — see Metaldehyde.

Cekumethion* — see Methyl Parathion.

Cekumetrin* — see Cypermethrin.

Cekupropanil* — see Propanil.

Cekuquat — see Paraquat.

Cekurat* — see Bromadiolone.

Cekusan* — see DDVP.

Cekusil* Herbicide (PMA) — Discontinued 1994 by Cequisa.

Cekusil Universal* A Fungicide (MEMA) — Discontinued 1993 by Cequisa.

Cekusil Universal* C Fungicide (MEMC) — Discontinued 1993 by Cequisa.

Cekusima* Herbicide (simazine) — Discontinued 1994 by Cequisa.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

Cekuthoate* Insecticide (dimethoate) — Discontinued by Zuelig Pte.

Cela 36 — see Stannoram*.

Cela S 1942 — see Bromophos.

Cela S 2225 — see Bromophos-Ethyl.

Cela W 524 — see Triforine.

Celathion* Insecticide (chlorthiophos) — Discontinued 1984 by Celamerck GmbH.

Celatom* — see Diatomaceous Earth.

Celcure*

Identification

COMMON NAME: Acid cupric chromate.

Chemistry

COMPOSITION: Principally copper sulfate, sodium dichromate, chromic or acetic acid.

Action/Use

ACTION: Water-borne wood preservative.

Celdion*

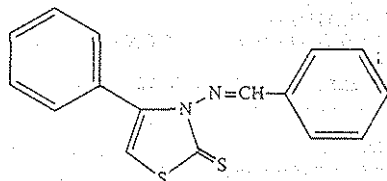
(Discontinued by Takeda Chemical Industries, Ltd.)

Identification

COMMON NAME: Fentiazon (JMAF).

Chemistry

COMPOSITION: 3-Benzylideneamino-4-phenylthiazoline-2-thione.



Fentiazon

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 10,000 mg/kg.

Celest* — see Fludioxonil.

Celest Combi* — see Difenoconazole; Fludioxonil.

Celest Extra* — see Difenoconazole; Fludioxonil.

Celest Special* — see Fludioxonil; Imazalil.

Celest Triple* — see Fludioxonil; Imazalil; Tebuconazole.

Celfume* — see Methyl Bromide.

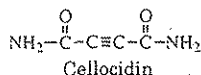
Celite* — see Diatomaceous Earth; Dusts

Celkate* — see Silicates (Synthetic Dry).

Cellocidin

Chemistry

COMPOSITION: Acetylene dicarboxamide.



Action/Use

ACTION: Fungicide.

USE: Controls rice bacterial leaf blight. *bae la*

Registration Notes

OUTSIDE U.S.: For use in Japan.

Cellutic* — see Permethrin.

Celmer* Herbicide (PMA) — Discontinued by Excel Industries Ltd.

Celmide* (ethylene dibromide) — Discontinued by Excel Industries Ltd.

Celmone* Plant Growth Regulator (1-naphthaleneacetic acid) — Discontinued by Excel Industries Ltd.

Celphide — see Aluminum Phosphide.

Celphine* — see Aluminum Phosphide.

Celphos* — see Aluminum Phosphide.

Celthion* Insecticide (malathion) — Discontinued by Excel Industries Ltd.

Cepha* Plant Growth Regulator (ethephon) —

Discontinued 1981 by GAF Chemicals Corp.

Cercobin* — Discontinued by W.A. Cleary Chemical Corp.

Cercobin M* — see Thiophanate-Methyl.

Ceredon*

(Discontinued by Bayer AG)

Identification

COMMON NAMES: Benquinox (BSI, ISO), tserenox (USSR).

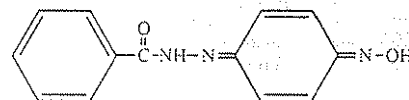
EXP. CODE NUMBER: Bay 15080.

OTHER CODE NUMBERS: CAS 495-73-8; SHA 281100.

DISCONTINUED NAMES: Tillantox* (+ phenylmercury chloride).

Chemistry

COMPOSITION: 1,4-Benzoquinone 1-benzoylhydrazone 4-oxime.



Benquinox

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 100 mg/kg.

Ceregam*

(Discontinued 1984 by SOPRA)

Chemistry

COMPOSITION: Methoxyethylmercury silicate + lindane.

Action/Use

ACTION: Insecticide, fungicide, repellent.

Ceregam Super 2* — see Ceregam.

Cereline* Seed Treatment — see Baycor*; Baytan*; Fuberidazole.

Cerelux* — see Calixin*; Flusilazole.

Ceresan* Fungicide (ethylmercury chloride + MEMC) — Discontinued 1981 by Du Pont Agricultural Products.

Ceresan* M Fungicide (ethylmercury p-toluene sulfonamide) — Discontinued 1974 by Du Pont Agricultural Products.

Ceresan* M-DB Fungicide (ethylmercury p-toluene sulfonamide) — Discontinued 1974 by Du Pont Agricultural Products.

Ceresan-Universal-Nassbeize* — see MEMC.

Cerewet*

(Discontinued by Bayer AG)

Identification

DISCONTINUED NAME: Aretan-nieuw* (Bayer AG).

Chemistry

COMPOSITION: Bis(methylmercuric) sulfate.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 50 mg/kg.

Cerone* — see Ethephon.

Certan* (Bacillus thuringiensis var. aizawai) — Discontinued

1987 by Sandoz Crop Protection Corp.

Certosan* — see Metoxuron*.

Certrol* — see Bromoxynil.

Certrol* DS — see Ioxynil.

Certrol* H — see Ioxynil; Mecoprop.

Cesar* — see Hexythiazox.

Cevadine — see Sabadilla.

CF 125* Growth Regulator (chlorflurenol) — Discontinued 1991

by Shell Agrar GmbH & Co KG.

CFV* — see Chlorfenvinphos.

CGA-10832 — see Tolban*.

CGA-12223 — see Triumph*.

CGA-13586 — see Alsol*.

CGA-15281 — see Pik-Off*.

CGA-15324 — see Curacron.

CGA-18731 — see Isoproturon.

CGA-18762 — see Cycle*.

CGA 18809 — see Azamethiphos.

CGA-24705 — see Metolachlor.

CGA-26351 — see Chlorfenvinphos.

CGA-38140 — see Fongarid*.

CGA-41065 — see Prime+*.

CGA-43089/Concep* Safener (cyometrinil) — Discontinued

1984 by Ciba-Geigy Corp.

CGA-48988 — see Metalaxyl.

CGA-49104 — see Pyroquilon.

CGA-64250 — see Propiconazole.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

CGA-64251 — see Etaconazole.
 CGA-71818 — see Penconazole.
 CGA-72662 — see Cyromazine.
 CGA-92194 — see Concep* II.
 CGA-114900 — see Fenpropidin.
 CGA-131036 — see Amber*.
 CGA-133205 — see Concep* III.
 CGA-142705 — see Fenpiclonil.
 CGA-169734 — see Difenoconazole.
 CGA-173506 — see Fludioxonil.
 CGA-179945 — see Pyrifenoxy.

CHA*-811

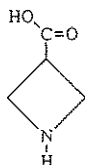
(Discontinued 1989 by Du Pont Agricultural Products)

Identification

CODE NUMBERS: CAS 36476-78-5; SHA 128830.

Chemistry

COMPOSITION: Azetidine-3-carboxylic acid.



CHA*-811 hydridizing agent

Action/Use

ACTION: Hydridizing agent.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >1000 mg/kg.

Challenge* — see Aclonifen; Glufosinate-ammonium.

Chamatkar* — see Mepiquat Chloride.

Chamilox* — see Galtak*.

Champ* — see Copper, Fixed; Copper Hydroxide.

Champ* Formula II DF — see Copper, Fixed; Copper Hydroxide.

Champ* Formula 2 Flowable — see Copper, Fixed; Copper Hydroxide.

Champion* — see Copper, Fixed; Copper Hydroxide.

Champion* 2B/2C — see Copper, Fixed; Copper Hydroxide.

Chapco CCA-C 50* (chromated copper arsenate) — Discontinued 1992 by Chapman Chemical Co.

Chapco Cu-Nap* Fungicide/Wood Preservative (copper naphthenates) — Discontinued by Chapman Chemical Co.

Charge* — see DDVP.

Charterso!* 300 (mineral spirits) — Discontinued by Charter Chemical.

CHE 1843

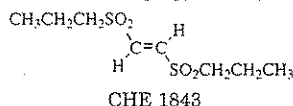
(Discontinued by Mobay Corp.)

Identification

CODE NUMBERS: CAS 1113-14-0; SHA 011701.

Chemistry

COMPOSITION: trans-1,2-Bis(n-propylsulfonyl)ethylene.



CHE 1843

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: WARNING.

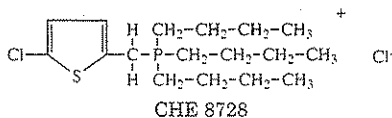
TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 200 mg/kg. Dermal >500 mg/kg.**CHE 8728**

(Discontinued by Mobay Corp.)

Chemistry

COMPOSITION: Tributyl [(5-chloro-2-thienyl)methyl] phosphonium chloride.



CHE 8728

Action/Use

ACTION: Plant growth regulator.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 455-523 mg/kg. Dermal LD₅₀ 1000 mg/kg.

Check-Mate* Herbicide (MSMA + sodium cacodylate) — Discontinued 1989 by Vineland Chemical.

Checkmate* — see Sethoxydim.

CheckMate* CM

BP: Consep, Inc.

Chemistry

COMPOSITION: 6.883% E,E-8,10-dodecadien-1-ol.

Action/UseACTION: Behavior modifying biochemical which functions by mating disruption to be used in control of codling moth (*Cydia pomonella*).

USE: For use in apples, pears, and walnuts.

FORMULATION: Pheromone in dual, controlled release membrane dispenser containing 105 mg of pheromone active ingredient.

Registration Notes

Registered in 1994.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

PROTECTIVE CLOTHING: Use gloves when handling dispensers.

HANDLING AND STORAGE CAUTIONS: Store container in cool place until used.

CheckMate* MRB

(Discontinued by Consep, Inc.)

Chemistry

COMPOSITION: 66.16% Z,13-octadecenyl acetate; 10.75% Z,13-octadecenyl acetate; 8.27% Z,11-hexadecenyl acetate.

Action/UseACTION: Behavior modifying biochemical which functions by mating disruption to be used in control of Mexican rice borer (*Eoreuma loftini*).**Safety Guidelines**

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

CheckMate* OFM

BP: Consep, Inc.

Chemistry

COMPOSITION: 9.59% Z-8-dodecen-1-yl acetate; 0.61% E-8-dodecen-1-yl acetate; 0.11% Z-8-dodecen-1-ol.

Action/UseACTION: Behavior modifying biochemical which functions by mating disruption to be used in control of Oriental fruit moth (*Grapholitha molesta*).

USE: For use in peaches and nectarines.

FORMULATION: Pheromone in controlled release membrane, dispenser containing 180 mg of pheromone active ingredient.

Registration Notes

Amendment for additional crops pending.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

PROTECTIVE CLOTHING: None.

HANDLING AND STORAGE CAUTIONS: Store container in cool place until used.

CheckMate* PBW

BP: Consep, Inc.

Chemistry

COMPOSITION: 40.4% Z,E-7,11-hexadecadien-1-ol acetate; 40.4% Z,Z-7,11-hexadecadien-1-ol acetate.

Action/UseACTION: Behavior modifying biochemical which functions by mating disruption to be used in control of pink bollworm (*Pectinophora gossypiella*).

USE: For use in cotton.

FORMULATION: Pheromone in sprayable controlled release granules containing 80.8% of pheromone active ingredient.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

PROTECTIVE CLOTHING: None.

HANDLING AND STORAGE CAUTIONS: Store in cool place until used.

CheckMate* TPW

BP: Consep, Inc.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: 2.84% E-4-tridecen-1-yl acetate; 0.09% Z-4-tridecen-1-yl acetate.

Action/Use

ACTION: Behavior modifying biochemical which functions by mating disruption to be used in control of tomato pinworm (*Keiferia lycopersicella*).

USE: For use in tomatoes.

FORMULATION: Pheromone in controlled release membrane dispenser containing 48 mg of pheromone active ingredient.

Registration Notes

U.S.: Federally registered.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

PROTECTIVE CLOTHING: None.

HANDLING AND STORAGE CAUTIONS: Store container in cool place until used.

Cheelox* - 100 — see Cheelox* Sequestrants.

Cheelox* Sequestrants

BP: Rhone-Poulenc Surfactants & Specialties (Cheelox* - 100)

Chemistry

COMPOSITION: Ethylenediaminetetraacetic acid (EDTA).

Action/Use

ACTION: Combining with di-, tri-, and polyvalent metal ions, to nullify undesirable effects of metal ion impurities.

USE: Inhibition of precipitation caused by undesired metal ions in agricultural emulsions. Various formulations determined by pH, water hardness, metallic ion to be sequestered, other environmental factors.

FORMULATIONS: Aqueous solution, powder.

See Chelating Agents.

Chelate (Chelation)

A chelate is an organic ring structure composed of a metal ion linked into the ring by N, O or S. Chelation (1) supplies dissolved trace elements in plant nutrition and (2) removes calcium or other metallic element deleterious to pesticide formulation.

Chelated Copper — see Stocktrine II*.

Chelating Agents

Certain organic chemicals (for example, ethylene-diaminetetra-acetic acid) combine with metal impurities to form soluble compounds (chelates), thus preventing conversion to insoluble substances. These chemicals are highly necessary in micronutrient fertilization, but also have value in protecting pesticide emulsions from undesirable precipitation of metallic ions such as iron, magnesium, etc. Pesticides sensitive to hard water (water containing calcium (Ca) or magnesium (Mg) ions) can require an appropriate sequesterant.

Chem Bam* — see Nabam.

Chem Neb 54* — see Maneb.

Chem Pels C* Fungicide/Herbicide/Insecticide (sodium arsenite) — Discontinued by Pennwalt.

Chem Rice* — see Propanil.

Chem Zineb* — see Zineb.

Chemathoate* — see Dimethoate.

Chemcol* — Discontinued 1984 by Vertac Chemical.

Chem-Fish* Regular — see Rotenone.

Chem-Fish* Special — see Rotenone.

Chem-Fish* Synergized — see Rotenone.

Chemfoam* Adjuvant — Discontinued by Foram Foam Spray Chemical

Chemform* (maleic hydrazide + methoxychlor) — Discontinued by Chemical Formulators.

Chem-Frost* (sodium metaborate + sodium chlorate) — Discontinued by U.S. Borax.

Chem-Hoe* Herbicide (propham) — Discontinued by PPG Industries.

Chemical Abstracts Service (CAS)

This scientific abstracting journal assigns code numbers to chemicals and serves as a world-wide standard for chemical names. CAS numbers are included in most of the listings in the Pesticide Dictionary.

Chemical Name

Scientific name of the active ingredient (a.i.) of a pesticide. The name is derived from the chemical structure of the active ingredient. See Common Name; Trivial Name.

Chem-O-Bam* Fungicide (amobam) — Discontinued 1994 by Atomergic Chemetals Corp.

Chemonite***Chemistry**

COMPOSITION: Contains ammoniacal copper arsenite.

Action/Use

ACTION: Water-borne wood preservative.

Chemosterilant

Chemical that controls pests by preventing reproduction. Compounds such as aphamide, apholate, tepa and metepa which sterilize insects sexually to prevent reproduction such as when fed in baits to the housefly. Additional chemosterilants tested are hemel, hempa, methiotepa, methotrexate, methyl apholate, Ornitol*, morzid, tretamine.

Chemox* Herbicide (dinoseb) — Discontinued by Tifa Ltd.

Chemox General* — see DNAP.

Chemox PE* — see Dinitrophenol.

Chempar* — see Copper Oxochloride.

Chemsect* DNOC (DNOC) — Discontinued by Tifa Ltd.

Chemsect* Herbicide (dinoseb) — Discontinued by Tifa Ltd.

Chem-Sen* 56 Fungicide/Herbicide/Insecticide (sodium arsenite) — Discontinued by Pennwalt.

ChemSHEAR*

(Discontinued 1984 by Armak)

Action/Use

ACTION: Growth regulator.

Safety Guidelines

SIGNAL WORD: DANGER. Corrosive.

TOXICITY CLASS: I.

TOXICITY: ChemSHEAR* slightly toxic. Undiluted product: (Rat): Oral LD₅₀ 5.0 g/kg. (Rabbit): Dermal LD₅₀ 5.0 g/kg.

CHEMTREC

The Chemical Transportation Emergency Center, operated by the Chemical Manufacturers Association (CMA). This U.S. system formed in 1971 as a centralized reporting agency for emergency chemical spills operates 24 hours a day, seven days a week. A caller at the scene of a spill reports to CHEMTREC, which in turn provides emergency instructions and contacts the chemical company involved.

Located in Washington, DC. Phone: 800-424-9300.

In Alaska, Hawaii, U.S. Territories, and Washington, DC call 202-483-7616.

Cheshunt Compound**Chemistry**

COMPOSITION: Ratio 2:1:1 copper sulfate, ammonium carbonate. When dissolved, yields largely cuprammonium sulfate. After application the latter becomes the basic sulfate.

Action/Use

ACTION: Fungicide.

USE: Seed box treatment to prevent soil-borne seedling diseases.

Chevron 20615 — see Ofurace.

Chex Mate***Registration Notes**

Trade name reused. See Moncide* under Cacodylic Acid.

Cheyenne* FM — see Fenoxaprop-P-ethyl; MCPA; Express*; Pinnacle*.

Cheyenne* Herbicide (Cheyenne* FM + X-TRA*) — see Fenoxaprop-P-ethyl; MCPA; Express*; Pinnacle*.

4-ChFu — see Marks 4-CPA*.

Chimac Cop* — see MCPP.

Chimac Cop Special* — see 2,4-D; MCPP.

Chimac Diazo* — see Diazinon.

Chimac Dim* — see Dimethoate.

Chimac DVP* — see DDVP.

Chimac Endo* — see Endosulfan.

Chimac Fol* — see Folpet.

Chimac L200* — see Lindane.

Chimac Mixte* — see 2,4-D; 2,4-MCPA.

Chimac Oxy* — see 2,4-MCPA.

Chimac Par H* — see Parathion.

Chimac Par M* — see Methyl-Parathion.

Chimac Zin* — see Zineb.

Chimibac 100* — see Benzalkonium Chloride.

Chimiclor* — see Alachlor.

Chimigor 40* — see Dimethoate.

China Clay — see Nuflo*.

Chinalphos — see Quinalphos.

Chinoin Fundazol* — see Benomyl.

Chinoin Fundozol* — see Benomyl.

Chinomethionat* Fungicide (thioquinox) — Discontinued by Bayer AG.

Chinomethionate — see Moresân*.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

ChinosolBP: Probelte, S.A. (Beltanol L[®])**Identification**

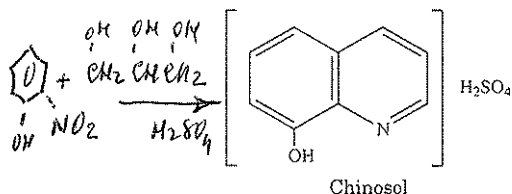
COMMON NAME: Hydroxyquinoline sulfate (ISO-E); Quinomethionate (BSI).

CODE NUMBERS: CAS 134-31-6; SHA 059804.

Chemistry

COMPOSITION: 8-Hydroxyquinoline sulfate.

PROPERTIES: Yellow crystalline powder. Melting point 175-178°C. Slightly soluble in ethanol. Insoluble in diethyl ether. Alkali liberates 8-hydroxyquinoline, a strong chelating agent which precipitates heavy metals.

**Action/Use**

ACTION: Bactericide, systemic fungicide.

USE: Controls certain vascular wilts on crop plants (citrus, fruit trees, vegetables, vine). Bacterial diseases of plants; fungus on cutting flowers.

FORMULATIONS: Soluble liquid.

Environmental Guidelines

HAZARDS: Bee: Nontoxic. Fish: Nontoxic. Birds: Nontoxic.

SOLUBILITY: Readily soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1200 mg/kg.**Emergency Guidelines**

FIRST AID: Treat symptomatically.

Chinotionat — see Eradex[®].**Chinufur[®] Insecticide/Nematicide (carbofuran)** — Discontinued 1989 by Chemol Trading Ltd. Co.**Chip-Cal[®] Herbicide/Insecticide (calcium arsenate)** — Discontinued by Rhone-Poulenc Ag Co.**Chipco[®] 26019** — see Iprodione.**Chipco[®] Allette[®]** — see Fosetyl-Aluminum.**Chipco[®] Bucril[®] Herbicide (bromoxynil)** — Discontinued by Rhone-Poulenc Ag Co.**Chipco[®] Crab Kleen[®] Herbicide (DSMA + bromoxynil)** — Discontinued by Vineland Chemical.**Chipco[®] Fiorel[®] Pro**

(Discontinued 1993 by Rhone-Poulenc Ag Co.)

Identification

COMMON NAMES: Ethephon (ANSI); chlorthephon (New Zealand).

CODE NUMBERS: CAS 16672-87-0; SHA 099801.

ADDITIONAL TRADE NAME: Ethrel[®] (Rhone-Poulenc Ag Co.).**Chemistry**

COMPOSITION: (2-Chloroethyl)phosphonic acid (CAS).

Action/Use

ACTION: Plant growth regulator.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ 300-350 mg/l (96 h) (bluegill, rainbow trout).

Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4400 mg/kg. Moderate eye irritant.Chipco[®] Fiorel[®]: Oral LD₅₀ >20,000 mg/kg.**Chipco[®] Mocap[®] 5G** — see Ethoprop.**Chipco[®] Nivral[®]** — see Larvin[®].**Chipco[®] Ronstar[®]** — see Oxadiazon.**Chipco[®] Spot Kleen[®] Fungicide (thiophanate methyl)** — Discontinued by Rhone-Poulenc Ag Co.**Chipco[®] Thiram 75** — see Thiram.**Chipco[®] Turf Herbicide D (2,4-D)** — Discontinued by Rhone-Poulenc Ag Co.**Chipco[®] Turf Herbicide MCPP (mecoprop)** — Discontinued 1987 by Rhone-Poulenc Ag Co.**Chipco[®] Turf Kleen[®] Herbicide (2,4-D + MCPP)** — Discontinued by Rhone-Poulenc Ag Co.**Chipcote[®] (methylmercury nitrile)** — Discontinued by Rhone-

Poulenc Ag Co.

Chiptox[®] — see MCPA.**Chlormethoxyfen** — see Chlormethoxynil.**Chlorméthoxyfène** — see Chlormethoxynil.**Chlor Kil[®] Insecticide (chlordane)** — Discontinued.**Chloral Chloroamide** — see Gralit 85[®].**Chloralose**F: Jewnin-Joffe Industry Ltd. (Alfamat[®])**Identification**

COMMON NAME: Alpha-chloralose.

TRIVIAL NAMES: Glucochloralose; glucochloral.

CODE NUMBER: CAS 15879-93-3.

Chemistry

COMPOSITION: (R)-1,2-O-(2,2,2-trichloroethylidene)-α-D-glucofuranose).

Action/Use

ACTION: Repellent, rodenticide.

USE: Used for many years in Europe on seed grain to repel birds. For hypnotic baits to control rodents, birds, foxes, and other pest animals.

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: (Mouse): Oral LD₅₀ 200 mg/kg.

HANDLING AND STORAGE CAUTIONS: Keep in closed containers in a closed area.

Emergency Guidelines

FIRST AID: Symptomatic, as for opium poisoning.

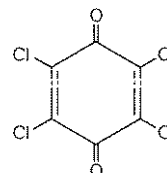
Chloramben — see Amiben[®]; Vegiben[®].**Chlorambèn** — see Vegiben[®].**Chlorambene** — see Amiben[®].**Chloramizol** — see Imazalil.**Chloraniformethane** — see Imugan[®].**Chloraniforméthane** — see Imugan[®].**Chloranil****Identification**

COMMON NAMES: Chloranil (ISO-E, BSI); chloranile (ISO-F).

CODE NUMBERS: CAS 118-75-2; SHA 079301; ENT 3747.

DISCONTINUED NAME: Spergon[®] (Uniroyal Chemical Co., Inc.).**Chemistry**

COMPOSITION: 2,3,5,6-Tetrachloro-1,4-benzoquinone.

**Action/Use**

ACTION: Fungicidal seed treatment, foliar application.

Registration Notes

Not sold in many countries.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4000 mg/kg.**Emergency Guidelines**

FIRST AID: Symptomatic treatment.

Chloranile — see Chloranil.**Chloranocryl** — see Dieryl.**Chlorasol[®] Fumigant (ethylene dichloride)** — Discontinued.**Chlorates**

Used as herbicides and defoliants. They act as contact poisons, are translocated and may be absorbed from the soil to kill both plant roots and tops. Chlorates cause chlorosis of leaves and a starch depletion in stems and roots when applied in less than lethal doses.

See Sodium Chlorate, Magnesium Chlorate.

Chlorax[®] Herbicide (sodium chlorate + sodium metaborate)

— Discontinued by Rhone-Poulenc Ag Co.

Chlorazine[®] Herbicide — Discontinued by Ciba-Geigy.**Chlorbenside****Identification**

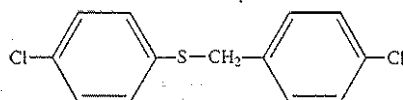
COMMON NAMES: Chlorbenside, chlorsulphacide (Canada).

CODE NUMBERS: CAS 103-17-3; SHA 017401.

DISCONTINUED NAMES: Chlorocide[®], Chlorparacide[®] (Boots Co. Ltd.).Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: 4-Chlorobenzyl 4-chlorophenyl sulfide.



Chlorbenside

Action/Use

ACTION: Acaricide; little insecticidal activity.

Chlorbicyclene — see Alodan*.**Chlorbromuron** — see Maloran*.**Chlorbufam** — see Alicep*; Alipur*.**Chlorbycyclen** — see Alodan*.**Chlorcyrin*** — see Chlorpyrifos; Cypermethrin.**Chlordane**

BP: Velsicol Chemical Corp. (Chlordrite*, Mahatz*, Termex*, Termiseal*, Termidan*)

Identification

COMMON NAME: Chlordane (ISO, BSI, ESA, JMAF).

CODE NUMBERS: CAS 12789-03-6; SHA 058201; EINECS 2003490.

ADDITIONAL TRADE NAME: Chlortox* (All India Medical Corp.).

DISCONTINUED NAMES: Octa-Klor*, Ortho Klor* (Chevron Chemical Co.); Aspon* Chlordane (Faesy & Besthoff, Inc.); Niran* (+ parathion) (Monsanto Agricultural Co.); Killex* Chlordane (Paushak); Corodane* (PPG Industries); Termi-Ded* (Rigo Co.); Synklor* (Tamogan); Gold Crest C-100*, Octachlor*, Velsicol 1068* (Velsicol Chemical Corp.); Belt*, Chlor Kil*, Kypchlor*, Topiclor 20*.

Chemistry

COMPOSITION: Technical chlordane; octachloro-4,7-methanoindene and related compounds.

FAMILY: Chlorinated cyclodiene.

PROPERTIES: Viscous amber-colored liquid. Stable toward acid, alkaline conditions that are encountered in formulation and application. Vapor pressure, 1×10^{-6} mm of Hg at 25°C. Completely miscible in most organic solvents.**Action/Use**

ACTION: Stomach, contact insecticide.

USE: Termite control and wood treatment.

FORMULATIONS: Emulsifiable concentrate. Chlordane may be formulated as an emulsifiable concentrate, using any of the usual non-phytotoxic solvents, of which kerosene is most commonly used, and using nonionic, anionic, and cationic emulsifiers available to the trade.

COMBINATIONS: Piran* (+ DDVP + dibromochloropropane + synergist) (Tamogan Ltd.); Termide* (+ heptachlor).

Registration Notes

U.S.: C-100, Termide* sales temporarily halted. Reinstatement of limited uses for termite control may be permitted pending completion of air monitoring tests following specific application styles.

OUTSIDE U.S.: Formulations available internationally for termite control and wood treatment, especially plywood glue-line.

Environmental Guidelines

HAZARDS: Fish: Highly toxic. Bee: Toxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 367-515 mg/kg. (Rabbit): Dermal LD₅₀ >200 but <2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Glass or steel containers having a protective baked phenolic coating are used for packing emulsifiable concentrates, water emulsions, and oil solutions. Dusts, dust concentrates, and wettable powders are generally placed in multiwall kraft paper bags. In handling chlordane or its formulations care should be exercised to avoid skin contact, inhalation of dusts or mists, and ingestion. For liquid formulations. Not for tech.

Emergency Guidelines

FIRST AID: For liquid formulations: Ingestion, do NOT induce emesis. Gastric lavage is indicated. Get medical aid.

Chlordecone — see Kepone*.**Chlordemeforme** — see Chlordimeform.**Chlordimeform****Identification**

COMMON NAMES: Chlordimeform (ANSI, BSI, ISO-E); chlordemeforme (ISO-F); chlorodimeform (New Zealand); chlorphenamidine (JMAF).

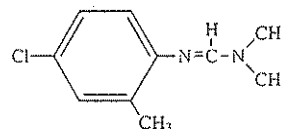
EXP. CODE NUMBERS: C 8514 (Ciba-Geigy); EP-333, SN 36268 (Schering AG).

OTHER CODE NUMBERS: CAS 6164-98-3; SHA 059701; ENT 27567.

DISCONTINUED NAMES: Ovatoxon* (Agro-Quimicas de Guatemala); Galecron* (Ciba-Geigy); Bermat* (Quimica Estrella - ACA S.A.); Fundal* (Schering AG, NOR-AM); Acaron*, Fundex*, Spanone* (Schering AG); Spanone*.

Chemistry

COMPOSITION: N'-(4-chloro-o-tolyl)-N,N-dimethylformamidine.



Chlordimeform

Action/Use

ACTION: Insecticide-acaricide, ovicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Base (Rat): Oral LD₅₀ 340 mg/kg. Dermal LD₅₀ 640 mg/kg. Hydrochloride (Fundal* SP) (Rat): Oral LD₅₀ 355 mg/kg. (Rabbit): Dermal LD₅₀ >4000 mg/kg.Galecron* 4E, Fundal* 4EC, Bermat* 50% (Rat): Oral LD₅₀ 250 mg/kg; Inhalation LD₅₀ 3.3 mg/l (4h). (Rabbit): Dermal LD₅₀ 2500 mg/kg; Severe eye, moderate skin irritation.**Emergency Guidelines**

ANTIDOTE: None. Chlordimeform is not a cholinesterase inhibitor. Medical therapy should include usual symptomatic treatment for organochlorine compounds.

Chlordrite* — see Chlordane.**Chlorea* Herbicide (sodium chlorate + sodium metaborate + diuron)** — Discontinued 1984 by Rhone-Poulenc Ag Co.**Chlorefenizon** — see Chlorfenson.**Chlorethephon** — see Chipco* Florel* Pro.**Chlorethoxyfos** — see Fortress*.**Chlorex*** — see Dichloroethyl Ether.**Chlorfenac** — see Fenatrol*.**Chlorfenethol** — see Qikron*.**Chlorfenidim** — see Monuron.**Chlorfenprop-methyl** — see Bidisin*.**Chlorfenson**

BP: Nippon Soda Co., Ltd. (Sappiran*)

Identification

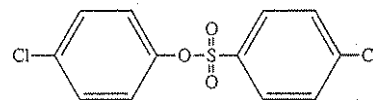
COMMON NAMES: Chlorfenson (ISO); chlorofenizon (ISO-F); CPCBS (JMAF); ovex (ANSI, Canada); ovatran (Argentina).

CODE NUMBERS: CAS 80-33-1; SHA 020201; ENT 16358; EINECS 2012704.

DISCONTINUED NAME: Mitran* (+ chlorfenethol) (Nippon Soda Co., Ltd.).

Chemistry

COMPOSITION: 4-chlorophenyl 4-chlorobenzenesulfonate.



Chlorfenson

Action/Use

ACTION: Acaricide.

COMBINATIONS: Tolpiran* (+ polynactins complex) (Chugai Pharmaceutical Co., Ltd.).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2000 mg/kg. No toxic effect observed (300 ppm/product/130 days).

See Ovex.

Chlorfensulfide — see Chlorfensulphide.**Chlorfensulphide****Identification**

COMMON NAMES: Chlorfensulphide (ISO-E, BSI); CPAS (JMAF); chlorfensulfide (ISO-F).

CODE NUMBER: CAS 2274-74-0; EINECS 2012746.

DISCONTINUED NAME: Mikasin* (+ oxythane + bis (4-chlorophenyl) disulphide), Milbex* (+ chlorfenethol) (Nippon Soda Co., Ltd.).

Chemicals are cross-referenced by common and trade name

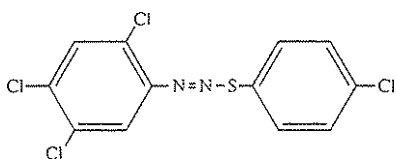
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chlorfenvinphos

Chemistry

COMPOSITION: 4-Chlorophenyl 2,4,5-trichlorophenylazosulfide.



Chlorfensulphide (ISO)

Action/Use

ACTION: Acaricide.

Chlorfenvinphos

BP: American Cyanamid Co. (Birlane*, Supona*)
Ciba, Ltd. (Sapecron*, Steladone*)

Identification

COMMON NAME: Chlorfenvinphos (BSI, ISO, BAN); CVP (JMAF).
EXP. CODE NUMBER: SD 7859 (Shell Chemical Co.); C 8949 (Ciba-Geigy); CGA 26351 (Ciba-Geigy).
OTHER CODE NUMBERS: CAS 470-90-6; SHA 084101; EINECS 207-432-0.

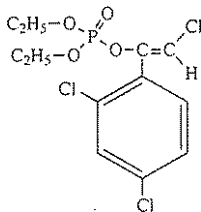
ADDITIONAL TRADE NAMES: CFV*, Compound 4072, Vinylphate*,
DISCONTINUED NAME: Apachlor* (KenoGard); Unitox* (Quimica Estrella).

Chemistry

COMPOSITION: 2-Chloro-1-(2,4-dichlorophenyl)vinyl diethylphosphate.

FAMILY: Organophosphate.

PROPERTIES: (Tech): amber liquid, boiling point 167-170°C at 0.5 mm/Hg. Miscible with organic solvents.



Chlorfenvinphos

Action/Use

ACTION: Insecticide, acaricide.

USE: Apachlor* preharvest insecticide for various rootflies in root-vegetables, Brussels sprouts, onions. Birlane* 10%G for control of root flies. Birlane* Liquid Seed Treatment for control of wheat bulb fly in winter wheat; as foliar for Colorado beetle and other pests on potatoes, leafhoppers on rice. Birlane* as soil insecticide for root maggots, root-worms, cutworms. Foliage insecticide for Colorado beetle, citrus scale, rice stem borers, cotton whitefly; seed dressing for wheat bulb fly. Birlane* 24 controls root flies, phorid, sciarid fly larvae, fruit fly on maize, sweet corn, wheat bulb fly in winter wheat.

FORMULATIONS: Emulsifiable concentrates, granules, seed treatments, wettable powder.

Registration Notes

U.S.: Steladone*, Supona* not registered for crop uses.

OUTSIDE U.S.: Birlane*, C8949, CGA 26351, Sapecron*, Steladone*.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.36 mg/l (24 h) (harlequin). Bee: Toxic. Granular nontoxic when used as directed.

SOLUBILITY: In water 145 ppm at 23°C.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 10-39 mg/kg. Dermal LD₅₀ 30-108 mg/kg.
PROTECTIVE CLOTHING: Wear face mask, neoprene apron when unloading or handling containers containing powder, dust, or granular formulations.

HANDLING AND STORAGE CAUTIONS: Poisonous if swallowed, inhaled, or absorbed through skin. Do not contaminate feed or food-stuffs. Do not get in eyes, skin, or clothing. Do not breathe spray. Keep container closed. Use with adequate ventilation and protective clothing. Wash thoroughly after handling. Do not drink any alcoholic beverages before or during spraying since alcohol promotes absorption of organic phosphates.

Emergency Guidelines

FLASHPOINT: Nonflammable. <38°C (Pensky-Martens closed cup).

PESTICIDE DICTIONARY

FIRE EXTINGUISHING MEDIA: Alcohol-resistant foam, dry powder, CO₂.

ANTIDOTE: Atropine combined with oxime preparations.

FIRST AID: Get immediate medical aid as necessary. **Eyes**, flush with plenty of water. **Skin**, remove contaminated clothing immediately and wash affected areas with soap and water. If poisoning symptoms develop, get immediate medical aid. **Inhalation**, remove to fresh air. Apply artificial respiration if needed. **Ingestion**, if conscious, induce vomiting. Do NOT give salt water or any other emetic.

Chlorfluazuron — see Atabron*.

Chlorfluazuron

Identification

COMMON NAME: Chlorfluazuron (ISO, BSI).

EXP. CODE NUMBER: NC-3363.

OTHER CODE NUMBERS: CAS 3615-21-2; SHA 327200.

Chemistry

COMPOSITION: 4,5-Dichloro-2-trifluoromethylbenzimidazole.

Action/Use

ACTION: Herbicide.

Chlorfluorecol — see Chlorfluorecol.

Chlorfluorecol-methyl ester — see Chlorfluorecol.

Chlorfluorecol

Identification

COMMON NAMES: Chlorfluorecol-methyl (ISO-E, BSI), chlorfluorecol-methyl (ISO-F).

EXP. CODE NUMBER: IT 3456 (chlorfluorecol methyl).

OTHER CODE NUMBERS: CAS 2464-37-1 (chlorfluorecol); CAS 2536-31-4 (chlorfluorecol-methyl); SHA 292200.

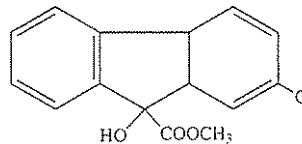
ADDITIONAL TRADE NAMES: Maintain A*, Maintain CF 125*.

DISCONTINUED NAMES: Break-Thru* (Andersons Industrial Products Group); CF 125*, Curbiset*, Multiprop* (Shell Agrar GmbH & Co. KG).

Chemistry

COMPOSITION: Methyl 2-chloro-9-hydroxyfluorene-9-carboxylate.

PROPERTIES: Soluble in acetone, benzene, and alcohol.



Chlorfluorecol-methyl ester

Action/Use

ACTION: Plant growth regulator; herbicide.

Environmental Guidelines

HAZARDS: (Chlorfluorecol-methyl) Fish: LC₅₀ (96 h) 7.2 mg/l (bluegill); c. 9 mg/l (carp); 0.015 mg/l (rainbow trout). Bee: Nontoxic.

SOLUBILITY: Low in water (approx. 18 ppm).

Safety Guidelines

SIGNAL WORD: DANGER (Curbiset*, Break-Thru*). CAUTION (CF 125*).

TOXICITY CLASS: I (Curbiset*, Break-Thru*). IV (CF 125*).

TOXICITY: (Rat): Oral LD₅₀ 12,700 mg/kg. Dermal LD₅₀ >10,000 mg/kg.

Chlorfonium — see Phosfon*.

Chloridazon — see Pyramin*; Quinmerac.

Chloridazone — see Pyramin*.

Chloride of Lime

Identification

CODE NUMBER: CAS 7778-54-3.

OTHER NAMES: Bleaching powder, calcium hypochlorite.

Chemistry

COMPOSITION: CaOCl₂.

PROPERTIES: Bactericidal properties owing to slowly released chlorine.

Action/Use

ACTION: Fungicide, bactericide.

Chlorimuron-ethyl — see Classic*.

Chlorinat — see Carbyne*.

Chlorinated Hydrocarbon

A group of pesticides which contain chlorine, carbon, and hydrogen. See Chlorinated Organic Insecticides and Acaricides.

Chlorinated Isocyanurates

Chemistry

COMPOSITION: Combination of six chemicals.

FAMILY: Halogenated triazines.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

PROPERTIES: White, crystalline solid. Slight chlorine odor, melting point 225-250°C.

Action/Use

ACTION: Algicide; disinfectant; fungicide; sanitizer.
FORMULATIONS: Aqueous dilutions, solids.

Environmental Guidelines

HAZARDS: Fish: Highly toxic. Bird: Slightly toxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Keep away from heat and flame.

Chlorinated Organic Acaricides — see Chlorinated Organic Insecticides and Acaricides.

Chlorinated Organic Insecticides and Acaricides

The organo-chlorine chemicals form one of the three principal pesticide families. This class in the insecticides and acaricides has related pharmacological effects, and EPA has limited the total amount of these related chemicals for residue purposes.

Included are the following chemicals and their metabolites:

Aldrin	Endrin
BHC (benzene hexachloride)	Heptachlor
Chlorbenside	Lindane
Chlordane	Methoxychlor
Chlorobenzilate	Mirex
DDT	Ovex
Dicofol	TDE
Dieldrin	Tetradifon
Endosulfan	Toxaphene

Chlormephos

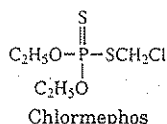
BP: Rhone-Poulenc Ag Co. (Dotan*)

Identification

COMMON NAME: Chlormephos (BSI, ISO).
EXP. CODE NUMBER: MC 2188 (Murphy Chemical).
CODE NUMBERS: CAS 24934-91-6; SHA 295300.

Chemistry

COMPOSITION: S-Chloromethyl O,O-diethyl phosphorodithioate.
PROPERTIES: Liquid, specific gravity 1.260. Stable. Soluble in most organic solvents.



Action/Use

ACTION: Soil insecticide.
USE: Controls wireworms, white grubs.
FORMULATIONS: Granules.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 1.5 mg/l (harlequin). Bee: Toxic. Bird: LD₅₀ 260 mg/kg (quail).

SOLUBILITY: Slightly soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 7 mg/kg. Dermal LD₅₀ 27 mg/kg.

Emergency Guidelines

ANTIDOTE: Co-administration of atropine sulphate, 2-PAM recommended.

Chlormequat — see Chlormequat Chloride.

Chlormequat Chloride

- BP: All India Medical Corp. (Hormocel*)
- American Cyanamid Co. (Cycocel*)
- Barclay Chemicals Mfg. Ltd. (Holdup*)
- BASF AG (CeCeCe*, Cycocel*, Cycocel-Extra*)
- BASF India Ltd. (Lihocin*)
- Cequisa (Ceku-CCC*)
- Ciech-Agrochemia (CCC*)
- Hico Products Ltd. (Hico CCC*)
- Makhteshim-Agan (Cycogan*, Pentagan*)
- Sarabhai M. Chemical (Increcel*)
- UCB Chemicals (Agrochemicals Headquarters)
- UCB Chemicals Corp.

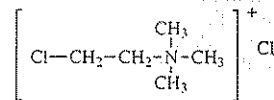
Identification

COMMON NAME: Chlormequat (BSI, ISO).
TRIVIAL NAMES: CCC, chlorocholine chloride.
EXP. CODE NUMBER: CN 29231090 (Ciech-Agrochemia).

CODE NUMBERS: CAS 999-81-5; SHA 018101; EINECS 213-666-4.
ADDITIONAL TRADE NAME: Cycostalk* (Chimac-Agriphar S.A.).
DISCONTINUED NAME: Ponnax* (+ carbendazim + choline choride), Mastiff* (+ carbendazim) (BASF AG).

Chemistry

COMPOSITION: 2-chloroethyltrimethylammonium chloride.
PROPERTIES: Tech a.i.: Solid, yellowish; very hygroscopic crystals. Solubility at 20°C (g a.i./100g solvent), in ethanol 32. CCC*: Yellow to brownish color. Density at 20°C - 1.14-1.15 g/ml.



Chlormequat chloride

Action/Use

ACTION: Bioregulator, plant growth regulator.
USE: For greenhouse use as plant growth regulator on azaleas, poinsettias, geraniums, and hibiscus. Lihocin* for cotton, various vegetables, grape vines, mango, tobacco and ornamentals. For wheat, rye, and oats in Europe.

FORMULATIONS: Aqueous solutions, dust, powder liquids.

COMBINATIONS: Terpal* C (+ ethephon), Terpal* M (+ mepiquat chloride + ethephon) (BASF AG).

Registration Notes

OUTSIDE U.S.: India: Hico CCC* for vegetables, cotton, sugarcane, and mango trees.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >100 mg/l (96 h) (trout). Bird: Oral LD₅₀ 555 mg/kg body wt. (Japanese quail). Bee: Nontoxic.

SOLUBILITY: At 20°C (g a.i./100g solvent), in water 100.

Safety Guidelines

SIGNAL WORD: CAUTION: (Cycocel-Extra*); CAUTION—POISON (Increcel*).

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 883 mg/kg. Dermal LD₅₀ >4000 mg/kg.

CCC*: (Rat): Oral LD₅₀ 1100 mg/kg.

Cycocel-Extra* (Rat): LD₅₀ 2836 mg/kg. Dermal: LD₅₀ >5650 mg/kg.

Lihocin* (Rat): LD₅₀ 709 mg/kg.

PROTECTIVE CLOTHING: Wear protective clothing and impermeable gloves.

HANDLING AND STORAGE CAUTIONS: Observe usual precautions. Avoid inhalation of spray, prolonged or repeated contact with skin. Clothing should be removed and washed thoroughly after handling chemical.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: Atropine is contraindicated. Oral administration only of choline salts (Do NOT administer intravenously).

FIRST AID: Get medical aid. Symptomatic treatment. Ingestion, do not induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC); 201-835-3100 (American Cyanamid).

Chlormethoxynil

BP: Ishihara Sangyo Kaisha, Ltd.

Identification

COMMON NAMES: Chlormethoxynil (JMAF); chlormethoxyfen (draft ISO-E); chlorméthoxyfène (draft ISO-F).

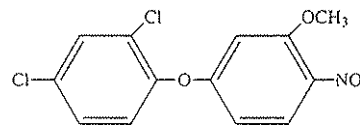
EXP. CODE NUMBER: X-52 (Ishihara Sangyo Kaisha, Ltd.).

OTHER CODE NUMBER: 32861-85-1.

DISCONTINUED NAMES: Diphenex* (Ishihara Sangyo Kaisha, Ltd.).

Chemistry

COMPOSITION: 2,4-dichlorophenyl 3'-methoxy-4'-nitrophenyl ether.
PROPERTIES: Solubility (20°C) in benzene 15%; acetone 20%; dimethylsulfoxide 10%. Stable to acid, alkaline, and light.



Chlormethoxynil

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Herbicide.

Environmental Guidelines

SOLUBILITY: At 20°C. in water 0.39 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat/Mouse): Oral LD₅₀ >10,000. Dermal LD₅₀ >5000.

Chlormezyl* — see Chlorpyrifos; Dimethoate.

Chlormite* — see Acaralate*.

Chlornitrofen — see CNP.

Chlornitrofen — see CNP.

Chloro IPC* — see Chlorpropham.

Chlorobenzilate**Identification**

COMMON NAME: Chlorobenzilate (BSI, ISO, ESA, JMAF).

EXP. CODE NUMBER: G 23992 (Ciba-Geigy Ltd.).

OTHER CODE NUMBERS: CAS 510-15-6; SHA 028801; ENT 18596.

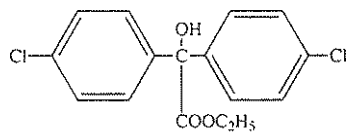
ADDITIONAL TRADE NAME: Kop-Mite*.

DISCONTINUED NAMES: Acaraben*, Akar*, Folbex* (Ciba-Geigy Ltd.); Benzilan* (Makhteshim-Agan); Benz-O-Chlor* (Tower).

Chemistry

COMPOSITION: Ethyl 4,4'-dichlorobenzilate.

PROPERTIES: Tech, brownish liquid, approx. 90% pure. Pale yellow solid, melting point 36-37.5°C. Tech soluble in most organic solvents including petroleum oils.



Chlorobenzilate

Action/Use

ACTION: Acaricide.

USE: Used on citrus to control many mite species.

FORMULATIONS: Emulsifiable concentrates; Tech, wettable powders.

Registration Notes

U.S.: Some or all applications may be classified as RUP.

OUTSIDE U.S.: Folbex* Smoke-Strips for use in hives against the bee-mite *Acarapis woodi*.**Environmental Guidelines**

HAZARDS: Bee: Nontoxic.

SOLUBILITY: Tech practically insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 2784-3880 mg/kg.Acaraben* 4E (Rat): Oral LD₅₀ 1800 mg/kg. (Rabbit): Dermal LD₅₀ >10,200 mg/kg. Severe eye, moderate skin irritation.

HANDLING AND STORAGE CAUTIONS: Acaraben* 4E shelf-life of at least 3-5 years when stored in a dry place and minimum (above 32°F) storage temperatures are observed.

Chloroble Fort* Fungicide/Insecticide (endosulfan + lindane + copper oxide) — Discontinued by Pechiney Progil.

Chloroble M* Fungicide (maneb) — Discontinued by Cumberland International Corp.

Chlorobromuron — see Maloran*.

Chlorocide* Insecticide (chlorsenside) — Discontinued.

Chlorodimeform — see Chlordimeform.

Chlorofenizon — see Ovex.

Chlorofenson — see Ovex.

Chlorofet* — see Chlorpyrifos.

Chloroform**Identification**

CODE NUMBERS: CAS 67-66-3; SHA 020701.

Chemistry

COMPOSITION: Trichloromethane.

Action/Use

ACTION: Fumigant.

USE: At least one grain fumigant mixture contains chloroform (73.2%) with carbon disulfide (26.8%). The chloroform acts to suppress the fire hazard of the carbon disulfide, as well as having some insect control capacity itself.

Chlorofos — see Trichlorfon.

Chloromethoxypropyl Mercuric Acetate**Action/Use**

ACTION: Fungicide.

USE: Seed treatment of oats, wheat.

FORMULATIONS: Liquid.

Chloroneb — see Nu-Flow AD; Nu-Flow D; Nu-Flow ND; TCMTB; Terraneb* SP.

Chloroneb 65W — see Terraneb* SP.

Chloronebe — see Terraneb* SP.

Chloronitropropane**Identification**

CODE NUMBERS: CAS 2425-66-3; SHA 011302.

ADDITIONAL TRADE NAME: Korax*.

DISCONTINUED NAME: Lanstan* (FMC Corp.)

Chemistry

COMPOSITION: 1-Chloro-2-nitropropane.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): LD₅₀ 197 mg/kg. Chemical is lachrymatory (tear gas).**Chlorophacinone**

BP: Chemol Trading Ltd. Co. (Redentin*)

LiphaTech, Inc. (Caid*, Rozol*)

Identification

COMMON NAME: Chlorophacinone (ISO, BSI, JMAF).

CODE NUMBERS: CAS 3691-35-8; SHA 067707.

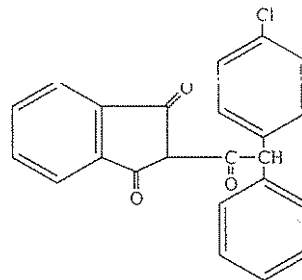
ADDITIONAL TRADE NAMES: Actosin C*, Lepit* (CAMCO); Dicusat M* (Diachem S.P.A.); Liphadione, LM 91. Microzul*, Ramucide*, Ratomet*, Raviac*, Topitox*.

DISCONTINUED NAMES: Mouse-Out* (LiphaTech, Inc.); Drat* (Rhône-Poulenc Ag Co.).

Chemistry

COMPOSITION: 2-[(p-chlorophenyl)phenylacetyl]-1,3-indandione (CAS 8CI).

PROPERTIES: Pale yellow crystalline, melting point 140-145°C. Soluble in dichloromethane and chloroform. Sparingly soluble in acetone and ether. Very sparingly soluble in ethanol and methanol.



Chlorophacinone

Action/Use

ACTION: Anticoagulant, rodenticide.

USE: Oil concentrate for impregnating bait material. Rozol* used also in production of paraffin blocks, pellets, water bait, tracking powder. Various labeled for indoor/outdoor use.

FORMULATIONS: Dry concentrate, ground spray, meal bait, oil concentrate, paraffin blocks, pellets, tracking powder. Concentrates available for mixing registered formulations.

Registration Notes

U.S.: For use in official establishments operating under the Federal Inspection Program for meat, poultry, shell egg grading and egg products.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING for tracking powder; CAUTION for most formulated baits.

TOXICITY CLASS: I (tech); II (tracking powder); III (baits).

TOXICITY: 100% chlorophacinone (Rat): Oral LD₅₀ 3.15 mg/kg (1 dose: 21 days). 0.005% chlorophacinone formulations (Commensal rodents): LD₅₀ 63 g/kg. (Mouse, field): generally 0.005%-0.0075% (varies by species/application).

PROTECTIVE CLOTHING: See label. Mask, gloves for concentrates >1%.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

HANDLING AND STORAGE CAUTIONS: See specific product label.

Emergency Guidelines

ANTIDOTE: Vitamin K₁.

FIRST AID: Get medical aid.

Chlorophenamide — see Chlordimeform.

Chlorophenothane — see DDT.

Chlorophenoxy Herbicides

Includes 2,4-D, 2,4-DB, Dichlorprop, Erbon*, Falone*, MCPA, MCPB, MCPP, Silvex, 2,4,5-T.

Chlorophenoxypropionic Acid

Identification

COMMON NAME: Clorprop (ISO, BSI).

CODE NUMBER: CAS 101-10-0.

Chemistry

COMPOSITION: (±)2-(3-chlorophenoxy)propionic acid.

Action/Use

ACTION: Fruit thinner.

USE: Plums, prunes.

FORMULATIONS: Wetttable powder.

Chlorophos — see Trichlorfon.

Chlor-O-Pic* — see Chloropicrin.

Chloropicrin

BP: Great Lakes Chemical Corp. (Chlor-O-Pic*)

LCP Chemicals

Mitsui Toatsu Chemicals, Inc.

Niklor Chemical Co., Inc.

TRICAL, Inc.

Identification

COMMON NAMES: Chloropicrin (ISO-E, BSI, ESA); chloropicrine (ISO-F).

TRIVIAL NAMES: Nitrochloroform, trichloronitromethane.

CODE NUMBERS: CAS 76-06-2; SHA 081501.

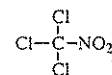
ADDITIONAL TRADE NAMES: Acquinite*, Dojyopicrin*, Dolo-chlor*, Larvacide*, Pic-Clor*, Tri-clor*.

DISCONTINUED NAMES: Drexel Plant Bed Gas* (+ methyl bromide) (Drexel Chemical); Terr-O-Gel* (+ methyl bromide) (Great Lakes Chemical); Picfume*, Profume* A.

Chemistry

COMPOSITION: Chloropicrin nitrotrichloromethane. CCl₃NO₂ or Cl₃CNO₂.

PROPERTIES: Heavy, colorless, liquid with intensely irritating tear gas odor. Specific gravity 1.66. Boiling point 112°C. Vapor pressure 20°C, 18.3 mm Hg. Vapor density 5.7.



Chloropicrin

Action/Use

ACTION: Soil/space fumigant; warning agent.

USE: For nematodes, bacteria, fungi, insects, and weeds. Warning agent for use with odorless fumigants (e.g. methyl bromide, sulfuryl fluoride).

FORMULATIONS: Ready-to-use concentrate.

COMBINATIONS: Brom-O-Gas*, Brom-O-Soi*, Terr-O-Gas* (all with methyl bromide) (Great Lakes Chemical); Rootect Oil* (+ DCIP) (SDS Biotech K.K.); TRI-CON* (+ methyl bromide) (TRICAL, Inc.); Bromo-coop* (+ methyl bromide) (Vinxport S.A.).

Registration Notes

U.S.: All applications are classified as RUP.

Environmental Guidelines

SOLUBILITY: In water 0.2 g/100g.

Safety Guidelines

SIGNAL WORD: DANGER (eye).

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 250 mg/kg. (Rabbit): Inhalation LC₅₀ 150 ppm (15 min.); OSHA PEL 0.1 ppm; ACGIH TLV 0.1 ppm or 0.7 mg/M³; EPA fumigation limit requiring respirator 0.1 ppm. Chloropicrin is highly toxic by inhalation and toxic by ingestion; severe eye, skin irritant and lachrymator (tear gas). Can cause injury to the heart. Chronic health hazards are unknown.

PROTECTIVE CLOTHING: Wear full-body clothing that is cleaned after each wearing or disposable protective clothing. Use gloves and apron that are resistant to Chloropicrin. If full-face respiratory protection is not required, wear goggles or full-face shield for eye protection when handling liquid. If the concentration of Chloropicrin in the working area, as measured by a Matheson-Kitagawa detection device using tube 172, does not exceed 0.1 ppm (0.7 mg/M³), no respiratory protec-

tion is required. If this concentration is exceeded at any time, all persons in the fumigation area must wear a NIOSH/MSHA approved air purifying respirator approved for organic vapors, self-contained breathing apparatus (SCBA), or a combination air supplied/SCBA respirator.

HANDLING AND STORAGE CAUTIONS: Wash all contaminated clothing with soap and hot water before reuse. Store original containers in a cool, dry, well-ventilated area under lock and key. Post as a pesticide storage area. Persons moving or handling containers should wear protective clothing. Open container only in a well-ventilated area. May be corrosive under certain conditions. Do NOT use water to clean equipment. Flush equipment with kerosene or fuel oil. Do NOT use handling equipment or containers made from magnesium, aluminum or their alloys.

Emergency Guidelines

FLASHPOINT: Liquid noncombustible.

FIRE EXTINGUISHING MEDIA: All conventional media are suitable.

FIRST AID: Get medical aid. Eyes, flush with water for at least 15 minutes. Skin, wash thoroughly with soap and water. Remove contaminated clothes and shoes immediately and thoroughly aerate before reuse. Inhalation, remove to fresh air immediately. Keep patient lying down and warm. Give artificial respiration if breathing has stopped.

Chloropicrine — see Chloropicrin.

Chloropon

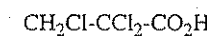
Identification

COMMON NAME: Chloropon (ISO, BSI).

CODE NUMBERS: CAS 3278-46-4; SHA 482700.

Chemistry

COMPOSITION: 2,2,3-Trichloropropionic acid.



Chloropon

Action/Use

ACTION: Herbicide.

Chloropropylate — see Acaralate*.

Chlorosis

The yellowing of a plant's normally green tissue because of a breakdown of chlorophyll or the failure of the chlorophyll to develop.

Chlorosul* — see Chlorothalonil.

Chlorothalonil

BP: Caffaro S.p.A. (ClortoCaffaro*)

Gilmore, Inc.

Helm AG

Hubei Sanonda Co., Ltd.

Inchema, Inc.

ISK Biosciences Corp. (Bravo*, Bravonil*, Daconil 2787*,

Tuff Brite*, Tufficide*)

OXON Italia S.p.A.

Pilarquim Corp. (Pilarich*)

Probelte, S.A.

Shinung Corp.

Sostram Corp. (Echo*)

Sundat (S) Pte. Ltd. (Colonil*)

Identification

COMMON NAME: Chlorothalonil (ANSI, BSI, ISO); TPN (JMAF).

CODE NUMBERS: CAS 1897-45-6; SHA 081901; EINECS 217-588-1.

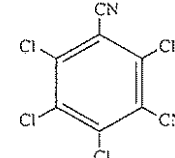
ADDITIONAL TRADE NAMES: Funconil* (Agsin Pte. Ltd.); Taloberg* (Diachem S.P.A.); Exotherm Termil* (Rigo Co.); Rothalonil* (Rotam Group); Chlorosul* (Sulphur Mills Ltd.).

DISCONTINUED NAMES: Arpege* EPI (+ tetraconazole) (ISAGRO).

Chemistry

COMPOSITION: Tetrachloroisophthalonitrile.

PROPERTIES: Tech: White crystalline solid. Melting point 250-251°C. Thermally stable under normal storage conditions. Stable to ultraviolet radiation. Stable in neutral or acidic aqueous media. Half life of 38.1 days in aqueous media at pH 9. Non-corrosive. Odorless in pure form. Nonvolatile under normal field conditions. Vapor pressure, 5.72 × 10⁻⁷ torr at 25°C. Slightly soluble in xylene, acetone.



Chlorothalonil

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G.1.

Action/Use

ACTION: Fungicide.

USE: Bravo* for beans, carrot, celery, cole crops, conifers, corn grown for seed, sweet corn, cranberry, cucumbers, dry edible beans, garlic, leek, melons (cantaloupe, muskmelon, honeydew, watermelon), mint, onion, papaya, passion fruit, peanut, potato, pumpkin, shallot, snap beans, soybeans, squash, stone fruits, tomato, and ornamentals; grass grown for seed. Daconil 2787* for turf, ornamental disease control. Exotherm Termil* for greenhouse tomatoes, many species of greenhouse ornamentals against Botrytis.

FORMULATIONS: Flowable, water dispersible granule, wettable powder, exothermic dust.

COMBINATIONS: Corbel* CL and Corbel* Star (+ fenpropimorph), Corbel* Triple (+ carbendazim + fenpropimorph) (BASF AG); Ridomil*/Bravo* (+ metalaxyl) (Ciba); Eminent Star* (+ tetraconazole) (ISAGRO); Bravo* C/M (+ copper oxychloride + maneb), Bravo* S (+ sulfur), Bravo* Zn (+ zinc), Bravocarb* (+ carbendazim), Dacobre* (+ copper oxychloride), Reach* (+ triadimefon) (ISK Biosciences Corp.); Clortosp* (+ copper oxychloride) (S.I.P.C.A.M.); Planete* (+ hexaconazole), premixes with flutriafol (Impact*) marketed under various trade names (ZENECA Agrochemicals); Clortocaf Ramato*; Trime-dac* (+ nuarimol).

Registration Notes

U.S.: Bravo*, Daconil 2787*.

OUTSIDE U.S.: Bravo*, Daconil 2787*, Dacostar*, Vanox* (ISK Biosciences Corp.); Exotherm Termil* (Rigo Co.), Italy: Clortosp* (S.I.P.C.A.M) and ClortoCaffaro*. U.K.: Corbel* CL (BASF AG).

Environmental Guidelines

HAZARDS: Fish: Toxic. LC₅₀ 49 µg/l (96 h) (rainbow trout); 62 µg/l (bluegill). Bee: Nontoxic.

SOLUBILITY: Insoluble in water (0.6-1.2 ppm).

Safety Guidelines

SIGNAL WORD: DANGER (Bravo* 90DG, Bravo* W-75, ClortoCaffaro*, Daconil W-75*, Echo* 90DF).

WARNING (Bravo* 500, Bravo* 720, Bravo* F, Daconil 2787* F, Echo* 500).

TOXICITY CLASS: I (Bravo* 90DG, Bravo* W-75, ClortoCaffaro*, Daconil W-75*, Echo* 90DF).

II (Bravo* 500, Bravo* 720, Bravo* F, Daconil 2787* F, Echo* 500).

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg. Inhalation LC₅₀ Actual airborne concentration: (1 hr) 0.52 mg/l; (4 hr) 0.1 mg/l. Nominal: (1 hr) 7.9 mg/l; (4 hr) 0.62 mg/l. (Rabbit): Dermal LD₅₀ >10,000 mg/kg. Skin, eye irritant.

PROTECTIVE CLOTHING: Wear goggles or eye shield, long sleeve shirts, long pants, and gloves when handling. Launder clothing after use before reworking.

HANDLING AND STORAGE CAUTIONS: Keep in cool, dry, ventilated place. Avoid contact with skin and eyes.

SPILL CONTROL/CLEANUP: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: (Echo*) Nonflammable.

FIRE EXTINGUISHING MEDIA: (Echo*) CO₂, foam, dry chemical or water.

FIRST AID: (Echo*) Eyes, immediately flush eyes with plenty of water for at least 15 minutes, holding eyelids apart to ensure flushing of the entire eye surface. Seek medical attention immediately. Skin, wash with plenty of soap and water. Remove contaminated clothes and footwear. Wash clothing and decontaminate footwear before reuse. Seek medical attention if irritation persists. Inhalation, remove person from contaminated area to fresh air or employ proper respiratory protection until adequate ventilation or other control measure is restored. Ingestion, if vomiting occurs, keep airway clear. Never give anything by mouth to an unconscious person.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Chlorothene Nu* (trichloroethane) — Discontinued by Dow Chemical Co.

Chlorothene SM* (trichloroethane) — Discontinued by Dow Chemical Co.

Chlorothion — see Chlorthion*.

Chlorothiophene

(Discontinued 1972 by FMC Corp.)

Chemistry

COMPOSITION: 2,3,4,5-tetrachlorothiophene.

Action/Use

ACTION: Soil fumigant, insecticide, nematicide.

Chlorotoluron

BP: Agrolinz (Austria)

Ciba-Geigy Ltd. (Dicuran*)

Makhteshim-Agan (Tolurex*, Toluron*)

Union Derivan S.A. (Clortokem*)

Identification

COMMON NAMES: Chlorotoluron (ISO, BSI), chlortoluron (old BSI).

EXP. CODE NUMBER: C2242 (Ciba-Geigy Ltd.).

OTHER CODE NUMBERS: CAS 15545-48-9; SHA 216500.

ADDITIONAL TRADE NAME: Chlortophyt* (Chimac-Agriphar S.A.);

Tolurane* (Diachem S.P.A.).

DISCONTINUED NAME: Highuron*.

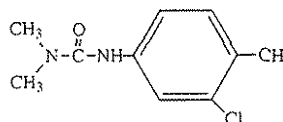
Chemistry

COMPOSITION: N'-(3-Chloro-4-methylphenyl)-N,N-dimethylurea

(CAS); or 3-(3-chloro-p-tolyl)-1,1-dimethylurea (IUPAC).

PROPERTIES: Colorless, odorless crystals. Melting point 147-148°C.

Solubility: At 20°C in acetone 5% w/v; benzene 2.4% w/v; methylene chloride 4.3% w/v.



Chlorotoluron

Action/Use

ACTION: Herbicide.

USE: Pre or postemergence control of annual grasses, annual broadleaf weeds in winter cereals (wheat, barley).

FORMULATIONS: WP, FW, WG.

COMBINATIONS: Erturon* Extra* (+ terbutrine).

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 35 (rainbow trout); >100 mg/l (carp). Bee: Nontoxic. Bird: Low toxicity.

SOLUBILITY: At 20°C in water 70 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg. Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Wear suitable protective clothing.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, clothing. Keep out of reach of children, unauthorized persons and domestic animals.

Emergency Guidelines

FIRST AID: Symptomatic treatment.

Chloroxifenidim — see Tenoran*.

Chloroxone* — see 2,4-D.

Chloroxuron — see Tenoran*.

Chloroxynil**Identification**

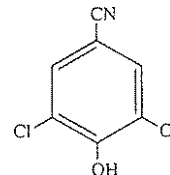
COMMON NAME: Chloroxynil (ISO, BSI).

CODE NUMBERS: CAS 1891-95-8; SHA 309500.

Chemistry

COMPOSITION: 3,5-Dichloro-4-hydroxybenzonitrile.

PROPERTIES: Analogous to bromoxynil and ioxynil with chlorine atoms replacing the respective bromine or iodine atoms.



Chloroxynil

Action/Use

ACTION: Herbicide.

Chlorparacide* insecticide (chlorbenside) — Discontinued

1985 by Boots Co. Ltd.

Chlorphenamidine — see Chlordimeform.

Chlorphonium — see Phosfon*.

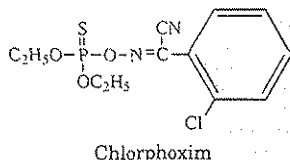
Chlorphoxim**Identification**

COMMON NAMES: Chlorphoxim (ISO-E, BSI); chlorphoxime (ISO-F).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

EXP. CODE NUMBER: BAY SRA 7747.
OTHER CODE NUMBERS: CAS 14816-20-7; OMS 1197 (WHO).
DISCONTINUED NAME: Baythion C* (Bayer AG).

Chemistry
COMPOSITION: 7-(2-chlorophenyl)-4-ethoxy-3,5-dioxa-6-aza-4-phosphoct-6-ene-8-nitrile 4-sulfide (CAS).
PROPERTIES: Readily soluble in dichloromethane, 2-propanol, toluene. Hardly soluble in n-hexane.



Action/Use

ACTION: Acaricide, insecticide.

Environmental Guidelines

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. Dermal LD₅₀ >500 mg/kg.

Chlorphoxime — see Chlorphoxim.

Chlorphthalim — see Diamate*.

Chlorpropham

BP: Kemira Agro Oy
Universal Crop Protection Ltd. (Unicrop* CIPC)

Identification

COMMON NAMES: Chlorpropham (BSI, ISO-E, WSSA), chlorprophame (ISO-F).

TRIVIAL NAME: CIPC.

CODE NUMBERS: CAS 101-21-3; SHA 018301.

ADDITIONAL TRADE NAMES: CIP*, Endogerm CP* (Chimac-Agriphar S.A.); Decco* 273 Aerosol and Decco* 276 EC (Elf Atochem North America, Decco U.S.); Sprout Nip* (Platte Chemical); Chloro IPC*, Taterpex*, Triherbide-CIPC*.

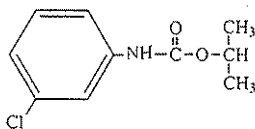
DISCONTINUED NAMES: Trixan* (+ dimexan) (Atochem Agri BV); and Nip* (Chevron Chemical Co.); Premalox* (+ fenuron + propham) (May + Baker Ltd.); Furloe* (Mirfield); Spud-Nic* (Platte Chemical); Beet-Kleen* (+ fenuron + propham) (Shell Chemicals UK Ltd.).

Chemistry

COMPOSITION: Isopropyl 3-chlorocarbanilate, or isopropyl 3-chlorophenylcarbamate.

FAMILY: Carbamate.

PROPERTIES: Melting point 38-40°C. Soluble in ethyl and isopropyl alcohols, ketones, and aromatic solvents.



Action/Use

ACTION: Preemergence herbicide with postemergence activity on several weed species. Plant growth regulator.

USE: Controls weeds in alfalfa, lima and snap beans, blueberries, canberries, cranberries, carrots, ladino clover, garlic, seed grass, onions, spinach, sugar beets, tomatoes, safflower, soybeans, gladioli, woody nursery stock. Inhibits potato sprouting and systemic sucker control in tobacco.

FORMULATIONS: Emulsifiable concentrate, dust, solution.

COMBINATIONS: Silone* (+ propham) (Chimac-Agriphar S.A.); Tripcece* (+ propham) (ELF Atochem Agri B.V.); Herald* (+ chloridazon + fenuron + propham) (Rhone-Poulenc Ag Co.); MorCran* (+ naptalam).

Registration Notes

U.S.: Decco* 273 Aerosol, Decco* 276 EC; Sprout Nip*.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 3.02-5.7 (rainbow trout); 6.3-6.8 ppm (bluegill).

Bird: LD₅₀ >2000 mg/kg (mallard).

Safety Guidelines

SIGNAL WORD: CAUTION; DANGER (Sprout Nip* 7A).

TOXICITY CLASS: III: I (Sprout Nip* 7A).

TOXICITY: (Rat): Oral LD₅₀ 3800 mg/kg.

Chlorprophame — see Chlorpropham.

Chlorpyrifos

BP: Aimco Pesticides Ltd. (Scout*)
Chimac-Agriphar S.A. (Profos*)
Excel Industries Ltd. (Tricel*)
DowElanco (Dursban*, Empire*, Equity*, Lentrek*, Lock-On*, Lorsban*, Pageant*)
Frunol GmbH (Contra-Insect*)
Gharda Chemicals Ltd. (Terraguard*)
Gilmore, Inc.
HELM AG
Hubei Sanonda Co., Ltd.
Khatau Junker Ltd.
Krishi Rasayan
Lupin Agrochemicals (I) Ltd.
Luxembourg Industries (Pamol) Ltd. (Dorsan*)
Makhteshim-Agan (Pyrinex*)
Mitsu Industries Ltd.
Rotam Group

Identification

COMMON NAMES: Chlorpyrifos (ANSI, BSI, ISO-E, ESA, BAN/BP); chlorpyriphos (ISO-F).

CODE NUMBERS: CAS 2921-88-2; SHA 059101; OMS 971 (WHO); ENT 27311; EINECS 220-864-4.

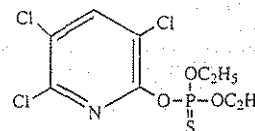
ADDITIONAL TRADE NAMES: Aciban* 50EC (Agro Chemicals Industries Ltd.); Genpest* (Agsin Pte. Ltd.); Pyriban* (All India Medical Corp.); Deviban* (Devidayal (Sales) Pvt. Ltd.); Piridane* (Diachem S.P.A.); Lorsban* 30, Lorsban* 50-SL (Gustafson Inc.); RIMI 101* (Jewnin-Joffe Industry Ltd.); Khatau Chlorifos* (Khatau Junker Ltd.); Classic* 20 (Lupin Agrochemicals (I) Ltd.); Brodan*, Eradex* (Planters Products); Sulban* (Sulphur Mills Ltd.); Chlorofet* (VAPCO).

DISCONTINUED NAMES: Dowco* 179, Stipend* (Dow Chemical).

Chemistry

COMPOSITION: O,O-diethyl O-(3,5,6-trichloro-2-pyridinyl) phosphorothioate.

PROPERTIES: White granular crystals. Melting point 41-42°C. Soluble in acetone, benzene, chloroform, ethanol, isooctane, methanol, and organic solvents.



Action/Use

ACTION: Insecticide.

USE: Foliar for alfalfa, cotton; for aphids, armyworms, billbugs, chinch bugs, common stalk borer, corn borers, corn earworm, corn rootworm adults, cutworms, flea beetle adults, grasshoppers, lesser cornstalk borer. Dormant to fruit trees for peach tree borer, overwinter scale. Slurry seed treatment for seed corn maggot. Foliar, soil application on sorghum, soybeans, sugarbeets, sunflowers. Soil application for peanuts. Dursban* for fire ants, ornamental plant insects, stored product insects, turf, wood destroying insects. Lorsban* as a soil insecticide for billbugs, corn rootworms, cutworms, flea beetle larvae, grubs, lesser cornstalk borer, seed corn beetle, seed corn maggot, symphylan, wireworm, on corn. Lorsban 30*, Lorsban 50SL (Gustafson Inc.) for stored seed at 12-24 ppm. See label for other pests in field, fruit, nut and vegetable crops. RIMI 101* 1% granular bait formulation to control Noctuid larvae, ants, mole crickets, grasshoppers, locusts, crane flies, earwigs, and sowbugs in field, vegetable, industrial, forage, and ornamental and nursery crops.

FORMULATIONS: Emulsifiable concentrate, dust, flowable, granular wettable powder, microcapsule, pellet, spray.

COMBINATIONS: Araoil* (+ oil) (Aragonesas Agro S.A.); Salut*, Saluthion* (+ dimethoate) (BASF AG); Chlorcyrin* (+ cypermethrin), Chlormezyl* (+ dimethoate), Chloxur* (+ propoxur), Diafos* (+ diazinon) (Chimac-Agriphar S.A.); Thi Lor* (Thiram) (UCB Chemical Corp.).

Registration Notes

OUTSIDE U.S.: Controls many insect pests in lowland rice (Dursban* 158EC), vegetable, field crops, turf, ornamentals.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.18 (24 h) (goldfish); < 1 mg/l (mosquito fish).

Bee: Toxic. Bird: Oral LD₅₀ 32 mg/kg (hen).

SOLUBILITY: Solubility in water 2 ppm (25°C).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

SIGNAL WORD: WARNING (Lorsban 4E*, 50W*); CAUTION (Lorsban 15G*).

TOXICITY CLASS: II (Lorsban* 4C, 50W); III (Lorsban* 15G).

TOXICITY: (Rat): Oral LD₅₀ 96-270 mg/kg. (Rabbit): Dermal LD₅₀ 2000 mg/kg. (Guinea pig): Oral LD₅₀ 504 mg/kg.

SPILL CONTROL/CLEANUP: Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations. PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: 102°F (TCC).

FIRE EXTINGUISHING MEDIA: Foam, CO₂, dry chemical.

ANTIDOTE: Atropine.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air.

Chlorpyrifos/Allethrin Transparent Emulsion — see Pyramin.

Chlorpyrifos-methyl

BP: DowElanco

Identification

COMMON NAMES: Chlorpyrifos-methyl (ANSI, BSI, ISO-E, ESA); chlorpyrifos-methyl (ISO-F).

CODE NUMBERS: CAS 5598-13-0; SHA 219300; OMS 1155 (WHO); ENT 27520.

ADDITIONAL TRADE NAMES: Reldan* (Gustafson Inc.).

DISCONTINUED NAME: Dowco* 214.

Chemistry

COMPOSITION: O,O-dimethyl O-(3,5,6-trichloro-2-pyridinyl) phosphorothioate (CAS).

Action/Use

ACTION: Insecticide.

APPLICATION: Stored grain.

Environmental Guidelines

HAZARDS: Fish: Toxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1000-3700 mg/kg. Dermal >3700 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg. (Guinea Pig): Oral LD₅₀ 2250 mg/kg. (Mouse): Oral LD₅₀ 1100-2250 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine only by injection.

Chlorpyrifos — see Chlorpyrifos.

Chlorpyrifos-methyl — see Chlorpyrifos-methyl.

Chlorquinox — see Luce!*

Chlorsulfuron

BP: Du Pont Agricultural Products (Glean*, Telar*)

Identification

COMMON NAME: Chlorsulfuron (ISO, ANSI, BSI, WSSA).

EXP. CODE NUMBER: DPX 4189.

OTHER CODE NUMBERS: CAS 64902-72-3; SHA 118601.

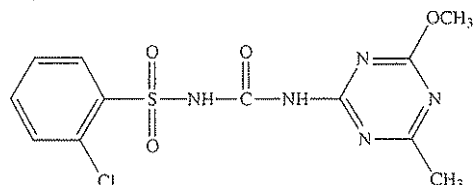
ADDITIONAL TRADE NAME: Lasher* (Hubei Sanonda Co., Ltd.).

Chemistry

COMPOSITION: 2-Chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]benzenesulfonamide (CAS).

PROPERTIES: Odorless, white, crystalline solid. Melting point 174-178°C. Slight solubility in methylene chloride, acetone, methanol, toluene and hexane.

SOIL PROPERTIES: pKa is 3.6 (in water at 25°C) and K_d value is 0.73, Flanagan silt loam (pH = 6.5, 4.02% organic matter).



Chlorsulfuron

Action/Use

ACTION: Herbicide.

USE: Selective control of most broadleaf weeds, annual ryegrass, including acreage enrolled in the Conservation Reserve Program (CRP).

Pre or postemergence to crop for some annual grasses in wheat, barley, durum, rye, triticale, oats. Chlorsulfuron selective and nonselective for noncropland. See Telar* label for detailed usage.

FORMULATIONS: Dry flowable. Fertilizer compatible formulations in U.S.

COMBINATIONS: Finesse* (+ metsulfuron-methyl), Glean T* (+ methabenzthiazuron) (Du Pont).

Registration Notes

U.S.: For cereals (primarily wheat, barley, oats); see label for specific rotational options.

OUTSIDE U.S.: Glean* T is a mixture sold only in Europe with various other cereal herbicides.

Environmental Guidelines

SOLUBILITY: Water solubility 300-2800 ppm at 25°C, pH 5-7.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 3053 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry area. Wash hands before eating or smoking. Keep out of reach of children. Do not contaminate water, food, or feed by storage or disposal. Keep from contact with fertilizers, insecticides, fungicides, and seeds during storage.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Chlorsulphacide — see Chlorbenseide.

Chlorthal Dimethyl — see Dacthal*.

Chlorthal-Methyl — see Dacthal*.

Chlorthiamid — see Prefix*.

Chlorthiepin* — see Endosulfan.

Chlorthion*

(Discontinued 1973 by Bayer AG)

Identification

CODE NUMBERS: CAS 500-28-7; SHA 034501.

OTHER NAME: Chlorothion.

Chemistry

COMPOSITION: O-(3-chloro-4-nitrophenyl) O,O-dimethyl phosphorothioate (CAS).

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 380 mg/kg.

Chlorthiophos**Identification**

COMMON NAME: Chlorthiophos (ISO, ANSI, ESA, BSI).

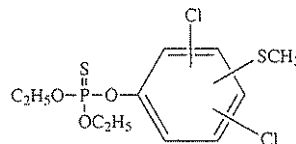
EXP. CODE NUMBERS: CM-S 2957, S 2957 (Celamerck).

OTHER CODE NUMBERS: CAS 21923-23-9 (for main isomer); CAS 60238-56-4 (for mixture of isomers); SHA 111811; OMS 1342 (WHO); ENT 27635.

DISCONTINUED NAME: Celathion* (Celamerck GmbH).

Chemistry

COMPOSITION: Mixture of 3 isomers: (1) 0-2,5-dichloro-4-(methylthio)phenyl phosphorothioic acid O,O-diethyl ester (main component); (2) 0-2,4-dichloro-5-(methylthio)phenyl phosphorothioic acid O,O-diethyl ester; (3) 0-4,5-dichloro-2-(methylthio)phenyl phosphorothioic acid O,O-diethyl ester.



Chlorthiophos

Action/Use

ACTION: Insecticide, acaricide.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 7.8-10.7 mg/kg.

Chlorthiamid — see Prefix*.

Chlortoluron — see Chlorotoluron.

Chlortophyt* — see Chlorotoluron.

Chlortox* — see Chlordane.

Chlorvar* Herbicide (bromacil + sodium chlorate + sodium metaborate) — Discontinued by Rhone-Poulenc Ag Co.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chloxur* — see Chlorpyrifos; Propoxur.

Chlozolinat — see Serinal*.

Cholecalciferol

BP: Bayer AG (Muritan*)
Motomco Ltd. (Rampage*)

Identification

COMMON NAME: Cholecalciferol.
CODE NUMBER: CAS 67-97-0; SHA 208700.
ADDITIONAL TRADE NAME: Mecharsemon* (Jewninn-Joffe Indus-

Chemistry

COMPOSITION: 9,10-Secocholesta-5,7,10(19)-trien-3 beta-ol, activated 7-dehydrocholesterol.
FAMILY: Sterol.
PROPERTIES: Light brown resin, melting point 84-85°C. Molecular weight 384.62. Soluble in acetone, chloroform, and fatty oils.



Cholecalciferol

Action/Use

ACTION: Rodenticide.
USE: Controls Norway rats, roof rats and house mice. A lethal dose can be consumed in a single day's feeding or accumulated in smaller, multiple feedings over a period of days. Rodents die 2-4 days after lethal dose consumption.

FORMULATIONS: Baits, seed blends.

Registration Notes

Muritan* also a previous Bayer AG trade name for dichlorobenzene diazothiocarbamid rodenticide.

Environmental Guidelines

HAZARDS: Bird: Low hazard.
SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 43.5 mg/kg. (Mice): Oral LD₅₀ 42.5 mg/kg.

HANDLING AND STORAGE CAUTIONS: Keep away from humans, domestic animals, and pets. Keep out of lakes, streams or ponds. Store only in original container in a dry place inaccessible to children and pets. Do not reuse empty container. Securely wrap in newspaper and discard in trash.

Emergency Guidelines

ANTIDOTE: If serum calcium levels are elevated, treatment with calcitonin is effective in reducing calcium to normal levels. Continue monitoring serum calcium and treat as necessary for hypercalcemia.
FIRST AID: Ingestion, drink 1-2 glasses of water, induce vomiting by touching back of throat with finger. Avoid use of all oils.

Cholinesterase

A body enzyme necessary for proper nerve function that is destroyed or damaged by organic phosphates or carbamates taken into the body by any path of entry.

Cholinesterase-inhibiting Pesticides

A class of pesticides having related pharmacological effects for which EPA has limited the total amount of these related chemicals for residue purposes. Included in this partial list are the following pesticidal chemicals:

Aldicarb (Temik*)	EPN
Carbaryl (Sevin*)	Ethion
Carbofuran (Furadon*)	Methomyl
Carbophenothion (Trithion*)	Methyl Parathion
Chlorpyrifos (Dursban*)	Parathion
Coumaphos (Co-Ral*)	Phorate (Thimet*)
Demeton (Systox*)	Phosalone (Zolone*)
Dimethoate	Ronnel
Dioxathion (Delnav*)	Schradan

Chopper*

BP: American Cyanamid (Chopper*)

Identification

COMMON NAME: Imazapyr isopropylamine salt.
EXP. CODE NUMBERS: AC 252,925, CL 252,925 (American Cyanamid).

Chemistry

MOLECULAR FORMULA: C₁₃H₁₈N₃O₃·C₃H₇N.

Action/Use

ACTION: Herbicide.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg (practically nontoxic by single dose). Dermal >2000 mg/kg. (Rabbit): skin, eye irritant. (Guinea Pig): Mild dermal sensitization.

Chromaphton — see Dition*.

Chromated Copper Arsenate

Identification

COMMON NAMES: Chromated copper arsenate, CCA.
DISCONTINUED NAMES: Mitrol CCA*, Chapco CCA-C 50*, Wood-guard CCA-50* (Chapman Chemical).

Action/Use

ACTION: Fungicide, insecticide.

USE: Wood preservative.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Chromated Zinc Chloride

Action/Use

ACTION: Wood preservative.

See Zinc Chloride.

Chromium-Metallic Complexes

This fungicide group includes copper-zinc-chromate, mercury-zinc-chromate, and other chemicals with a wide variety of composition and proportion.

Chronic Toxicity

Capacity of a substance to cause long-term poisonous human health effects.

See Toxicity.

Chrysanthemum cinerariaefolium — see Pyrethrins; Pyrethrum.

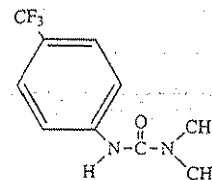
Chryson* — see Resmethrin.

CIB 5935

(Discontinued by Ciba-Geigy Ltd.)

Chemistry

COMPOSITION: N-(4-trifluoromethylphenyl)-N', N'-dimethylurea.



CIB 5935

Action/Use

ACTION: Herbicide.

Cibelte* — see Cypermethrin.

Ciclosom* Insecticide (trichlorfon) — Discontinued by Quimica Estrella.

Cide-Kick*

BP: Brewer International Inc. (Cide-Kick*, Cide-Kick* II*)

Identification

COMMON NAMES: D-limonene (citrus peel) oil, selected emulsifiers.

Chemistry

COMPOSITION: Natural byproduct of citrus concentrate manufacturing.

PROPERTIES: Nonionic, biodegradable low viscosity oil.

Action/Use

ACTION: Activator-type pesticide adjuvant.

USE: Masks odors, enhances penetration. Weed control in surface-submerged aquatics, citrus, cropland, forestry, rights-of-way, turf.

FORMULATIONS: Liquid.

Environmental Guidelines

SOLUBILITY: Water soluble.

Emergency Guidelines

EMERGENCY TELEPHONE: 800 255-3924 (Chem Tel).

Cide-Kick* II — see Cide-Kick*.

CIDE-TRAK*

BP: Trece, Inc. (CIDE-TRAK*)

Action/Use

ACTION: Insect sex pheromone/mating disruptants.

USE: For control of codling moth and Oriental fruit moth by pheromone-mediated mating disruption.

FORMULATIONS: Controlled-release pheromone dispensers.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Registration Notes

U.S.: Experimental use only.

OUTSIDE U.S.: Registrations in progress or secured in several countries.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

Cidial* — see Phenthoate.

Cilcord* — see Cypermethrin.

Cildon* — see Phosphamidon.

Cinch* (cinmethylin) — Discontinued 1989 by Du Pont Agricultural Products.

Cinerin I, Allyl Homolog — see Allethrin; Pynamin.

Cinerins

Cinerins I and II are active principals of pyrethrum extract similar to pyrethrins I and II, being comparable esters of a slightly different organic alcohol. Their discovery was published in 1945, and led to the synthesis of allethrin, barthrin and cyclothrin having certain pyrethrin-like properties.

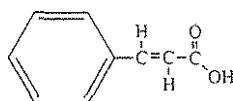
See Jasmolins, Pyrethrins, Pyrethrum.

Cinmethylin — see Argold*.

Cinnméthyline — see Argold*.

Cinnamic Acid**Action/Use**

ACTION: Plant growth regulator.



Cinnamic Acid

Ciodrin* — see Crotoxyphos.

CIP* — see Chlorpropham.

CIPC — see Chlorpropham.

Cismethrin — see Pyrethroids.

Citowett*

BP: BASF AG (Citowett*)

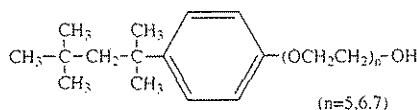
Identification

DISCONTINUED NAMES: Citowett* Plus (BASF AG).

ChemistryCOMPOSITION: α -(4-(1,1,3,3-tetramethylbutyl)phenyl)- ω -hydroxyoligo(oxethylene).

PROPERTIES: Light yellow liquid, density ca. 1.05 kg/l (20°C). Soluble in alcohols and aromatic hydrocarbons.

FORMULATIONS: Liquid.



Citowett*

Action/Use

ACTION: Emulsifier; spreader-sticker; wetting agent.

USE: For crops; cleaning out spraying machinery.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Water (turbid solutions).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ approx. 3180 mg/kg. Dermal LD₅₀ >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Protect skin, eyes. Do not contaminate water.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: >100°C.

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Change contaminated clothing and shoes immediately. Ingestion, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC).

Citowett Plus* Spreader (alkylaryl polyglycol ether) — Discontinued 1987 by BASF AG.

Citram* — see Tetram*.

Citrazon* — see Benzoximate.

Citru-film*

BP: Helena Chemical Co.

Chemistry

COMPOSITION: Light to mid range paraffin-based petroleum oil polyol fatty acid esters, 99% polyethoxylated derivatives.

Action/Use

ACTION: Penetrant, spray enhancement adjuvant, spreader, wetting agent.

USE: Alone, or in combination with spray oil, pesticides, nutritional.

FORMULATIONS: Oil concentrate.

Safety Guidelines

TOXICITY: Nontoxic.

Citrus Fix*

BP: Amvac Chemical Corp. (Citrus Fix*)

Identification

COMMON NAME: 2,4-D-isopropyl ester.

CODE NUMBERS: CAS 94-11-1 (isopropyl ester).

Chemistry

COMPOSITION: Isopropyl 2,4-dichlorophenoxyacetate.

PROPERTIES: Slightly viscous, pale yellow to amber liquid. Specific gravity 1.26 at 20°C. Readily soluble in most organic solvents.

Action/Use

ACTION: Plant growth regulator.

USE: Prevents preharvest drop of mature citrus. Used in lemon packing houses to keep buttons alive and healthy.

FORMULATIONS: Tech, emulsifiable concentrate.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 375 mg/kg. Inhalation LC₅₀ 5 mg/l. Slight skin, minimal eye irritation.

Isopropyl: 700 mg/kg.

Sodium Salts: 666-805 mg/kg.

PROTECTIVE CLOTHING: Applicators and other handlers should wear long sleeved shirt, long pants, chemical resistant gloves, shoes, socks and protective eyewear. Mixers and loaders who do not use a mechanical system (probe and pump) to transfer contents must also wear coveralls or a chemical resistant apron.

HANDLING AND STORAGE CAUTIONS: Product may crystallize if stored at cold temperatures; if this occurs, call Amvac Chemical Corp. for instructions before using. Store in closed, original container in secure, dry, temperate area. Do not store near food, feed, fertilizers, seeds, insecticides or fungicides. Avoid contact with water.

Safety Guidelines

SPILL CONTROL/CLEANUP: In case of spill or leak, soak up with sand, earth, or synthetic absorbent and dispose of wastes in compliance with local State and Federal regulations. If wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA regional office for guidance.

Emergency GuidelinesFIRE EXTINGUISHING MEDIA: CO₂, dry chemical, foam.FIRST AID: Eyes, immediately flush with plenty of water. See physician. Ingestion, do NOT induce vomiting. Call a physician or poison control center immediately. Inhalation, remove to fresh air. Administer artificial respiration if necessary. Contact physician immediately.

EMERGENCY TELEPHONE: Medical: 800-228-5635 Ext. 169 (Hazard Information Services); Transportation: 800-424-9300 (CHEMTREC).

Citry Plus*

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: D'Limonene and Selected Emulsifiers.

Action/Use:

ACTION: Citrus Surfactant/Penetrant/Masking Agent.

USE: For use as a surfactant/penetrant for penetration through heavy canopies, works as a masking agent for herbicides that contain strong aromatic characteristics.

FORMULATION: Concentrated liquid.

CL 64475 — see Nem-A-Tak*.

CL 222,705 — see Flucythrinate.

CL 252,925 — see Arsenal*.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Clairmait* — see Peropal*

Clarity*

BP: Sandoz Agro, Inc. (Clarity*)

Identification

CODE NUMBERS: CAS 10400-79-1 (a.i.); CAS 929-06-6 (2-(2-aminoethoxy)ethanol).

Chemistry

COMPOSITION: 2-(2-aminoethoxy)ethanol salt of 3,6-dichloro-*o*-anisic acid; Diglycolamine* salt of 3,6-dichloro-*o*-anisic acid.

FAMILY: Substituted benzoic acid.

PROPERTIES: Thin, amber liquid, little odor.

Action/Use

ACTION: Herbicide.

USE: Broadleaf weed control in field, seed, popcorn, and silage corn.

FORMULATION: Water soluble liquid.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >1000 mg/l (bluegill); LC₅₀ >1000 mg/l (*daphnia*).

SOLUBILITY: Fully soluble in water.

Safety Guidelines

SIGNAL WORD: Caution.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3512mg/kg; dermal LD₅₀ >2000 mg/kg; Inhalation LC₅₀ >5.3 mg/l.

PROTECTIVE CLOTHING: Protective clothing, gloves, eye protection.

STORAGE AND HANDLING CAUTIONS: Follow label instructions. Avoid contact with skin, eyes, or clothing. Store original container in cool, dry location away from fertilizer, feed, food stuffs, and separated from other pesticides.

SPILL CONTROL/CLEANUP: Contain liquid spill with absorbent material, collect in a suitable waste container. Wash affected area with water and detergent. Keep wash water out of drains. Whenever possible, all product or absorbed material should be used/applied according to label instructions and quantities. Otherwise, dispose of at an approved chemical waste facility.

Emergency Guidelines

FLASHPOINT: >200° F.

COMBUSTION PRODUCTS: HCl, organochlorides, amines, NOX's.

FIRE EXTINGUISHING MEDIA: Water spray, foam, CO₂, dry chemical.

FIRST AID: Get medical attention. Eyes, flush with water for 15 minutes. Skin, wash thoroughly with soap and water. Ingestion, drink 1-2 glasses of water and induce vomiting. Inhalation, remove to fresh air.

EMERGENCY TELEPHONE: 708-699-1616 (Sandoz Agro, Inc.).

Classic*

BP: Du Pont Agricultural Products (Classic*)

Identification

COMMON NAME: Chlorimuron-ethyl.

EXP. CODE NUMBER: DFX F6025.

CODE NUMBERS: CAS 90982-32-4; SHA 128901.

Chemistry

COMPOSITION: Ethyl 2-[[[(4-chloro-6-methoxy-2-pyrimidin danyl)amino]carbonyl]amino]sulfonyl]benzoate (CAS).

FAMILY: Sulfonylurea.

PROPERTIES: White solid, melting point 186°C. Low solubility in organic solvents.

Action/Use

ACTION: Herbicide.

USE: Selective postemergence annual broadleaf, yellow nutsedge weed control in peanuts and soybeans.

FORMULATIONS: Dry formulation.

COMBINATIONS: Concert* and Synchrony* STS* (+ thifensulfuron-methyl), Lorox Plus* (+ linuron) (both Du Pont).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ > 1000 mg/l (96 h) (rainbow trout); > 100 mg/l (bluegill). Bee: 12.5 µg/bee (48 h). Bird: >2510 mg/kg (mallard). (Dietary) >5620 ppm (mallard, quail).

SOLUBILITY: Water, 1200 ppm at 25°C pH=7.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >4000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING & STORAGE CAUTIONS: Avoid contact with skin, eyes or clothing. Wash contaminated clothing with soap and hot water before reuse. Store in original container only, away from other pesticides, fertilizer, food or feed. Do not contaminate water, food or feed by storage or disposal. Wastes resulting from the use of this product may be disposed of on-site or at an approved waste disposal facility. Con-

tainer disposal: triple rinse (or equivalent), then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or incineration or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Emergency Guidelines

FIRST AID: Get medical aid if irritation persists. Eyes, flush with plenty of water. Skin, wash with plenty of soap and water.

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Classic* 20 — see Chlorpyrifos.

Clay

BP: Agrisorbents Product Group, Div. of OIL-DRI Corp. of America (Agsorb*)

Floridin Co. (Attapulgit, Kaolin, Montmorillonite)

J.M. Huber Corp., Chemicals Div. (Barden*)

Southeastern Clay Co. (Type 41 Clay*)

R.T. Vanderbilt Co., Inc. (Continental Clay*)

A disperse system of mineral fragments of hydrated aluminum silicate, predominantly those smaller than two microns, which is plastic when wet and permanently hard when fired. The term clay refers to a physical condition, not a definite chemical composition. The five basic types of clays, some of which are used by the pesticide industry, are kaolinite, montmorillonite, illite, ball clay, and attapulgit. They have been formed as weathering products from other rocks and minerals. The five types are vastly different from one another. See Attapulgit Clay; Bentonite; Dusts; Kaolin.

Clean-Bolt* Herbicide (cacodylic acid + sodium cacodylate) — Discontinued by Drexel Chemical.

Clearcide*

(Discontinued by Bayer AG)

Identification

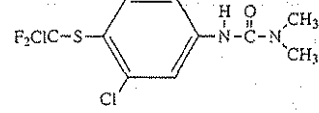
COMMON NAME: Fluothiuuron (ISO, BSI).

EXP CODE NUMBER: KUE 2079 A.

OTHER CODE NUMBER: CAS 33439-45-1.

Chemistry

COMPOSITION: 3-[3-chloro-4-(chlorodifluoromethylthio)phenyl]-1,1-dimethylurea.



Clearcide*

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 336-554 mg/kg. Dermal LD₅₀ >500 mg/kg.

Clary 3336 — see Thiophanate.

Clary's MCPP* — see MCPP.

Clethodim — see Select*.

Clifton* CMPP 60 — see Mecoprop.

Clifton* Glyphosate Additive

BP: Clifton Chemicals Ltd.

Action/Use

ACTION: Surfactant.

Registration Notes

U.S.: Not marketed.

Clifton* Wetter — see Wetting Agent.

Clipper* Plant Growth Regulator (paclobutrazol) — Discontinued 1993 by Monsanto Co., The Agricultural Group.

Clobber*

(Discontinued by Gulf Oil Chemical Co.)

Identification

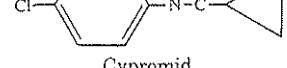
COMMON NAMES: Cypromid (ISO-E, ANSI, BSI, JMAF, WSSA); cypromide (ISO-F).

EXP. CODE NUMBER: S-6000 (Gulf).

OTHER CODE NUMBERS: CAS 2759-71-9; SHA 026101.

Chemistry

COMPOSITION: 3',4'-Dichlorocyclopropanecarboxanilide.



Cypromid

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Herbicide.

Cloethocarb — see Lance*.

Clofentezine

BP: AgrEvo USA Co. (Apollo* SC)

Hoechst Schering AgrEvo GmbH (Acaristop*, Apollo*)

Identification

COMMON NAME: Clofentezine (ISO draft, ANSI, BSI).

EXP. CODE NUMBER: NC-21314.

OTHER CODE NUMBERS: CAS 74115-24-5; SHA 125501.

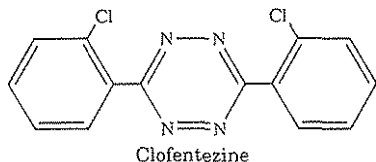
ADDITIONAL TRADE NAME: Apolo*, Cara*, Salan* (Hoechst Schering AgrEvo GmbH).

DISCONTINUED NAME: Panatac* (FBC Ltd.).

Chemistry

COMPOSITION: 3,6-bis(2-chlorophenyl)-1,2,4,5-tetrazine.

FAMILY: Tetrazine.

PROPERTIES: Pure: odorless, magenta colored, crystalline solid, melting point 182°-186°. Low vapor pressure 1×10^{-7} mm/Hg. Formulation: viscous magenta liquid of 4 lb. ai/gal.**Action/Use**

ACTION: Ovicidal miticide. Specific acaricide.

USE: Acaricide for eggs and early motile stages of *Panonychus ulmi* (including winter eggs) and *Tetranychus* spp. on top fruit, citrus, vines, cotton, ornamentals, vegetable crops. Apply early season for extended residual control. Selective to beneficial insects, predatory mites. Apolo* for mites in almonds, apples, grapes, ornamentals, pears, stone fruits.

FORMULATIONS: Suspension concentrate (SC).

Environmental Guidelines

SOLUBILITY: Formulation completely miscible in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral $LD_{50} > 3200$ mg/kg.Apolo* SC (Rat): Oral $LD_{50} > 5000$ mg/kg. Dermal > 2400 mg/kg.

PROTECTIVE CLOTHING: Chemical resistant gloves, safety goggles when mixing or loading.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes, skin, and clothing. Wash hands and exposed skin before eating, drinking, or smoking, and after spraying or handling. Wash all contaminated clothing before reuse. Store in original container, tightly closed in a safe place.

Emergency GuidelinesFIRE EXTINGUISHING MEDIA: Water, foam, dry powder or CO_2 .

FIRST AID: Get medical aid if irritation persists. Eyes, flush with plenty of water. Skin, remove contaminated clothing, flush skin with plenty of water. Ingestion, do NOT induce vomiting. Wash out mouth thoroughly with water and give water to drink.

EMERGENCY TELEPHONE: 302-892-3000 (AgrEvo USA Co.).

Clofop-isobutyl — see Alopex*.

Clomazone — see Command*, Commence*.

Clomeprop — see Yukahope*.

Clomitane* — see Captan.

Cloning

In biotechnology, obtaining a group of genetically identical cells from a single cell. This term has assumed a more general meaning that includes making copies of a gene.

Clonitralid — see Bayluscid*.

Clopyralid — see Broadstrike* Plus; Confront*; Stinger*.

Cior Chem T-590* Insecticide (toxaphene) — Discontinued by Iacon.

Clorofos — see Trichlorfon.

Clortocaf Ramato* — see Chlorothalonil.

ClortoCaffaro* — see Chlorothalonil.

Clortokem — see Chlorotoluron.

Clortosip — see Chlorothalonil.

Closed Mixing Systems

Any of several mechanical devices that transfer pesticide concentrates directly from shipping containers to mixing or application tanks without human exposure to the toxic material. Typical closed systems consist of probes, vacuum or gravity transfer, metering apparatus, and rinsing system that transfers rinse water to the tank. Some units incorporate can crushing components.

Clout* — see Alloxidim-Sodium.

CME 127 — see Aclonifen.

CME 134 — see Teflubenzuron.

CME 74770 — see Triforine.

CMMP — see Pentanochlor.

CMPP — see Mecoprop.

CM-S 2957 — see Chlorthiophos.

CMU — see Monuron.

CN-11-2936 — see Prodiamine.

CNA — see DCNA.

CNC — see Copper Naphthenates.

CNP

BP: Mitsui Toatsu Chemicals, Inc. (Mo*)

Identification

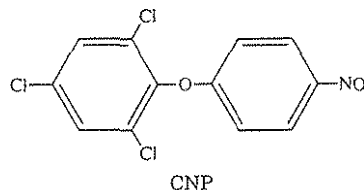
COMMON NAME: CNP (JMAF); chlornitrofen (ISO-E, BSI); chlornitrofen (ISO-F).

CODE NUMBER: CAS 1836-77-7.

ADDITIONAL TRADE NAMES: Showrone*, Showrone M*.

Chemistry

COMPOSITION: 2,4,6-trichlorophenyl 4-nitrophenyl ether.

**Action/Use**

ACTION: Selective herbicide.

USE: For rice paddies, carrot, burdock, Chinese cabbage, radish and cabbage.

FORMULATIONS: Emulsifiable concentrate, granules.

Registration Notes

U.S.: Not registered.

Environmental GuidelinesHAZARDS: Fish: > 40 ppm (48 h) (carp).

SOLUBILITY: In water 0.25 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat/Mouse): Oral $LD_{50} > 10,000$ mg/kg. Dermal $> 10,000$ mg/kg.

Coal Tar — see Creosote.

Coarse Chaff — see Lite-R-Cobs*.

Coax*

BP: CCT Corp. (Coax*)

Chemistry

COMPOSITION: Pharmamedia* cottonseed flour, disaccharide, vegetable lipid oil.

PROPERTIES: Thick flowable, brown color, boiling point approximately 218° F, partially soluble (requires agitation to remain in suspension), specific gravity 1.095.

Action/Use

ACTION: Insect feeding stimulant.

USE: Insect control is enhanced when Coax* is mixed and applied with stomach poison insecticides (*Bacillus thuringiensis* and other microbial-type products). Insects with chewing mouth parts, such as the Lepidoptera Order, are stimulated to eat more thereby increasing the efficacy of the insecticide. Coax* also increases efficacy of contact insecticides by stimulating their ingestion by target pests.

FORMULATIONS: Flowable concentrate.

Registration Notes

U.S.: EPA exempt.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Nontoxic.

PROTECTIVE CLOTHING: Gloves, eye protection.

HANDLING AND STORAGE CAUTIONS: Use normal handling precautions, follow safe handling procedures. Keep product tightly closed in original container.

SPILL CONTROL/CLEANUP: May be disposed of on site or at approved waste disposal facility.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

PRODUCT/WASTE DISPOSAL: Comply with local, state, and federal regulations.

Emergency Guidelines

FLASHPOINT: N/A.

COMBUSTION PRODUCTS: N/A.

FIRE EXTINGUISHING MEDIA: N/A.

ANTIDOTE: N/A.

FIRST AID: **Eyes**, flush with large quantities of water. See a physician if irritation results. **Skin**, wash with soap and water.

EMERGENCY TELEPHONE: 619-929-9228 (CCT Corp.).

Cobex* — see Dinitramine.

Cobexo* (dinitramine) — Discontinued.

Cobox* — see Copper Oxychloride.

Cobra*

BP: Valent U.S.A. Corp.

Identification

COMMON NAME: Lactofen (ANSI, WSSA).

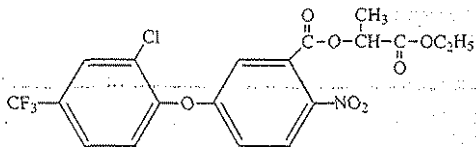
EXP. CODE NUMBER: PPG-844 (PPG Industries)

OTHER CODE NUMBER: CAS 77501-63-4.

Chemistry

COMPOSITION: ethyl O-[5-(2-chloro- α,α,α -trifluoro-p-tolyloxy)-2-nitrobenzoyl]-DL-lactate (IUPAC).

PROPERTIES: Tech, dark brown to tan. Solubility in isopropanol 20%, soluble in acetone and xylene.



Lactofen

Action/Use

ACTION: Selective herbicide.

USE: Preemergence, postemergence to control broadleaf weeds. Selective in conifers, peanuts, snapbeans, soybeans. Weed control by placement in cotton, fruiting vegetables.

FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

SOLUBILITY: In water 0.94 ppm.

Safety Guidelines

SIGNAL WORD: DANGER. Formulation severely irritating to skin and eyes.

TOXICITY CLASS: I.

TOXICITY: Manufacturing concentrate: (Rat): Oral LD₅₀ 5.96 gm/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Chemical goggles, face shield, impervious protective clothing, chemical resistant gloves and footwear.

EMERGENCY TELEPHONE: 800-457-2022.

Coccins* — see Barium Polysulfide.

COCS* — see Copper Oxychloride Sulfate.

Codal* — see Metolachlor.

Codleture* — see Pheromone.

Codling Moth Granulosis Virus — see Decyde*.

Colfix*

F: Jewnin-Joffe Industry Ltd.

Chemistry

COMPOSITION: 40% polyvinyl resin.

Action/Use

ACTION: Powder sticker.

USE: For non-copper fungicides, wettable powders and other pesticides.

FORMULATIONS: Concentrated liquid or powder.

Collego*

(Discontinued 1993 by Ecogen, Inc.).

Identification

CODE NUMBER: SHA 122807.

Action/Use

ACTION: Selective postemergent mycoherbicide.

Environmental Guidelines

HAZARDS: No hazard to wildlife. Fish: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Nontoxic to man.

Colloid* — see Dispersants.

Colloidal Silicon Dioxide — see Fumed silica.

Colloidox* Fungicide (copper oxychloride) — Discontinued by Mechemia Ltd.

Coloniil* — see Chlorothalonil.

Coloration

The AAPCO has adopted these regulatory principles relating to coloration of highly toxic materials: "The white economic poisons hereinafter named shall be colored or discolored in accordance with this section. Provided, however, that any such white economic poison which is intended solely for use by a textile manufacturer or commercial laundry, cleaner or dyer as a moth proofing agent, which would not be suitable for such use if colored and which will not come into the hands of the public when incorporated into a fabric, shall not be required to be so colored or discolored in accordance with the section. The hue, values and chromas specified are those contained in the Munsell Book of Color, Munsell Color Co., 10 E. Franklin St., Baltimore, MD.

"(a) The coloring agent must produce a uniformly colored product not subject to change in color beyond the minimum requirements during ordinary conditions of marketing and storage and must not cause the product to become less effective or cause damage when used as directed or in accordance with commonly recognized safe practice.

"(b) Standard lead arsenate, basic lead arsenate, calcium arsenate, magnesium arsenate, zinc arsenate, zinc arsenite and barium fluosilicate shall be colored any hue, except the yellow-reds and yellows, having a value of not more than 8 and a chroma of not less than 4, or shall be discolored to a neutral lightness value of not over 7.

"(c) Sodium fluoride and sodium fluosilicate shall be colored blue or green having a value of not more than 8 and a chroma of not less than 4, or shall be discolored to a neutral lightness value of not over 7.

"(d) Others. Other white powder economic poisons may be required to be colored or discolored, after investigation and public hearing.

"(e) The enforcement official may permit other hues to be used for any particular purpose if the prescribed hues are not feasible for such purposes, and if such action will not be injurious to the public.

"(f) The coloration requirements above shall apply to the materials named therein, and not to non-highly toxic mixtures consisting of other ingredients with highly toxic materials."

Comac* — see Bordeaux Mixture.

Comac Burcop* (burgundy mixture) — Discontinued by La Cornubia S.A.

Comac Macuprax* — see Bordeaux Mixture.

Comac Parasol* — see Copper Hydroxide.

Comac* 23-35

BP: La Cornubia S.A.

Identification

ADDITIONAL TRADE NAMES: Super Macclesfield* F23-35 or Macc* F23-35.

Chemistry

COMPOSITION: Cupric hydroxide + folpet.

Action/Use

ACTION: Fungicide.

FORMULATIONS: Wettable powder.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Super Macclesfield* F23-35: (Rat): Oral LD₅₀ >4000 mg/kg. Cupric Hydroxide: (Rat): Oral LD₅₀ 1000 mg/kg.

Combat Plus* — see Foam Suppressant.

Combine* — see Bromoxynil.

Comite* — see Propargite.

Command*

BP: FMC Corp. (Command*, Gamit*, Magister*, Merit*)

Identification

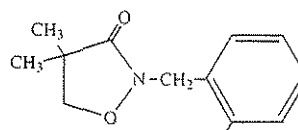
COMMON NAME: Clomazone (ISO draft, ANSI, BSI).

CODE NUMBER: CAS 81777-89-1.

Chemistry

COMPOSITION: 2-[(2-chlorophenyl)methyl]-4,4-dimethyl-3-isoxazolidinone.

PROPERTIES: Light brown viscous liquid. Specific gravity 1.192 at 20°C. Vapor pressure 1.92 x 10⁻² Pa at 25°C, (1.44 x 10⁻⁴ mmHg).



Command*

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Broad spectrum herbicide.
USE: For annual grasses, broadleaf weeds in peas, peppers, pumpkins, soybeans, tobacco; weeds in chemical fallow wheat fields.
FORMULATIONS: Emulsifiable concentrate.
COMBINATIONS: Commence* (+ trifluralin) (FMC Corp.)

Registration Notes

U.S.: Commando*.
 OUTSIDE U.S.: Gamit*, Magister*, Merit*.

Environmental Guidelines

SOLUBILITY: In water, 1100 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION. **WARNING** (4EC).

TOXICITY CLASS: III,II (4EC).

TOXICITY: Tech (Rat): Oral LD₅₀ 1369 mg/kg (female); 2077 mg/kg (male), 4EC (Rat): 1406 mg/kg (female); 2343 mg/kg (male); (Rabbit): Dermal >2000 mg/kg.

PROTECTIVE CLOTHING: Depending upon concentration encountered, wear safety glasses or goggles, rubber gloves, rubber boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals. No loss of tech at ambient temperature for one year; no loss at 50°C for three months. Do not store below 40°F.

Emergency Guidelines

FLASHPOINT: 4EC: 106-109°F (closed cup).

FIRE EXTINGUISHING MEDIA: Foam, carbon dioxide, or dry chemical.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** do NOT induce vomiting.

EMERGENCY TELEPHONE: 716-735-3765.

Commando* — see Suffix BW*.

Commence*

BP: FMC Corp. (Commence*)

Identification

COMMON NAME: Trifluralin + clomazone.

Chemistry

COMPOSITION: (α,α,α-trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine) + 2-[(2-chlorophenyl)methyl]-4,4-dimethyl-3-isoxazolidinone.
PROPERTIES: Orange liquid, vapor pressure 0.12 mm/hg. Specific gravity 1.06-1.10 g/ml at 25°C.

Action/Use

ACTION: Broad spectrum herbicide.
USE: Controls annual grasses, broadleaf weeds in soybeans.
FORMULATIONS: Emulsifiable concentrate.

Safety Guidelines

SIGNAL WORD: WARNING (EC).

TOXICITY CLASS: III (EC).

TOXICITY: (Rat): Oral LD₅₀ >540 but <5400 mg/kg. (Rabbit): Dermal LD₅₀ >5400 mg/kg.

PROTECTIVE CLOTHING: Wear goggles, face shield, or safety glasses when handling. Use protective clothing such as coveralls, a long sleeved shirt and impermeable gloves.

HANDLING AND STORAGE CAUTIONS: Do not freeze. Do not store below 40°F. If solid crystals are observed, warm material to about 60°F by placing container in warm location. Shake or roll container periodically to redissolve solids. Keep out of reach of children and animals. Store in original containers only. Store in a dry place. Carefully open containers. After partial use, replace lids and close tightly. Do not put concentrate or dilute material into food or drink containers. Do not contaminate other pesticides, fertilizers, water, food or feed by storage or disposal.

Emergency Guidelines

FLASHPOINT: 118°F (closed cup).

FIRE EXTINGUISHING MEDIA: Foam, carbon dioxide, dry chemical.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** do NOT induce vomiting. Administer activated charcoal (6-8 heaping teaspoonfuls) with large quantity of water.

EMERGENCY TELEPHONE: 800-331-3148.

Commodore* — see Lambda-cyhalothrin.

Common Name

If no trivial names are commonplace, other names may be coined for the active ingredients of pest control chemicals, including growth regulators, desiccants, and defoliant, whose chemical names are so long and complicated that they are not easily remembered or adaptable to

literature and ordinary use. In the United States, the American National Standards Institute (ANSI) provides a procedure whereby manufacturers, formulators, or interested organizations (public or private) may obtain recognition and acceptance of a proposed common name. To obtain approval, a sponsor submits a statement together with an application fee to: Secretary, American National Standards Committee K62, ANSI, 1430 Broadway, New York, NY 10018.

Organizations represented in the K62 Committee include, among others, the Weed Science Society of America (WSSA), the American Phytopathological Society, Entomological Society of America (ESA), and Environmental Protection Agency (EPA). Outside the U.S., the International Organization for Standardization (ISO) approves common names. ANSI is the U.S. representative to this organization.

Common Salt — see Sodium Chloride.

Comp-Ad* — see Compatibility Agent.

Compass* — see Thiophanate Methyl.

Compatibility

The ability of 2 or more substances to mix without objectionable changes in their physical or chemical properties, or without reducing effectiveness of any individual component.

Compatibility Agent

A mixture or formulation for use where simultaneous applications of liquid fertilizers and pesticides are desired. Improves the stability of these mixtures and the uniformity of their application.

Compel* CRW

BP: Ecogen Inc.

Action/Use

ACTION: Insect feeding stimulant.
USE: For corn rootworms. Designed to increase the effectiveness of insecticides.

FORMULATIONS: Powder in adhesive mixture.

Compete*

BP: Rohm and Haas Co. (Compete*)

Identification

COMMON NAMES: Fluoroglycofen-ethyl (ISO-E draft, ANSI, BSI); fluoroglycofene-ethyl (ISO-F).

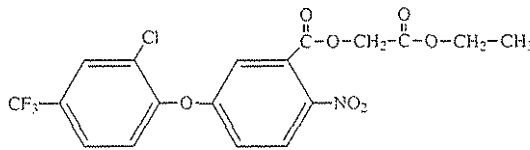
EXP. CODE NUMBER: BAS 9106H (BASF AG); RH-0265 (Rohm and Haas Co.).

OTHER CODE NUMBERS: CAS 77501-60-1 (fluoroglycofen); CAS 77501-90-7 (fluoroglycofen-ethyl).

DISCONTINUED NAME: Super Blazer*.

Chemistry

FAMILY: Diphenyl ether.
COMPOSITION: Ethyl O-(5-(2-chloro-α,α,α-trifluoro-p-tolyloxy)-2-nitrobenzoyl)glycolate.



Action/Use

ACTION: Herbicide.
USE: Postemergence for broadleaf weeds; side effects on some grasses in cereals, soybeans, peas (presowing).

FORMULATIONS: Emulsifiable concentrate, wettable powders.

COMBINATIONS: Estrad* Duplo (+ dichlorprop-P), Estrad* M (+ mecoprop-P), Trenox* (+ bentazone + dichlorprop-P) (BASF AG).

Registration Notes

U.S. Not registered.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96 h) 2-23 mg/l (freshwater adult); 2 g/l (eggs).

Bird: LD₅₀ >3000 mg/kg. **Bee:** Nontoxic (honeybee).

DEGRADATION: Soil photolysis half-life 14 days; aqueous photolysis half-life 3-6 hr.

SOIL PARTICLE ADSORPTION: Low potential to leach.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 1480 mg/kg (male); 1590 mg/kg (female). (Rabbit): Dermal >5000 mg/kg.

SPILL CONTROL/CLEANUP: Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Competitor* — see Fluoroglycofen; Isoproturon.

Compex*

BP: Kalo, Inc. (Compex*)

Chemistry

COMPOSITION: Alcohol sulfates, sodium alkyl butanediamate and polyesters of sodium thio butanedioate.

FORMULATION: Liquid.

Action/Use

ACTION: Compatibility agent.

USE: Improves the compatibility of many agricultural chemicals with liquid fertilizer and/or other agricultural chemicals.

SOLUBILITY: Complete in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat) Oral LD₅₀ >500 mg/kg. Dermal >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid prolonged contact with skin.

Compitox* — see Mecoprop.

Compitox Plus* — see Mecoprop.

Comply* — see Fenoxycarb.

Compound 1080 — see Sodium Fluoroacetate.

Compound 4072 — see Chlorfenvinphos.

Compressed Air Sprayer

Sprayer usually of 1 to 3 gallon capacity with extension rod, equipped with air pump to develop pressure, often with shoulder strap for carrying. Not suitable for spraying at heights over 6 to 8 feet.

Concentrate

A liquid or dry formulation containing a percentage of toxicant (active ingredient) high enough to save shipping and storage charges and yet be of a convenient strength and composition for ready dilution by the user.

See Dry Concentrate, Emulsifiable Concentrate.

Concentrate Spray — see Low Volume Spray; Ultra Low Volume Spray.

Concentration

The amount of a substance contained in a unit volume of a formulation or mixture. e.g., 4 lb./gal.; or the percentage of the substance, as in a 50% wettable powder.

Concep* Herbicide (cyometrinil) — Discontinued 1984 by Ciba-Geigy.

Concep* II

BP: Ciba

Identification

COMMON NAME: Oxabtrimil (ISO draft, BSI).

EXP. CODE NUMBER: CGA-92194 (Ciba-Geigy).

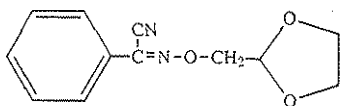
OTHER CODE NUMBER: CAS 74782-23-3.

Chemistry

COMPOSITION: α -[(1,3-dioxolan-2-yl)methoxyimino]benzeneacetonitrile.

FAMILY: Oxime ether.

PROPERTIES: Brown powder; melting point 70°C.



Concep* II

Action/Use

ACTION: Herbicide safener.

USE: Applied as a sorghum seed treatment prior to planting.

FORMULATIONS: 70 WP.

Environmental Guidelines

SOLUBILITY: In water, 20 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. Dermal >5000 mg/kg. (Rabbit): Minimal eye, skin irritation.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in well-ventilated, secure area out of reach of children and domestic animals.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemical, foam or carbon dioxide.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Apply artificial respiration if necessary. Ingestion, drink one or two glasses of water and induce vomiting.

Concep* III

BP: Ciba (Concep* III)

Identification

COMMON NAME: Fluxofenim.

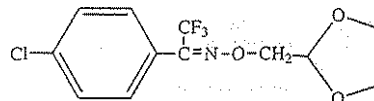
EXP. CODE NUMBER: CGA-133205 (Ciba-Geigy).

Chemistry

COMPOSITION: 1-(4-chlorophenyl)-2,2,2-trifluoroethanone O-(1,3-dioxolan-2-ylmethyl)oxime.

FAMILY: Oxime ether.

PROPERTIES: Colorless liquid, mild odor.



Concep* III

Action/Use

ACTION: Herbicide safener.

USE: Applied as a sorghum seed treatment prior to planting.

FORMULATIONS: Emulsifiable concentrate; 8 EC.

Environmental Guidelines

SOLUBILITY: In water, 30 ppm at 20°C.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 669 mg/kg; Inhalation LC₅₀ 1.21 mg/l (4h). (Rabbit) Oral LD₅₀ 1544 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in well-ventilated, secure area out of reach of children and domestic animals.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemical, foam or carbon dioxide.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Apply artificial respiration if necessary. Ingestion, drink one or two glasses of water and induce vomiting.

Concert*

BP: Du Pont Agricultural Products (Concert*)

Chemistry

COMPOSITION: Chlorimuron-ethyl + thifensulfuron-methyl.

FAMILY: Sulfonylurea.

Action/Use

ACTION: Postemergent herbicide.

USE: For broadleaf weed control in soybeans.

FORMULATIONS: Water dispersible granule, water soluble packets.

Registration Notes

U.S.: For use only in certain states.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Concord* — see Fastac*.

Conditional Registration

Under special circumstances, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) permits registration of pesticide products that is "conditional" upon the submission of additional data. These special circumstances include a finding by the EPA Administrator that a new product or use of an existing pesticide will not significantly increase the risk of unreasonable adverse effects. A product containing a new (previously unregistered) active ingredient may be conditionally registered only if the Administrator finds that such conditional registration is in the public interest, that a reasonable time for conducting the additional studies has not elapsed, and the use of the pesticide for the period of conditional registration will not present an unreasonable risk.

Condor*

BP: Ecogen Inc. (Condor*)

Chemistry

COMMON NAME: *Bacillus thuringiensis* var. *kurstaki*.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Biological insecticide.
USE: Controls gypsy moth and spruce budworm in forests, trees, and shrubs; soybean looper in soybeans; armyworm, cotton bollworm, and tobacco budworm in cotton.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Wildlife: Nontoxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Causes skin and eye irritation.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry area.

Condor G*

BP: Ecogen Inc. (Condor G*)

Chemistry

COMMON NAME: *Bacillus thuringiensis* var. *kurstaki*.

Action/Use

ACTION: Biological insecticide.

USE: Controls European corn borer in corn.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Wildlife: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Causes skin and eye irritation.

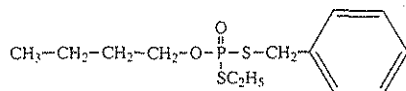
HANDLING AND STORAGE CAUTIONS: Store in a cool, dry area.

Conen*

(Discontinued by Sumitomo Chemical Co., Ltd.)

Identification

COMPOSITION: S-benzyl O-butyl S-ethyl phosphorodithioate.



Active ingredient of Conen*

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 870 mg/kg.

Confidor* — see Imidacloprid.

Conifroni*

BP: DowElanco (Conifron*)

Identification

CODE NUMBER: CAS 057213-69-1.

Chemistry

COMPOSITION: Triclopyr + clopyralid.

PROPERTIES: Clear amber liquid with slight amine smell. Boiling point 212°F.

Action/Use

ACTION: Herbicide.

USE: Broadleaf postemergence turf herbicide.

FORMULATION: EC.

Environmental Guidelines

SOLUBILITY: Completely soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

PROTECTIVE CLOTHING: Use chemical goggles.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children and animals. Store under cool, dry conditions. Avoid elongated temperatures and direct sunlight.

Emergency Guidelines

FLASHPOINT: 150°F (SFCC).

FIRE EXTINGUISHING MEDIA: Foam, CO₂.

ANTIDOTE: No specific antidote. May cause tissue destruction leading to stricture. If lavage is performed, suggest endotracheal and/or esophagosopic control.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** do NOT induce vomiting. Give large amounts of water or milk and transport to medical facility.

Conifer

A tree or shrub with needle-like or scaly leaves and bearing cones. Softwoods; most are evergreen such as pine, cedar, spruce, and hemlock. Larch is a deciduous conifer.

Conquest* Herbicide (atrazine + cyanazine) — Discontinued by Du Pont.

Conquest* (U.K.) — see Glufosinate-ammonium.

Conrel* H.F. Pheromone Dispensers — see Hollow Fiber Pheromone Dispensers; Scentry* Pheromone Lures.

Contact Herbicide

A herbicide that kills primarily by contact with plant tissues rather than by translocation (Systemic Herbicides). It must be applied thoroughly to the foliage of weeds.

Contact Insecticide

A chemical causing the death of an insect with which it comes in contact; ingestion not necessary.

Container, Original — see Original Container.

Contamination

The presence of an unwanted material, as a pesticide, in or on a plant or plant product, in a meat product, or in soil, water, air, etc. See Residue.

Continental Clay* — see Clay; Dusts.

Contour*

BP: American Cyanamid Co. (Contour*)

Chemistry

COMPOSITION: Imazethapyr + atrazine.

Action/Use

ACTION: Herbicide.

USE: For use only on Pursuit* resistant/tolerant field corn hybrids (IMI-Corn*).

Registration Notes

U.S.: RUP.

Safety Guidelines

SIGNAL WORD: CAUTION.

PROTECTIVE CLOTHING: Long-sleeved shirt and long pants, chemical-resistant gloves, chemical-resistant footwear plus socks.

Contrac* — see Bromadiolone.

Contra-Insect* — see Chlorpyrifos.

Contraven* — see Terbufos.

Contrax-W* Rodenticide (warfarin) — Discontinued 1993 by Motomco Ltd.

Controlled Release*

BP: AgriSense, Div. of biosys (Acrylates Copolymer*, Decoy*, Magnet*)

Chemistry

PROPERTIES: Volatiles or active chemicals. Entails the use of pheromone attractants, synthetic attractants and pesticides.

Action/Use

ACTION: Custom-formulated polymer entrapment system enabling controlled time release.

USE: Converts liquids into solids or protects a.i. from degrading effects.

FORMULATIONS: Solids, powders, sprayable beads, cylinder shaped lures.

Controlled Release Pesticides — see Encapsulated Pesticides; Scentry* Pheromone Lures.

Contrax-D* Rodenticide (diphacinone) — Discontinued 1993 by Motomco Ltd.

Contur* — see Baythroid*.

Coopex* — see Permethrin.

Coopxil* — see Metalaxyl.

Copac* E

BP: BASF AG

Identification

COMMON NAME: Ammoniacal copper sulfate.

TRIVIAL NAME: Tetraamminecopper sulfate

ADDITIONAL TRADE NAME: Cuproxat* flüssig (BASF AG).

CODE NUMBER: CAS 14283-05-7.

Chemistry

COMPOSITION: Cu(NH₃)₄SO₄.

PROPERTIES: Violet liquid, density ca. 1.07 g/cm³.

Action/Use

ACTION: Contact bactericide.

USE: For the prophylactic control of various epiphytic bacterial diseases such as fire blight (*Erwinia amylovora*) on apples, pears, vegetables, ornamental shrubs, stone fruit.

FORMULATIONS: Aqueous solution.

Registration Notes

U.S.: Copac* E registration voluntarily withdrawn by BASF AG on April 30, 1993.

Environmental Guidelines

HAZARDS: Fish: Toxic; Bee: Nontoxic.

DEGRADATION AND METABOLISM: Natural substances.

SOLUBILITY: Water soluble.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: DANGER. (Severe eye irritant.)

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2530 mg/kg. Dermal LD₅₀ >2500 mg/kg.

PROTECTIVE CLOTHING: Protective clothing and boots when handling undiluted and diluted product. Goggles, impermeable gloves and apron when handling undiluted product.

HANDLING AND STORAGE CAUTIONS: Keep out of children's reach, and away from food, drink or animal feed. Do not eat, drink or smoke while using.

SPILL CONTROL/CLEANUP: Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: EDTA, BAL, penicillamine.

FIRST AID: Get medical aid. Eyes, rinse immediately with plenty of water. Ingestion, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC).

CoPilot* — see Quizalofop-P-ethyl.

Cop-O-Cide*

Discontinued by Tower Chemical

Chemistry

COMPOSITION: Emulsion of copper salts of fatty acids, rosin acids.

Action/Use

ACTION: Fungicide.

Safety Guidelines

TOXICITY: Exempt from residue tolerances.

Cop-O-Zinc 25-25*

BP: Cuproquim Corp.

Chemistry

COMPOSITION: Basic copper sulfate, zinc oxide/sulfate.

FORMULATION: Wettable powder.

Action/Use

ACTION: Fungicide.

USE: For peaches, nectarines, walnuts, apples, pears, almonds, cherries, citrus and apricots.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

Copper

Compounds of copper form one of the most useful groups of fungicides. And various forms are applied to plants, cordage, fabric and leather, and used as algicides, seed disinfectants and wood preservatives.

Copper materials have also been used as insecticides and repellents for certain insects. The various forms include Bordeaux mixture, other inorganic salts (carbonates, chloride, hydroxide, oxalate, oxides, phosphate, silicate, sulfates and zinc chromate complex) and organic compounds such as acetate, naphthenate, oleate, quinolinolate and resinate. The copper ion available in the form of soluble salts provides the fungicidal as well as phytotoxic and poisonous properties. Federal agencies have decided that no tolerance level need be established for a large number of copper compounds: Bordeaux mixture, copper acetate, copper carbonate basic, copper-lime mixtures, copper oxychloride, copper silicate, copper sulfate, copper sulfate-basic, copper-zinc-chromate, cuprous oxide, cupric oxide and copper hydroxide.

The AAPCO has adopted this regulatory principle relating to the labeling of products containing copper: "If an economic poison contains a copper compound of uncertain composition, the ingredient statement may be given in terms of copper expressed as metallic providing the type of compound is also shown. For example, the name of active ingredient may be stated as "copper expressed as metallic (derived from basic copper sulfate)."

Copper, Fixed

BP: Agtrol Chemical Products (Champ*, Champ* Formula II DF, Champ* Formula 2 Flowable, Champion*)

Boliden Intertrade, Inc.

Ingenieria Industrial S.A. de C.V. (Bordocop*, Cuprox*,

Hydrocop*, Oxycop*, Tricop*)

Old Bridge Chemicals, Inc.

Phibro-Tech, Inc. (Copper Pride*, Coxysul*, CP-TS 53)

Chemistry

COMPOSITION: These compounds include: copper hydroxide, the basic sulfates, oxychlorides, and oxides. Others have had minor use or experimentation.

Action/Use

ACTION: Fungicides, bactericides.

USE: Developed to replace Bordeaux mixture. Most are equal to on-farm-made Bordeaux as fungicides but may not adhere or persist as well. This has been overcome by reducing the particle size of basic sulfates, hydroxides, and oxides and by adding materials to improve spreading and sticking qualities.

FORMULATIONS: Aqueous and dry flowables, wettable powders.

COMBINATIONS: Champion* 20/20 (+ copper hydroxide + metallic zinc) (Agtrol Chemical Products); Kocide* 20/20 (+ copper hydroxide + metallic zinc) (Griffin Corp.).

Safety Guidelines

SIGNAL WORD: CAUTION; WARNING or DANGER (some form.).

TOXICITY CLASS: III; II, I (some form.).

TOXICITY: Exempt from residue tolerance.

PROTECTIVE CLOTHING: Wear goggles.

Emergency GuidelinesFIRST AID: Get medical aid. Eyes, flush with large amounts of water for 15 minutes. Ingestion, drink water and induce vomiting.**Copper Abietate****Identification**

CODE NUMBERS: CAS 29586-23-6; SHA 023301.

Chemistry

PROPERTIES: Rosin derivative reacted with copper.

CORROSIVENESS: Non-corrosive.

Action/Use

ACTION: Fungicide.

Copper Acetate**Identification**

CODE NUMBERS: CAS 4180-12-5; SHA 044002.

HISTORY: First factory-made basic copper fungicide; developed by 1889.

Action/Use

ACTION: Fungicide.

Copper Acetoarsenite — see Paris Green.

Copper Ammonium Carbonate

BP: Ingenieria Industrial S.A. de C.V. (Cupromin*)

Mineral Research & Dev., Div. Chemical Specialties Inc.

(Copper-Count-N*)

Identification

DISCONTINUED NAME: Oxycop 8L* (Cuproquim Corp.)

Chemistry

COMPOSITION: Copper from Copper Ammonium Complex.

FAMILY: Inorganic copper.

Action/Use

ACTION: Bactericide, fungicide.

USE: For almonds, apples, apricots, avocados, beans (snap and dry), cabbage, caneberries, carrots, celery, cherries, citrus, cranberries, cucurbits, eggplant, filberts, grapes, lettuce, limes, mangos, olives, onion, peaches, peanuts, pears, peppers, potatoes, spinach, strawberries, sugar beets, tomatoes, walnuts, wheat, barley, hops, watermelons, muskmelons, bananas, cacao, cantalopes, honeydews, peas, and pumpkin squash. Use only on copper tolerant plants.

FORMULATIONS: Aqueous blue solution.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Low. Tolerance exempt.

Copper Arsenite**Identification**

TRIVIAL NAME: Acid copper arsenite.

CODE NUMBERS: CAS 10290-12-7; SHA 022401.

HISTORY: Introduced in 1875 as a possible substitute for Paris Green. More recently used as a wood preservative.

ChemistryCOMPOSITION: CuHAsO₄.**Action/Use**

ACTION: Insecticide, wood preservative.

USE: For cotton and vegetables (except potatoes, tomatoes).

FORMULATIONS: Wettable powder.

Copper Arsenate, Basic

(Discontinued 1970 by Sherwin Williams Co.)

Identification

CODE NUMBERS: CAS 10103-61-4; SHA 022801.

ChemistryCOMPOSITION: Cu(OH)₂·Cu₃(AsO₄)₂.**Action/Use**

ACTION: Insecticide, fungicide.

See Chromated Copper Arsenate.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Copper Carbonate, Basic

BP: Boliden Intertrade, Inc.
Ingenieria Industrial S.A. de C.V. (Carbocop*)

Identification

COMMON NAME: Basic cupric carbonates.
CODE NUMBERS: CAS 12069-69-1; SHA 022901.
ADDITIONAL TRADE NAME: Malachite*.

Chemistry

COMPOSITION: $\text{Cu}(\text{OH})_2\text{CuCO}_3$.

Action/Use

ACTION: Fungicide.

USE: Used to impregnate pear wraps. Seed treatment as a dry powder, does not affect germination; allows easier treatment; extends seed storage period. For smut diseases of most grasses. Applied as early season sprays for certain tree fruits, nuts. As fertilizer program supplement.

FORMULATIONS: Spray-dried, powder, light or dense grades available.

COMBINATIONS: Trimiltox* (+ copper sulfate + copper oxychloride + mancozeb) (Sandoz Agro Ltd.).

Safety Guidelines

SIGNAL WORD: WARNING

TOXICITY CLASS: II.

TOXICITY: Exempt from residue tolerance.

PROTECTIVE CLOTHING: Wear goggles.

Copper Chloride, Basic — see Copper Oxychloride.

Copper Chromate — see Celcure*.

Copper Count-N* — see Copper Ammonium Carbonate.

Copper Hydroxide

BP: Agtrol Chemical Products (Champ*, Champ* Formula II DF, Champ* Formula 2 Flowable, Champion*)
Crystal Chemical Inter-America (Cudrox*, Cuidrox*)
Cuproquim Corp. (Blue Shield* DF)
Griffin Corp. (Kocide*)
HELM AG
Ingenieria Industrial S.A. de C.V. (Hidrocob*, Hidroflow*, Hydrocop*)
La Cornubia S.A. (Comac Parasol*, Cuproxide*)
Old Bridge Chemicals, Inc. (Coppercide 23*, Coppercide 50*)
Urania Agrochem GmbH (Funguran*-OH)

Identification

CODE NUMBERS: CAS 20427-59-2; SHA 023401.

OTHER NAME: Cupric hydroxide.

DISCONTINUED NAME: Manpower* (1 manob) (Agtrol Chemical Products); Hydrox* (Cuproquim Corp.).

Chemistry

COMPOSITION: $\text{Cu}(\text{OH})_2$.

Action/Use

ACTION: Fungicide.

USE: Blue Shield*, Champ*, Champion*, Coppercide 50*, Kocide 101* for alfalfa, almonds, apricots, avocados, bananas, beans, blackberries, broccoli, Brussels sprouts, cabbage and cauliflower, cacao, cantaloupes, honeydews, muskmelons, carrots, celery, cherry, citrus, coffee, cranberry, cucumbers, currants, gooseberry, grapes, filberts, peaches, nectarines, peanuts, pears, peas, peppers, philodendron, potatoes, pumpkin, squash, strawberries, apples, eggplant, hops, lettuce, onion, sugar beets, sycamore, tomatoes, walnut, watermelon, wheat, and barley. Champion*, Kocide* SD for rice seed, wheat, barley seed. Champion*, Cudrox* tech, Kocide* tech used as a starting material to formulate other cupric hydroxide based agricultural fungicides.

FORMULATIONS: Dry flowable, flowable, micro flowable, water dispersible granules, wettable powder.

COMBINATIONS: Champion* 20/20 (+ copper, fixed + metallic zinc) (Agtrol Chemical Products); KO-Zinc WP* (+ zinc oxide/sulfate) (Cuproquim); Kocide* 20/20 (+ copper, fixed + metallic zinc), Kocide* 404S (+ sulfur) (Griffin Corp.); Comac* 23-35 (+ folpet) (La Cornubia S.A.).

Registration Notes

OUTSIDE U.S.: Cudrox*, Cuidrox* (Crystal Chemical Inter-America).

Safety Guidelines

SIGNAL WORD: DANGER (eye).

TOXICITY CLASS: I (eye).

TOXICITY: (Rat): Oral LD_{50} 1000 mg/kg.

Champion*: (Rat): Oral LD_{50} 2000 mg/kg. Tolerance exempt.

Blue Shield* DF: (Rat): Oral LD_{50} 1300 mg/kg.

Copper Lime Dust**Chemistry**

COMPOSITION: Ratio 20:80 monohydrated copper sulfate, lime.

Action/Use

ACTION: Fungicide.

USE: Has been used as a substitute for Bordeaux mixture on some vegetable crops and in combination with calcium arsenate.

Copper Linoleate**Identification**

CODE NUMBERS: CAS 53404-08-3; SHA 023303.

Chemistry

COMPOSITION: Copper with linoleic acid, an unsaturated 18-carbon fatty acid.

Action/Use

ACTION: Fungicide.

Registration Notes

U.S.: No longer registered.

Copper Naphthenate 8% — see Copper Naphthenates.

Copper Naphthenates

BP: ISK Biosciences Corp. (Curap 20*, Perm E-8*)

Identification

CODE NUMBERS: CAS 1338-02-9; SHA 023102.

ADDITIONAL TRADE NAMES: CNC, Coppo W*, Copper Uversol*, Cunapsol*, Cuprinol*.

DISCONTINUED NAMES: Chapco Cu-Nap* 8% (Chapman Chemical); Troysan* Copper 8% (Troy Chemical Corp.); Wiltz-65* (Esso Chemical); Wittox C* (Witco Corp.).

Chemistry

PROPERTIES: Solvent based. Soluble in petroleum solvents.

Action/Use

ACTION: Fungicide; wood preservative.

USE: Wood preservative to control fungal decay, insect attack. Fungicide to protect cellulosic textiles and cordage. Usually applied as 1%-2% (copper, metallic equiv.) solution in petroleum solvents.

FORMULATIONS: Solutions in petroleum solvents, liquid concentrate dilutable with petroleum solvents, water-based solutions, water soluble liquid concentrate.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (water soluble); CAUTION, WARNING (solvent based).

TOXICITY CLASS: I (water soluble) due to corrosivity; II, III (solvent based).

TOXICITY: Tech: (Rat): Oral LD_{50} >6.0 g/kg (solvent based); 2 g/kg (water based). Perm-E8* 3%: (Rat): Oral LD_{50} >5000 mg/kg; Inhalation: LC_{50} >2.0-20.1 mg/L. (Rabbit): LD_{50} 2000-20,000.

PROTECTIVE CLOTHING: Impervious gloves, apron, safety glasses, goggles, or face shield. Use respiratory protection in poorly ventilated areas.

HANDLING AND STORAGE CAUTIONS: Do not use, pour, spill, or store near heat or open flame. Keep container closed. Use with adequate ventilation. Avoid skin contact. Dispose of wastes by burial.

Emergency Guidelines

ANTIDOTE: (Water soluble) Drink promptly a large quantity of milk, egg white, gelating solution, or if these are not available, large quantities of water. Avoid alcohol.

FIRST AID: Get immediate medical aid. **Eyes**, flush with plenty of water, lifting upper and lower lids occasionally. **Skin**, remove contaminated clothing, wash exposed area immediately with soap and water. **Inhalation**, remove to fresh air. If not breathing, give artificial respiration (preferably mouth-to-mouth). **Ingestion**, do NOT induce vomiting. EMERGENCY TELEPHONE: 901-396-5151. 800-424-9300 (CHEM-TREC).

Copper Nordox* — see Copper Oxide.

Copper Oleate

(Discontinued 1984 by Witco Corp.)

Identification

CODE NUMBERS: CAS 1120-44-1; SHA 023304.

Action/Use

ACTION: Fungicide.

Copper Oxide

BP: Ingenieria Industrial S.A. de C.V. (Cuprocop*, Cuprox*)
NORDOX Industrier AS (Copper Nordox*, Nordox*, Oleo Nordox*)
Sandoz Agro Ltd. (Copper Sandoz*, Caocobre*)
TODO Agricola S.A.

Identification

COMMON NAMES: Cuprous oxide.

CODE NUMBERS: CAS 1317-39-1 (cuprous oxide); CAS 1317-38-0 (cupric oxide).

ADDITIONAL TRADE NAMES: Oleocouvre*, Yellow Cuprocide*.

DISCONTINUED NAMES: Fungi-Rhap* Cu-53, Fungi-Rhap* Cu-75 (CP Chemicals).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

PROPERTIES: Amorphous powder, yellow to red color range. Liable to oxidation to cupric oxide and to conversion to a carbonate on exposure to moist air and apt to corrode aluminum. Practically insoluble in organic solvents. Soluble in dilute mineral acids and in aqueous solutions of ammonia and its salts.

Action/Use

ACTION: Protective fungicide.

USE: Seed, seedling treatment to protect against damping off; dust or spray for the control of vegetable, fruit diseases; foliage application against blight, downy mildews and rusts. Nonphytotoxic except to brassicaceae and copper-shy varieties, particularly under adverse weather conditions. Copper Sandoz[®]; controls many common leaf, fruit diseases of horticultural crops (tomato and potato blight, celery leaf spot, peach leaf curl, hop downy mildew). Against fungal diseases in bananas, citrus crops, cocoa, coffee, and tea.

FORMULATIONS: Wettable micro granular (Copper Sandoz[®]).

Registration Notes

U.S.: Oleocuvire[®].

Environmental Guidelines

HAZARDS: Fish: Toxic.

Copper-Sandoz[®]; Fish: Nontoxic. LC₅₀ up to 50 ppm (48 h/WHO test) (goldfish).

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

TOXICITY CLASS: III (Copper Nordox[®]).

TOXICITY: Copper Nordox[®] (Rat): Oral LD₅₀ 1500 mg/kg.

PROTECTIVE CLOTHING: Dust mask and eye protection.

HANDLING AND STORAGE CAUTIONS: Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water by cleaning of equipment, or disposal of wastes near a body of water.

Copper Nordox[®]: Store in a dry, cool place.

Handle without spillage. Spillage is collected by brush or vacuum cleaner and has to be recycled.

Emergency Guidelines

ANTIDOTE: EDTA or penicillamine.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing. **Ingestion,** drink glass of warm water (with spoon of sodium chloride added), induce vomiting. **Inhalation,** remove to fresh air.

EMERGENCY TELEPHONE: 47-22659090 (Nordox).

Copper Oxochloride

BP: Agtrol Chemical Products
All India Medical Corp. (Coptox[®])
Caffaro S.p.A. (Aviocaffaro[®], Cuprocaffaro[®], Neoram[®], Pasta Caffaro[®])
Ciech-Agrochemia (Pol-Kupritox[®])
Crystal Chemical Inter-America (Criscobre[®])
Cuproquim Corp. (COC[®], Nucop[®])
HELM AG
Ingenieria Industrial S.A. de C.V. (Oxicob[®], Oxycop[®])
ISAGRO (Cuprossina[®])
Sandoz Agro Ltd. (Recop[®])
TODO Agricola S.A.
Urania Agrochem GmbH

Identification

COMMON NAMES: Basic cupric chloride, copper oxochloride.

EXP. CODE NUMBER: CN 38082010 (Ciech-Agrochemia).

OTHER CODE NUMBERS: CAS 1332-40-7; SHA 023501; EINECS 215-572-9.

ADDITIONAL TRADE NAMES: Blitox[®], Chempar[®], Cupox[®] (Agsin Pte. Ltd.); Cuprokylt[®], Cuprovinol[®], Cuprox[®], Devicopper[®], Fytolan[®], Kilex[®], Neoram blu[®], Cobox (BASF AG); Coprantol[®], Cupramar[®], Cupravit[®] (Bayer AG); Devicopper[®] (Devidayal (Sales) Pvt. Ltd.); Cuprenox[®] (Diachem S.P.A.); Blue Diamond[®] (Sulphur Mills Ltd.); Agoram[®] (Tecomag); Vacomil (VAPCO).

DISCONTINUED NAMES: Tricuzin[®] (+ zineb) (Atochem Agri BV); BASF Grünkupfer[®], Kauritil[®] (BASF AG); Fungi-Rhap[®] Cu-56 (CP Chemicals); Vitigran[®] (Hoechst); Galben[®] R and Tairel[®] R (+ benalaxyl) (ISAGRO); Colloidox[®], Coxyzan[®] (Mechema); Rhodiocuvire[®], Viricuvire[®] (Rhône-Poulenc Ag Co.).

Chemistry

COMPOSITION: Approx. 3Cu(OH)₂•CuCl₂.

PROPERTIES: Green to bluish-green powder, 90.0% suspendability; apparent density 420-520 g/l. Made by the action of air on scrap copper in cupric chloride-sodium chloride solution. Composition of product varies with conditions of manufacture but generally 56-58% copper. If precipitated in the presence of lime, a product approaching

3Cu(OH)₂•CaCl₂ in composition may be obtained. Both strongly corrosive to iron, galvanized iron. Soluble in ammonium hydroxide solutions. Soluble with decomposition in dilute acids.

Action/Use

ACTION: Protective fungicide.

USE: For beets, fruit crops, grapes, olive trees, plantation crops, potatoes, tomatoes, vegetables, ornamental plants, etc.

FORMULATIONS: Wettable powder, water dispersible granules.

COMBINATIONS: Aviso[®] Cup (+ cymoxanil + metiram) (BASF AG); Antracol[®] Kupfer and Antracol[®] Ramato Micro and Cupro-Antracol[®] (+ propineb), Antracol[®] Triple (+ propineb + triadimefon), Bakreni Euparen[®] (+ dichlorluanid), Euparen[®] Ramato Micro CM (+ dichloflu-anid + cymoxanil) (Bayer AG); Kasumin[®]-Bordeaux (+ kasugamycin) (Hokko Chemical Industry Co., Ltd.); Galben[®] C (+ benalaxyl) (ISA-GRO); Clortocaf Ramato[®] (+ chlorothalonil); Cuprosan[®] (+ zineb) (Rhône-Poulenc Ag Co.); Milttox[®] (+ zineb), Trimilttox[®] (+ copper sulfate + copper carbonate + mancozeb) (Sandoz Agro Ltd.); Vacomil[®]-Plus (+ metalaxyl) (VAPCO).

Registration Notes

OUTSIDE U.S.: Antracol[®] Kupfer, Antracol[®] Ramato Micro, Antracol[®] Triple, Bakreni Euparen[®], Cupro-Antracol[®], Euparen[®] Ramato Micro CM (Bayer AG); Criscobre[®] (Crystal Chemical Inter-America).

Environmental Guidelines

HAZARDS: Bee: Nontoxic. COC[®], Nucop[®]: Fish, aquatic organisms: Toxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Low for mammals. (Rat): Oral LD₅₀ 1470 mg/kg.

COC[®], Nucop[®]: (Rat): Oral LD₅₀ 1200 mg/kg.

PROTECTIVE CLOTHING: Protective clothing, chemical-resistant footwear plus socks, chemical-resistant headgear for overhead exposures. Chemical-resistant apron when cleaning equipment, mixing, or loading.

SPILL CONTROL/CLEANUP: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: EDTA or penicillamine.

FIRST AID: Ingestion, induce vomiting.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Copper Oxochloride Sulfate

BP: Agtrol Chemical Products (Copro[®], Coxysul[®], CS-56[®])
Cuproquim Corp. (Oxycop Dry S[®])

Identification

CODE NUMBERS: CAS 8012-69-9; SHA 023503.

ADDITIONAL TRADE NAME: COCS[®] (Platte Chemical Co.)

Chemistry

COMPOSITION: Basic chloride + sulfate of copper. Usually formulated in combination with insecticides. Approx. 3Cu(OH)₂•CuCl₂ + 3Cu(OH)₂•CuSO₄ coprecipitated.

Action/Use

ACTION: Fungicide.

USE: Controls downy mildews, blights, leafspots, and brown rot of tree, vine, field, row crops.

FORMULATIONS: Wettable powder, dusts formulated from wettable powder, water dispersible granules.

Environmental Guidelines

SOLUBILITY: Insoluble in water. Low order of phytotoxicity owing to the controlled solubility of the copper ion.

Safety Guidelines

TOXICITY: Exempt from residue tolerance.

HANDLING AND STORAGE CAUTIONS: Do not use in areas where injury to crops from excessive copper is known to occur or where fumigation with hydrogen cyanide gas is practiced.

Copper Oxy-sulfate — see Cuproxat[®].

Copper 3-Phenylsalicylate

(Discontinued 1969 by Dow Chemical)

Identification

CODE NUMBERS: CAS 5328-04-1; SHA 023801.

Action/Use

ACTION: Preservative.

Copper Potassium Sulfide**Chemistry**

COMPOSITION: Copper + potassium polysulfide + potassium thiosulfate.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Fungicide.

USE: Soil application, soak for transplants.

Copper Power* — see Copper Sulfate, Basic.**Copper Pride*** — see Copper, Fixed; Copper Sulfate, Basic.**Copper 8-Quinolinate****Identification**

COMMON NAMES: Copper-8, Oxine-copper (BSI, ISO); oxine cuivre or oxine-Cu, or oxyquinolinate de cuivre (France).

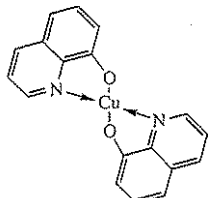
CODE NUMBERS: CAS 10380-28-6; SHA 024002.

TRADE NAMES: PQ-8* (ISK Biosciences Corp.); Seed Guard* (VAPCO); Bioquin*; Cunilate 2472*; Dokirin*; Fruitdo*.

DISCONTINUED NAMES: Mitrol PQ* (Chapman Chemical Co.).

Chemistry

PROPERTIES: Clear orange liquid with an alcoholic odor.



Copper 8-Quinolinate

Action/Use

ACTION: Fungicide; wood preservative.

USE: Treatment of fruit handling equipment. Disinfectant for potato seed handling equipment to control potato ring rot.

FORMULATIONS: Liquid concentrates (dilutable with petroleum solvents, water soluble), emulsifiable concentrates.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (water-base) due to eye corrosivity;

WARNING, CAUTION (petroleum solvent base).

TOXICITY CLASS: I (water-base); II, III (petroleum solvent base).

TOXICITY: (PQ-8*); (Rat): LD₅₀ 1606; Inhalation LC₅₀ <0.2 mg/l. (Rabbit): LD₅₀ 2000-20,000 mg/kg.

PROTECTIVE CLOTHING: Gloves, face protection.

Emergency Guidelines

FLASHPOINT: 101°F (TCC).

EMERGENCY TELEPHONE: 901-396-3151, 800-424-9300 (CHEMTREC).

Copper S* — see Copper Sulfate, Basic.**Copper Sandoz*** — see Copper Oxide.**Copper Sulfate**

BP: Agtrol Chemical Products

All India Medical Corp.

Boliden Intertrade, Inc.

Chem One Corp.

Elf Atochem Agri S.A. (Bouillie Bordelaise RSR*)

Forward International Ltd.

Griffin Corp. (Blue Viking*)

Ingenieria Industrial S.A. de C.V. (Sulfacop*)

La Cornubia S.A.

Ladda Co., Ltd.

Old Bridge Chemicals, Inc.

Phelps Dodge Refining Corp. (Triangle*)

Phibro-Tech, Inc.

Source Technology Biologicals, Inc. (Phyton-27*)

Identification

TRIVIAL NAMES: Blue copperas, blue vitriol, bluestone.

COMMON NAME: Copper (II) sulfate or cupric sulfate.

CODE NUMBERS: CAS 7758-99-8 (pentahydrate); SHA 024401.

DISCONTINUED NAME: Vencedor* (Atanor S.A.).

Chemistry

COMPOSITION: Cupric sulfate pentahydrate.

PROPERTIES: Blue color with no odor. Absorbs moisture readily when exposed to the air.

Action/Use

ACTION: Fungicide, algicide.

USE: One of the earliest widely used fungicides, and formerly as a fungicide in copper-lime dust. Copper sulfate pentahydrate for control of algae, pond weeds in impounded potable waters. Boliden, CP, and Chem One Corp. labels also for use in potable water, irrigation water conveyance systems, root control in sewers, and for algae, tadpole

shrimp in rice. Phyton-27* for systemic, broad-spectrum bacterial and fungal control on many ornamental crops and trees.

FORMULATIONS: Various crystal sizes: medium, large liquid, powder (snow) form, granular, water soluble.

COMBINATIONS: Cuprofix* M (+ maneb), Cuprofix* 30 (mancozeb) (ELF Atochem North America, Inc.); Trimiltox* (+ copper carbonate + copper oxychloride + mac).

Environmental GuidelinesHAZARDS: Fish: LC₅₀ ≥1 mg/l (rainbow trout). Bec: Toxic.**Safety Guidelines**

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 472 mg/kg. Nontoxic dermally or by inhalation. Non-irritating to skin. Corrosive to eyes.

PROTECTIVE CLOTHING: Wear goggles, protective equipment. Change clothing frequently.

HANDLING AND STORAGE CAUTIONS: Avoid contact. May be corrosive to eyes, mucous membrane, skin, gastro-intestinal tract. Keep excessive quantities out of lakes, streams and ponds.

Emergency GuidelinesFIRST AID: Get medical aid. Eyes, flush including under lids with ample water for 15 minutes. Ingestion, drink 2 glasses milk of magnesia, milk or water. Induce vomiting. Repeat until vomit clear. Swallowing may cause nausea, shock.**Copper Sulfate, Basic**

BP: Agtrol Chemical Products (Copper Power*)

Boliden Intertrade, Inc. (Tri-Basic*)

Cuproquim Corp. (Basic Copper 53*)

ELF Atochem North America, Inc.

Griffin Corp. (Basicop*)

Ingenieria Industrial S.A. de C.V. (Sultricot*, Tricop*)

Old Bridge Chemicals, Inc.

Phibro-Tech, Inc. (CP-TS 53, Copper Pride*)

Identification

ADDITIONAL TRADE NAMES: KOP 300* (Drexel Chemical); Idro-rame FL* (Diachem S.P.A.); Phyto-Bordeaux*, Super Cu*, TNCS 53*.

DISCONTINUED NAMES: Kilcop 53D* (Asgrow Florida); Kobasic* (Kocide Chemical); Sultricot* (Ingenieria); Vencedor* (Atanor S.A.).

Chemistry

PROPERTIES: Min. 53% copper metallic basis.

Action/Use

ACTION: Fungicide.

USE: For citrus diseases; bacterial, fungus diseases on peppers, tomatoes, numerous fruit, vegetable, nut, field crops. Used dormant with oils.

FORMULATIONS: Can be blended with taic for use as a dust, or as spray without lime. Flowable, wettable powder.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING (Eye irritant).

TOXICITY CLASS: II.

PROTECTIVE CLOTHING: Protective eyewear.

HANDLING AND STORAGE CAUTIONS: Normal storage. Avoid excess moisture. Keep flowables from freezing.

Emergency GuidelinesFIRST AID: Get medical aid. Eyes, flush with plenty of water. Ingestion, drink water, induce vomiting.**Copper TEA Complex** — see Ricetrine*.**Copper Uversol*** — see Copper Naphthenates.**Copper-Tetra Copper Calcium Oxychloride****Action/Use**

ACTION: Fungicide.

USE: For peanuts, nuts, small fruits, sugar beets, tree fruits, vegetables.

Copper-triethanolamine Complex — see A & V-70 Algacide: Algae-Rhap Cu 7*.**Coppercide 23*** — see Copper Hydroxide.**Coppercide 50*** — see Copper Hydroxide.**Copperas** — see Ferrous Sulfate.**Copperized Boliden Salts****Chemistry**

COMPOSITION: Copperized chromated zinc arsenate.

Action/Use

ACTION: Water-borne wood preservative.

Copper-Zinc-Chromate**Identification**

DISCONTINUED NAMES: Miller 658* (Miller Chemical & Fertilizer Corp.).

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Fungicide, bactericide.

Coppo W* — see Copper Naphthenates.

Coprantol* — see Copper Oxychloride.

Copro* — see Copper Oxychloride Sulfate.

Coptox* — see Copper Oxychloride.

Corado* Fungicide (pyrifenoX) — Discontinued by Dr. R. Maag Ltd.

Corasil* — see Dichlorprop.

Coratop* — see Pyroquilon.

Co-Rax* — see Warfarin.

Coraza*

BP: Productos OSA (Coraza*)

Identification

TRIVIAL NAME: DPA.

CODE NUMBERS: CAS 122-39-4; SHA 038501.

ADDITIONAL TRADE NAMES: Big Dipper*, Deccoscaid 282*, No-Scald DPA 283* (Atochem North America); Shield DPA* (Shield-Brite, Div. Pace Intl. LP); Scaldip*.

Chemistry

COMPOSITION: Diphenylamine.

Action/Use

USE: Postharvest treatment of apple, pear scald.

FORMULATIONS: Emulsifiable concentrate, liquid, wettable powder, pure.

Environmental Guidelines

HAZARDS: Fish: Toxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Guinea Pig): Oral LD₅₀ 300-1000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin contact. Remove, wash contaminated clothing.

Corazal* — see Diphenylamine.

Corbel* — see Fenpropimorph.

Corbel* CL — see Chlorothalonil; Fenpropimorph.

Corbel* Duo Fungicide (fenpropimorph + carbendazim) — Discontinued by BASF AG.

Corbel* Star — see Chlorothalonil; Fenpropimorph.

Corbel* Triple — see Carbendazim; Chlorothalonil; Fenpropimorph.

Corbit* — see Anthraquinone.

Corncobs

BP: The Andersons Industrial Products Group (Grit-O' Cobs*, Lite-R-Cobs*)

When corncobs are dried and separated into their main fractions, a hard woody material is derived, along with a softer and lower bulk density chaff. Both fractions can be ground to uniform sizes, ranging from 8 mesh to 60 mesh. The hard woody material is useful as a carrier for pesticides which need to reach the ground, and the lighter chaff is useful for carrying pesticides which need to remain on the leaf of the plant. Either material can be used as a filler, as well as a carrier. Water absorption on the hard portion is 133%, and on the chaff portion 727%. Bulk density of the hard portion is approximately 28 pounds per cubic foot, and 14 pounds per cubic foot on the chaff.

Cornox* — see 2,4-D.

Cornox CWK* — see Galtak*.

Cornox Plus* — see Mecoprop.

Cornox RK* Herbicide (dichlorprop) — Discontinued by Schering AG.

Cornoxynil* Herbicide (dichlorprop) — Discontinued 1989 by Agrolinz, Inc.

Corodane* Insecticide (chlordan) — Discontinued by PPG Industries.

Corona* — see PyrifenoX.

Corothion* — see Parathion.

Corotran* — see Ovex.

Corozate* Fungicide (ziram) — Discontinued by PPG Industries.

Corrective — see Safener; Water Modifier.

Correx*

(Discontinued by Hopkins Agricultural Chemical Co.)

Identification

CODE NUMBERS: CAS 52316-55-9; SHA 099102.

DISCONTINUED NAME: Lignasan BLP*.

Chemistry

COMPOSITION: Methyl 2-benzimidazolecarbamate phosphate.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 35,918 mg/kg. Tech: 7500 mg/kg.

Corrosive Sublimates

Identification

COMMON NAMES: Bichloride of mercury, mercuric chloride.

CODE NUMBERS: CAS 7487-94-7; SHA 052001.

ADDITIONAL TRADE NAME: Fungchex*.

Action/Use

ACTION: Fungicide, insecticide.

USE: Bulb, tuber dip, including seed potatoes; greenhouse beds for earthworm control.

COMBINATIONS: Calocure*.

Registration Notes

U.S.: Laboratory use only.

Safety Guidelines

SIGNAL WORD: POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 1-5 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid inhalation, skin contact.

Corvet* CM — see Fenpropimorph.

Cosan* — see Sulfur.

Cosavet* DF — see Sulfur.

Cosban* — see XMC.

Cosmic* — see Maneb.

Cosmic FL* — see Calixin*; Carbendazim; Maneb.

Co-thion* Insecticide (azinphos-ethyl + azinphos-methyl + parathion) — Discontinued 1970 by Chemagro Corp.

Cotnion-Ethyl* — see Azinphos-ethyl.

Cotnion-Ethyl-Methyl* — see Azinphos-ethyl; Azinphos-methyl.

Cotnion-Methyl* — see Azinphos-methyl.

Cotofor* Herbicide (dipropetryn) — Discontinued by Ciba-Geigy Ltd.

Cotolina* — see Fluometuron; Trifluralin.

Cotoran* — see Fluometuron.

Cotoran* Multi — see Fluometuron; Metolachlor.

Cotton Aide HC* — see Cacodylic acid; Sodium Cacodylate.

Cottonex* — see Fluometuron.

Cotton-Pro* — see Prometryn.

Cougar* — see Diflufenican; Isoproturon.

Coumachlor

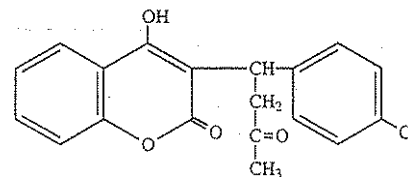
Identification

COMMON NAMES: Coumachlor (BSI, ISO-E), coumachlore (ISO-F).

EXP. CODE NUMBER: G 23133 (Ciba-Geigy Ltd.).

OTHER CODE NUMBERS: CAS 81-82-3; SHA 224200.

DISCONTINUED NAMES: Ratilan*, Tomorin* (all Ciba-Geigy Ltd.).



Coumachlor

Registration Notes

U.S.: Never marketed.

Coumachlore — see Coumachlor.

Coumafène — see Warfarin.

Coumafuryl — see Fumarin*.

Coumatetrayl — see Racumin*.

Coumithoate — see Dition*.

Counter* — see Terbufos.

Counter* CR* — see Terbufos.

Coupling Agent

A solvent that has the ability to solubilize or to increase the solubility of one material in another is referred to as a coupling agent, as when dodecylphenol is utilized in emulsifier blends.

Coverage

The spread of a pesticide over a surface such as the leaves, fruit, stem, etc.

Cov-R-Tox*

BP: HACCO, Inc.

Identification

COMMON NAME: Warfarin.

CODE NUMBERS: CAS 81-81-2; SHA 086002.

ADDITIONAL TRADE NAMES: Rodex*, Tox-Hid*.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: 50% tech warfarin.

PROPERTIES: Virtually odorless, white powder. Coated to reduce detection by rodent. Soluble in certain organic solvents.

Action/Use

ACTION: Anticoagulant rodenticide.

USE: For formulating use, baits.

FORMULATIONS: Encapsulated tech, manufacturing concentrate.

Environmental Guidelines

HAZARDS: Bee: Nontoxic when used as directed.

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON (coated tech); CAUTION (bait, concentrate).

TOXICITY CLASS: I (coated tech); III (bait, concentrate).

TOXICITY: Warfarin (Rat): Oral LD₅₀ 3 mg/kg (NIOSH); TLV 0.1 mg/M³.

PROTECTIVE CLOTHING: Clean coveralls, impervious gloves, goggles. Respirator for toxic dust.

HANDLING AND STORAGE CAUTIONS: Keep away from children, domestic animals, pets or wildlife.

Emergency Guidelines

ANTIDOTE: Vitamin K, and transfusions for ingestion.

FIRST AID: Ingestion, if conscious induce vomiting. Get medical aid. See Warfarin.

Coxysan* Fungicide (copper oxochloride) — Discontinued by Mechema Ltd.

Coxysul* — see Copper, Fixed; Copper Oxochloride Sulfate.

Coyden**Identification**

CODE NUMBERS: CAS 2971-90-6; SHA 306200.

Chemistry

COMPOSITION: 3,5-Dichloro-2,6-dimethyl-4-pyridinol.

3-CP — see Fruitone* CPA.

CP-4742 — see Vegadex*.

CP 50144 — see Alachlor.

CP 53619 — see Butachlor.

CP Basic* Sulfate — see Copper Sulfate, Basic.

3-CPA — see Fruitone* CPA.

4-CPA

BP: A.H. Marks & Co., Ltd. (Marks 4-CPA*)

Nissan Chemical Industries, Ltd. (Tomatotone*)

IdentificationCOMMON NAME: 4-CPA (ISO, BSI); 4-ClPh₂ (USSR)

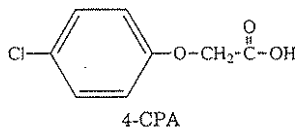
CODE NUMBERS: CAS 122-88-3; SHA 019401.

ADDITIONAL TRADE NAMES: Tomadorane* (Diachem S.P.A.).

DISCONTINUED NAME: Tomato Fix*, Tomato Hold* (Amvac Chemical Corp.).

Chemistry

COMPOSITION: 4-chlorophenoxyacetic acid.

**Action/Use**

ACTION: Plant growth regulator.

USE: For tomato plants as an aid in setting fruit.

FORMULATIONS: Aerosol, liquid, tablet.

Registration Notes

U.S.: All Amvac Chemical Corp. registrations for 4-CPA have been cancelled.

OUTSIDE U.S.: Tomatotone* sold in Japan.

Safety Guidelines

SIGNAL WORD: WARNING; CAUTION.

TOXICITY CLASS: II; III.

TOXICITY: (Rat): Oral LD₅₀ 850 mg/kg.

PROTECTIVE CLOTHING: Wear all-purpose canister mask, rubber vinyl-coated gloves. Face shield for eye protection.

HANDLING AND STORAGE CAUTIONS: If material released or spilled, flush with water.

Emergency Guidelines

FIRST AID: Eyes, Skin, flush with water. Inhalation, move to fresh air. Ingestion, induce vomiting.

CPAS — see Chlorfensulphide; Milbex*.

CPBS — see Fencon.

CPCBS — see Chlorfenson; Mitran*; Neosappiran*; Ovex; Polynactins Complex.

CPMC — see Etrofol*.

CP-TS 53 — see Copper, Fixed; Copper Sulfate, Basic.

CQ-250*

BP: CEQSA Especialidades Químicas S.A.

Action/Use

ACTION: Coadjuvant for fungicides.

USE: For post-harvest treatment of fruits and/or vegetables to help maintain pH between 4.0 and 5.0.

Crab Grass Killer* (arsenic acid) — Discontinued by Garden Products.

Crab-E-Rad* Herbicide (calcium acid methanearsonate + DSMA) — Discontinued by Vineland Chemical.

Crag* 1 Herbicide (sesone) — Discontinued 1994 by Rhone-Poulenc Ag Co.

Crag* 2 Herbicide (dichloralurea) — Discontinued by Rhone-Poulenc Ag Co.

Crag* 341 Fungicide (glyodin) — Discontinued by Union Carbide Corp.

Crag* 531 — see Cadmium-Calcium Copper Zinc Chromate Complex.

Crag* 974 (dazomet) — Discontinued by Union Carbide Corp.

Crag* Fly Repellent (butoxy polypropylene glycol) — Discontinued by Union Carbide Corp.

Crag Turf Fungicide 531* — see Cadmium Calcium Copper Zinc Chromate Complex.

Creek-O-Nite* Clay (bentonite) — Discontinued 1993 by Golden Cat Corp.

Creosote**Identification**

CODE NUMBERS: CAS 8001-58-9; SHA 025003 (creosote); CAS 8007-45-2 (coal tar).

OTHER NAME: Coal tar.

Action/Use

ACTION: Wood preservative.

USE: Apply by pressure-treating. High toxicity to wood destroying organisms.

Environmental Guidelines

SOLUBILITY: Relatively insoluble in water.

Cresatin* — see m-Cresyl Acetate.

Cresol**Identification**

CODE NUMBERS: CAS 108-39-4; SHA 022102.

Chemistry

COMPOSITION: Methylphenol. Commercial: Ortho + meta + para cresols obtained by distillation of coal tar.

Action/Use

ACTION: Disinfectant, fungicide, insecticide.

Cresopur* — see Galtak*.

Cresylic Acid

A name commonly applied to the different tar acids, chiefly or entirely cresols, that boil above 185°C. Use similar to cresol.

Cricket Attack* Insecticide (Nosema locustae Canning) — Discontinued 1987 by Reuter Laboratories.

Crimidine — see Castrix*.

Criptan* — see Captan.

Crisalamina* — see 2,4-D.

Crisamina* — see 2,4-D.

Crisatrina* — see Atrazine.

Crisazina — see Atrazine.

Crisazina*-Crisatrina* Kombi — see Ametryn; Atrazine.

Crisazufre* — see Sulfur.

Criscobre* — see Copper Oxochloride.

Crisfolatan* Fungicide (captafol) — Discontinued by Crystal Chemical Inter-America.

Crisodrin* — see Monocrotophos.

Crisquat* — see Paraquat.

Cristoxo* Insecticide (toxaphene) — Discontinued by Crystal Chemical Inter-America.

Crisulfan* — see Endosulfan.

Crisuron* — see Diuron.

Croak* — see Fluometuron; MSMA.

Croneton*

BP: Bayer AG (Croneton*)

Identification

COMMON NAMES: Ethiofencarb (ISO-E, BSI); éthiophencarbe (ISO-F).

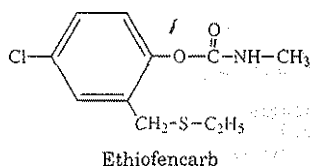
EXP. CODE NUMBER: HOX 1901; BAY 108594 (Bayer AG).

OTHER CODE NUMBERS: CAS 29973-13-5; SHA 112101; EINECS 249-981-9.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: 2-[(ethylthio)methyl]phenyl methylcarbamate.
 PROPERTIES: Colorless crystals. Readily soluble in dichloromethane, 2-propanol, toluene. Hardly soluble in n-hexane.



Action/Use

ACTION: Insecticide.
 USE: For specific control of aphids by contact and stomach action with systemic properties on fruit crops, ornamentals, vegetables.
 FORMULATIONS: Emulsifiable concentrate, granules.

Registration Notes

U.S.: Not marketed.
 OUTSIDE U.S.: Not marketed in Canada.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 12.8 mg/l (96 h) (rainbow trout). Bee: Liquid concentrate toxic; granular nontoxic. Bird: LD₅₀ 155 mg/kg/b.w. (Japanese quail).
 SOLUBILITY: Hardly soluble in water.

Safety Guidelines

TOXICITY CLASS: II.
 TOXICITY: (Rat): Oral LD₅₀ approx. 200 mg/kg/b.w. Dermal >1000 mg/kg/b.w.
 HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Atropine sulphate. NOT oxime therapy.

Crop Oil Concentrate/Surfactant

BP: Rhone-Poulenc Surfactants & Specialties (AgrHO* EM, Geronol*)

Identification

DISCONTINUED NAMES: Surfel* (Rhone-Poulenc Surfactants & Specialties).

Chemistry

PROPERTIES: Paraffin base.

Action/Use

ACTION: Oil surfactant adjuvant.
 USE: For use with postemergence herbicides in corn, sorghum.
 FORMULATIONS: Liquid.

Environmental Guidelines

SOLUBILITY: Water soluble.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY: Tolerance exempt.

Crop Rider* — see 2,4-D.

Crop Tolerance

Various crop species and varieties differ in their sensitivity to chemicals. For instance, corn will grow in land that has been treated with the herbicide atrazine while soybeans sometimes cannot be grown on that same land even the following year. Corn is an example of crop tolerance to atrazine.

Cropotex*

(Discontinued 1989 by Bayer AG)

Identification

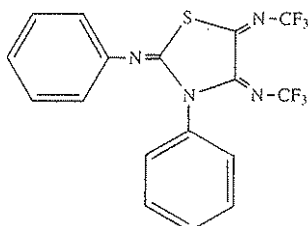
COMMON NAME: Flubenzimine (ISO, BSI).

EXP. CODE NUMBER: BAY SLJ 0312.

OTHER CODE NUMBER: CAS 37893-02-0.

Chemistry

COMPOSITION: N-[3-phenyl-4,5-bis(trifluoromethyl)imino]-2-thiazolidinylidene]benzenamine (C.A.).



Cropotex*

Action/Use

ACTION: Acaricide with development-inhibitory properties.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral/Dermal LD₅₀ >5000 mg/kg.

Cropstar* — see Alachlor.

Crossbow*

BP: DowElanco

Chemistry

COMPOSITION: Triclopyr ester + 2,4-D ester.

Action/Use

ACTION: Herbicide.

USE: Controls many unwanted trees, brush, annual, perennial broad-leaf weeds on fence rows, permanent pasture, rangeland, other non-crop areas.

FORMULATION: Emulsifiable concentrate.

Environmental Guidelines

HAZARDS: Fish: Toxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): LD₅₀ 2589 mg/kg (male); 2398 mg/kg (female). Inhalation: LC₅₀ 5mg/L (male); >5 mg/L (female).

PROTECTIVE CLOTHING: Impervious gloves, safety glasses.

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed, inhaled, or absorbed through skin. Causes eye irritation. May cause allergic skin reaction. Wash thoroughly with soap and water after handling and before eating or smoking. Do not store near heat or open flame. Do not cut or weld container.

Emergency Guidelines

FLASHPOINT: 148°F.

FIRE EXTINGUISHING MEDIA: Water fog, foam, CO₂, dry chemical.
 FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting.

Cross-resistance

Cross-resistance occurs when resistance to one product confers resistance to another via the same biochemical or physiological mechanisms and/or genetic factors.

Crotilin

Identification

OTHER NAME: Krotiline.

Chemistry

COMPOSITION: Chlorocrotyl ester of 2,4-D.

Action/Use

ACTION: Herbicide.

Crotothane* — see Dinocap.

Crotoxyphos

Identification

COMMON NAME: Crotoxyphos (BSI,ISO, ESA).

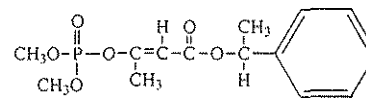
CODE NUMBERS: CAS 7700-17-6.

ADDITIONAL TRADE NAMES: Ciodrin*, Cypona* EC, Decrotox*, Duo-Kill*.

Chemistry

COMPOSITION: Dimethyl phosphate of alpha-methylbenzyl 3-hydroxy-cis-crotonate (CAS-8CI).

PROPERTIES: Clear liquid. Miscible in most organic solvents.



Crotoxyphos

Action/Use

ACTION: Insecticide.

USE: Contact, stomach poison.

Environmental Guidelines

HAZARDS: Fish: Moderate (U.S.). Bee: Toxic.

SOLUBILITY: Soluble in water at room temperature, 1 g/l.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 53 mg/kg. Dermal approx. 385 mg/kg.

PROTECTIVE CLOTHING: Rubber gloves, respirator for commercial handling.

HANDLING AND STORAGE: Keep cool but avoid freezing EC.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Emergency Guidelines

ANTIDOTE: Atropine with oxime preparations.

Crown* — see Carboxin; Thiabendazole.**Crufomate** — see Ruelene*.**Crunch* Insecticide (carbaryl)** — Discontinued by Crystal Chemical Inter-America.**Cryolite**BP: ELF Atochem North America, Inc. (Kryocide*)
Gowan Co. (Prokil*)**Identification**

CODE NUMBERS: CAS 15096-52-3; SHA 075101.

ChemistryCOMPOSITION: Sodium fluoaluminat; or sodium aluminofluoride Na_2AlF_6 .

FAMILY: Inorganic fluorine compound.

PROPERTIES: Most compatible of the fluorine insecticides. Insoluble in alcohol. Decomposed by alkali.

Action/Use

ACTION: Stomach insecticide.

USE: For grapes and potatoes. Limited use on beans, citrus, lettuce, and some other vegetables.

FORMULATIONS: Aqueous suspension, dust, wettable powder.

Environmental GuidelinesHAZARDS: Tech: Fish: LC_{50} 47 ppm (96 h) (rainbow trout); >400 ppm (bluegill). Bee: Practically nontoxic. Bird: Practically nontoxic.

SOLUBILITY: Slightly soluble in water, <200 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Avoid contact with or drift to untreated areas. Store in the original container in dry area. On some crops, especially peach, serious injury may result from use of cryolite. Remove excess residues on edible portions of fruit and vegetables by washing, brushing or other effective means.

Emergency Guidelines

EMERGENCY TELEPHONE: 409-779-0060.

Cryptonol*

(Discontinued by Midox Ltd.)

Chemistry

COMPOSITION: Potassium hydroxyquinoline sulfate.

Action/Use

ACTION: Fungicide, bactericide.

Crystal Diuron* — see Diuron.**Crythyon 2L*** insecticide (azinphos-methyl) — Discontinued by Cumberland International.**CS-56*** — see Copper Oxychloride Sulfate.**CSA**

Designates Canadian Standards Association.

See Common Name.

CubeThe root of a tropical plant (*Lonchocarpus* spp.) valued as a source of rotenone. Obtained commercially mostly from Peru. Pronounced koo-bay.

See Rotenone.

Cube Powder* — see Rotenone.**Cudgel*** — see Dyfonate*.**Cudrox*** — see Copper Hydroxide.**Cuelure***

BP: Agri-Pharm International Inc.

Chemistry

COMPOSITION: 4-(4-Hydroxyphenyl)-2-butanone acetate).

Action/Use

USE: Melon Fly trap.

Registration Notes

U.S.: For federal and state program.

Cufram Z*

(Discontinued by Universal Crop Protection Ltd.)

Identification

COMMON NAME: Cufraneb.

CODE NUMBER: CAS 11096-18-7 (cufraneb).

Chemistry

COMPOSITION: Dithiocarbamate complex (Cu, Mn, Fe, Zn).

Action/Use

ACTION: Fungicide; miticide; seed dressing.

COMBINATIONS: Comac Macuprax* (+ pre-reacted bordeaux mixture) (La Cornubia S.A.).

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD_{50} 2700 mg/kg.**Cufraneb** — see Cufram Z*.**Cuidrox*** — see Copper Hydroxide.**Cultar*** — see Paclobutrazol.**Cuman*** — see Ziram.**Cumene* Fungicide (zineb)** — Discontinued 1989 by Agrimont S.p.A.**Cumulative Pesticides**

Those chemicals which tend to accumulate or build up in the tissues of animals or in the environment (soil, water).

Cunapso* — see Copper Naphthenates.**Cunilate 2472*** — see Copper 8-Quinolinate.**Cupinidica*** — see Heptachlor.**Cupox*** — see Copper Oxychloride.**Cupramar*** — see Copper Oxychloride.**Cuprammonium Sulfate** — see Cheshunt Compound.**Cupravit*** — see Copper Oxychloride.**Cuprenox*** — see Copper Oxychloride.**Cupric Hydroxide** — see Copper Hydroxide.**Cupric Meta-Arsenite****Identification**

OTHER NAME: Air-Flo Green*.

Chemistry

PROPERTIES: Related chemically to Paris green.

Action/Use

ACTION: Former mosquito larvicide.

Cuprinol* — see Copper Naphthenates.**Cupro-Antracol*** — see Copper Oxychloride; Propineb.**Cuprobam****Identification**

CODE NUMBERS: CAS 7076-63-3; SHA 483300.

Chemistry

COMPOSITION: Tricopper dichloride dimethyldithiocarbamate.

Action/Use

ACTION: Fungicide.

Registration Notes

OUTSIDE U.S.: In France.

Cuprocaffaro* — see Copper Oxychloride**Cuprocop*** — see Copper Nordox; Copper Oxide.**Cuprofix* 30** — see Copper Sulfate; Mancozeb.**Cuprofix* M** — see Copper Sulfate; Maneb.**Cuprokylt*** — see Copper Oxychloride**Cupromin*** — see Copper Ammonium Carbonate**Cuprosan*** — see Copper Oxychloride; Zineb.**Cuprossina*** — see Copper Oxychloride.**Cuprous Oxide** — see Copper Oxide.**Cuprothex*** — see Zineb.**Cuprovinol*** — see Copper Oxychloride.**Cuprox*** — see Copper, Fixed; Copper Oxide; Copper Oxychloride.**Cuproxtat***

BP: Agrolinz (Austria)

Agrolinz, Inc. U.S.A.

Identification

COMMON NAME: Tribasic copper sulfate.

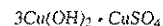
OTHER NAME: Copper oxysulfate.

Chemistry

COMPOSITION: Cupric sulfate-tricupric hydroxide-hemihydrate;

Copper (II) sulfate-tricopper, hydroxide hemihydrate.

PROPERTIES: Green, odorless.



Cuproxtat* Flowable

Action/Use

ACTION: Fungicide.

USE: For almonds, citrus, coffee, grapes, peanuts, peppers, potato plants, tomatoes, sugar beets, pistachio trees, walnuts.

FORMULATIONS: Flowable concentrate, suspension concentrate.

Environmental Guidelines

SOLUBILITY: Stable in water with excellent dispersion.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD_{50} 2500 mg/kg. Dermal >2000 mg/kg. Mild eye irritant.Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Emergency Guidelines

FLASHPOINT: >100°C, 1.27.
 ANTIDOTE: Potassium prussiate (0.6g in water). Calcium disodium edetate (EDTA, Versene, i.v. or i.p. Penicillamine-Cuprimine). Milk.
Cuproxtat* flüssig — see Copac* E.

Curacron*

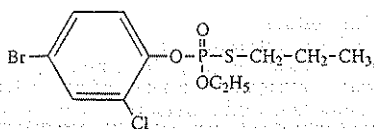
BP: Ciba (Curacron*)
 Ciba, Ltd. (Curacron*, Selecron*)

Identification

COMMON NAME: Profenofos (ISO, ANSI, ESA, BSD).
 EXP. CODE NUMBER: CGA-15324 (Ciba, Ltd).
 OTHER CODE NUMBERS: CAS 41198-08-7; SHA 111401; OMS 2004 (WHO).
 ADDITIONAL TRADE NAME: Polycron*

Chemistry

COMPOSITION: O-4-bromo-2-chlorophenyl O-ethyl S-propyl phosphorothioate.
 PROPERTIES: Amber-colored oily liquid; garlic-like odor; boiling point 110°C (0.001 mm Hg). Stable under neutral and slightly acid conditions, unstable under alkaline conditions. Readily miscible with organic solvents.



Active Ingredient of Curacron*

Action/Use

ACTION: Insecticide; acaricide.
 FORMULATIONS: Emulsifiable concentrate.

Registration Notes

U.S.: For cotton. Some or all applications may be RUP.

Environmental Guidelines

SOLUBILITY: Water soluble at 20 ppm.

Safety Guidelines

SIGNAL WORD: WARNING.

Toxicity Class: II.

TOXICITY: (Rat): Oral LD₅₀ 358 mg/kg. (Rabbit): Oral LD₅₀ 700 mg/kg. Dermal LD₅₀ 277 mg/kg.
 Curacron* 6E (Rat): Oral LD₅₀ 662 mg/kg. Inhalation LC₅₀ >11.5 mg/l (nominal). (Rabbit): Dermal LD₅₀ 192 mg/kg. Moderate eye, mild skin irritation.

PROTECTIVE CLOTHING: Goggles or safety glasses, rubber gloves, waterproof boots, long-sleeved shirt, long pants and a hat.

HANDLING AND STORAGE CAUTIONS: Store in well-ventilated, secure area out of the reach of children and domestic animals. Always wash thoroughly after handling.

Emergency Guidelines

FLASHPOINT: 167°C.

FIRE EXTINGUISHING MEDIA: Dry chemical, foam or carbon dioxide.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting. Give large quantity of water to drink. Apply artificial respiration if necessary. Avoid mouth-to-mouth resuscitation.

Curalan* — see Vinclozolin.

Curamit* — see Afugan*.

Curap 20* — see Copper Naphthenates.

Curaterr* — see Carbofuran.

Curaterr* Forte — see Carbofuran; Nemacur*.

Curative Pesticide

A pesticide which can inhibit or eradicate a disease-causing organism after it has become established in the plant or animal.

Curbit* — see Sonalan*.

Curbiset* Growth Regulator (chlorflurenol) — Discontinued 1991 by Shell Agrar GmbH & Co. KG

Cure*

(Discontinued 1975 by Lowden, Inc.)

Identification

COMMON NAME: Chlorflurenol.

Action/Use

ACTION: Antibiotic fungicide.

Safety Guidelines

TOXICITY: Nontoxic for people, trees, environment.

Curesan* Fungicide (MEMC) — Discontinued by Shroffs Industrial.

Curetan* — see MEMC.

Curitan* — see Dodine.

Curtail*

BP: DowElanco (Curtail*)

Chemistry

COMPOSITION: Clopyralid + 2,4-D (both as alkanolamine salts).

Action/Use

ACTION: Herbicide.

USE: Selective control of broadleaf weeds in wheat, barley not underseeded with legumes, fallow cropland and Conservation Reserve Program (CRP) acres, non-cropland, rangeland, and permanent grass pasture.

Environmental Guidelines

SOIL PARTICLE ADSORPTION: Capable of travel (seep or leach).

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

PROTECTIVE CLOTHING: Goggles or face shield when handling.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Remove contaminated clothing and laundry before reuse.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush with plenty of water for at least 15 minutes. Skin, wash with plenty of soap and water. Ingestion, induce vomiting immediately by giving 2 glasses of water and sticking finger down throat.

EMERGENCY TELEPHONE: (Collect) 517-636-4400 (DowElanco).

Curtail* M — see Clopyralid; MCPA.

Curtain* — see Clopyralid.

Curtine-V* — see Cymoxanil; Mancozeb.

Curzate* — see Cymoxanil.

Curzate* M Fungicide (carbendazim) — Discontinued by Du Pont.

Curzate* M8 — see Cymoxanil; Mancozeb; Maneb.

Custom Applicator

Any person who, for hire, by contract or otherwise, applies by aerial, ground, or any hand or mechanical equipment, pesticides, to any waters, lands, plants, farm structures, or animals.

Cutlass*

BP: Ecogen Inc. (Cutlass*)

Identification

COMMON NAME: *Bacillus thuringiensis* var. *kurstaki*.

Action/Use

ACTION: Biological insecticide.

USE: For use on vegetables, nuts, trees and vines.

FORMULATIONS: Wettable powder.

Registration Notes

U.S.: Registered in California on vegetables to control caterpillar insects.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. No hazard to wildlife.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place.

Cutless*

BP: DowElanco (Cutless*)

Identification

COMMON NAME: Flurprimidol (ISO, ANSI, BSD).

EXP. CODE NUMBER: EL 500.

OTHER CODE NUMBER: CAS 56425-91-3.

Chemistry

COMPOSITION: α -(1-methylethyl)- α -[4-(trifluoromethoxy)phenyl]-5-pyrimidinemethanol (CAS).

PROPERTIES: Colorless crystals. Melting point 94-96°C. Solubility (25°C): In acetone 700-800 g/l; chloroform, dichloromethane 800-900 g/l.

Action/Use

ACTION: Plant growth regulator; gibberellin synthesis inhibitor.

USE: Turf and ornamentals/trees.

FORMULATIONS: WP, TC, TP, solid implant (trees).

Environmental Guidelines

SOLUBILITY: (25°C): In water 120-140 mg/l.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 709 mg/kg. (Mouse): 602 mg/kg.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contami-

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

nated clothing and shoes. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting. Get medical aid.

Cutrine*-Plus

BP: Applied Biochemists, Inc. (Cutrine*-Plus)

Identification

OTHER NAME: Copper alkanolamine complex.

Chemistry

COMPOSITION: Mixed copper-ethanolamine complexes; chelated copper.

FAMILY: Copper/Nitrogen Compounds.

PROPERTIES: Dark blue liquid. Specific gravity 1.21 at 25°C, pH 10.4. Chelated copper does not precipitate out of solution in hard waters.

Action/Use

ACTION: Algicide/herbicide; photosynthetic inhibitor.

USE: Controls filamentous, planktonic algae. Chara and Hydrilla in potable water reservoirs, farm, fish, and fire ponds, lakes, fish hatcheries, irrigation conveyance systems, other potential sources of potable water. Granular to be spread over water areas containing bottom-growing algae. No restrictions for swimming, fishing, irrigation of turf and ornamentals, or stock watering.

FORMULATIONS: Liquid, granular.

COMBINATIONS: Tank mixes with diquat dibromide or dipotassium endothall in states where individual products are registered and use rates conform with those pertinent to each product.

Environmental Guidelines

SOLUBILITY: Completely soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 0.50-2.00 ml/kg.

PROTECTIVE CLOTHING: Rubber gloves, eyewear when handling concentrate.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. Avoid contact with eyes, skin or clothing. May cause eye irritation, skin damage. Avoid contamination with acids. Do not expose granular to temperatures >150°F, especially if material is damp.

Emergency Guidelines

FLASHPOINT: N/Ap.

FIRE EXTINGUISHING MEDIA: CO₂, H₂O, dry chemical.

FIRST AID: Get medical aid. Eyes, flush with plenty of water. Skin, flush with plenty of water. Inhalation, not likely.

EMERGENCY TELEPHONE: 800-558-5106.

CVMP — see Tetrachlorvinphos.

Cyanamid*

Identification

TRIVIAL NAMES: Cyanamide, nitrolime.

CODE NUMBERS: CAS 156-82-7; SHA 014001.

Chemistry

COMPOSITION: Calcium cyanamide (IUPAC, CAS).

Action/Use

ACTION: Herbicide; fertilizer; fungicide.

Cyanamide — see Cyanamid*.

Cyanazine

BP: American Cyanamid Co. (Bladex* - Outside U.S., Fortrol*)
Du Pont Agricultural Products (Bladex*)

Identification

COMMON NAME: Cyanazine (BSI, ISO, WSSA).

CODE NUMBERS: SD 15418 (Shell International Chemical Co. WL 19805).

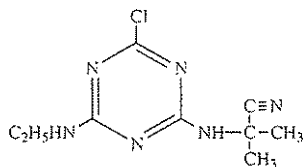
OTHER CODE NUMBERS: CAS 21725-46-2; SHA 100101; EINECS 244-544-9.

DISCONTINUED NAMES: Vega* (+ bentazone + dichlorprop) (BAS F AG); Conquest* and Extrazine* (+ atrazine) (Du Pont); Scogal* (+ MCPA), Vortix* (+ MCPB) (Shell Chemicals UK Ltd.).

Chemistry

COMPOSITION: 2-[[4-chloro-6-(ethylamino)-1,3,5-triazin-2-yl]amino]-2-methylpropionitrile (CAS-8CI).

PROPERTIES: White crystalline solid, melting point 167.5-169°C.



Cyanazine

Action/Use

ACTION: Selective herbicide.

USE: In U.S. for early preplant, pre or postemergence weed control in corn and cotton.

FORMULATIONS: 90DF, 4L.

COMBINATIONS: Bellater* (+ atrazine) (American Cyanamid); Cy-cle* (+ metolachlor) (Ciba); Extrazine II* (+ atrazine) (Du Pont).

Registration Notes

U.S.: Classified as RUP. Refer to appropriate state 24(c) label.

OUTSIDE U.S.: For soybeans, oilseed rape, peas and forestry.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 16 mg/l (24 h) (harlequin). Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 288 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg (a.i.).

PROTECTIVE CLOTHING: Coveralls, waterproof gloves, chemical-resistant footwear plus socks, protective eyewear.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling and before eating or smoking. Avoid breathing spray mist. Remove contaminated clothing and wash before reuse. Store under cool, dry conditions.

Emergency Guidelines

ANTIDOTE: Unknown. Poisoning unlikely.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water and induce vomiting.

EMERGENCY TELEPHONE: 201-835-3100 (American Cyanamid); 800-441-3637 (Du Pont).

Cyano (methylmercuri) guanidine

(Discontinued by NOR-AM)

Identification

CODE NUMBERS: CAS 502-39-6; SHA 051909.

ADDITIONAL TRADE NAMES: Morsodren*, Panodrin A-13*.

DISCONTINUED NAME: Panogen* Turf Fungicide.

Action/Use

ACTION: Fungicide. Former seed, soil, turf treatment.

Cyanofenphos

Identification

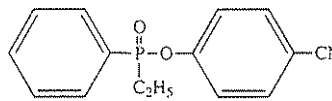
COMMON NAMES: Cyanofenphos (BSI, ISO-E); cyanophenpho-(ISO-F); CYP (JMAF).

EXP. CODE NUMBER: S-4087 (Sumitomo).

OTHER CODE NUMBERS: CAS 13067-93-1; ENT-25832a.

Chemistry

COMPOSITION: 4-Cyanophenylethylphenyl phosphonothionate. O-4-cyanophenyl O-ethyl phenylphosphorothioate (IUPAC).



Cyanofenphos

Action/Use

ACTION: Insecticide.

Cyanogas* Fumigant (calcium cyanide) — Discontinued 1978 by American Cyanamid.

Cyanogas A* — see Sodium Cyanide.

Cyanogen Chloride

Identification

CODE NUMBERS: CAS 506-77-4; SHA 025801.

Chemistry

COMPOSITION: CNCl.

PROPERTIES: Tear gas property.

Action/Use

ACTION: Fumigant.

USE: Formerly much used because of its warning characteristic.

Cyanophenphos — see cyanofenphos.

Cyanophos

BP: Sumitomo Chemical Co., Ltd. (Cyanox*)

Identification

COMMON NAME: Cyanophos (BSI, ISO), CYAP (JMAF).

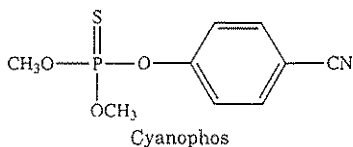
EXP. CODE NUMBER: S-4084 (Sumitomo).

OTHER CODE NUMBERS: CAS 2636-26-2; SHA 268200; OMS 226 (WHO); OMS 869 (WHO).

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: O-4-cyanophenyl O,O-dimethyl phosphorothioate.
 PROPERTIES: Clear amber liquid, melting point 14-15°C. Miscible in alcohols, benzene, chloroform, ketones, toluene, xylene.



Action/Use

ACTION: Insecticide.
USE: For fruits, vegetables. Used in regular schedules, controls lepidopterous larvae on apples, vegetables. Grain protectant.
FORMULATIONS: Dust, emulsifiable concentrate, oil-based liquid spray.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 610 mg/kg (female); 580 mg/kg (male).
Cyanox* — see Cyanophos
Cyansan* — see Sodium Cyanate.
Cyanthoate — see Tartan*.
YAP — see Cyanophos.
Cybolt* — see Flucythrinate.
Cybrom* — see Cypermethrin; Naled.

Cycle*

BP: Ciba

Chemistry

COMPOSITION: Metolachlor + cyanazine.
 FAMILY: Chloracetamide and triazine.
 PROPERTIES: Off-white to light-brown liquid suspension; sweet latex paint odor.

Action/Use

ACTION: Selective herbicide.
USE: Preplant incorporated or preemergence control of grasses and broadleaf weeds in corn. In sorghum when seed treated with safener.
FORMULATIONS: Liquid (4L).

Registration Notes

U.S.: RUP.

Environmental Guidelines

SOLUBILITY: Stable dispersion in water.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 1260 mg/kg. Inhalation: LC₅₀ (4h) 1.45 mg/L. (Rabbit): Dermal LD₅₀ 2010 mg/kg. Mild eye, moderate skin irritation.
PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.
HANDLING AND STORAGE CAUTIONS: Store in well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FLASHPOINT: >200°F.
FIRE EXTINGUISHING MEDIA: Dry chemical, foam or carbon dioxide.
FIRST AID: **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. Apply artificial respiration if necessary. **Ingestion,** drink one or two glasses of water and induce vomiting.

Cytlethrin insecticide — Discontinued.

Cycloate

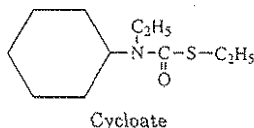
BP: Chemol Trading Ltd. Co. (Sabet*)
 ZENECA Ag Products (Ro-Neet*)

Identification

COMMON NAMES: Cycloate (ISO, BSI, WSSA), hexythiocarbam (JMAF).
EXP. CODE NUMBER: R-2063 (ZENECA Ag Products).
OTHER CODE NUMBERS: CAS 1134-23-2; SHA 041301.

Chemistry

COMPOSITION: S-ethyl cyclohexyl(ethyl)thiocarbamate.



PROPERTIES: Tech, amber liquid. Specific gravity 1.023-1.026 at 20°/20°C. Hydrolyzed by strong acids and alkalis. Stable to heating to 100°C for 16 hours. Miscible with acetone, benzene, ethanol, kerosene, 4-methylpentan-2-one, xylene.

Action/Use

ACTION: Selective herbicide.
USE: Preplant for annual grasses, nutgrass, certain perennial grasses, many broadleaf weeds in sugar beets, table beets, spinach.
FORMULATIONS: Emulsifiable concentrate, granule.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 4.5-5.6 mg/l (96 h) (rainbow trout). Bee: Nontoxic when used as directed.
SOLUBILITY: In water, 76 mg/l.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: Tech (Rat): Oral LD₅₀ 2000-4100 mg/kg. 6EC: Oral LD₅₀ 3160-3690 mg/kg. 10G: Oral LD₅₀ 4640 mg/kg.
PROTECTIVE CLOTHING: Chemical tight goggles; impervious gloves and apron.

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin contact. Store away from feed, foodstuffs and out of the reach of children. Prevent drifting.

Emergency Guidelines

FLASHPOINT: 282°F, 139°C (Tag CC).
FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** drink one or two glasses of water and induce vomiting.

Cyclodan* — see Endosulfan.

Cyclodiene Insecticides

Combined chlorine makes up a major proportion of the molecular weight of most of these compounds. The cyclodienes include mainly aldrin, chlordane, dieldrin, endrin, heptachlor, Strobane, endosulfan and toxaphene. They are characterized by their endomethylene bridge structure. See structural formula of aldrin.

Cyclohexanone

Solvent for various insecticides.

Cycloheximide — see Acti-Aid*; Acti-dione*.

Cyclon* Fumigant (hydrocyanic acid) — Discontinued 1970 by American Cyanamid Co.

Cyclone* — see Paraquat.

Cyclophosphamide — see Endoxan*.

Cycloprate — see Zardex*.

Cycloprothrin — see Cyclosal*.

Cyclosal*

BP: Nippon Kayaku Co., Ltd.

Identification

COMMON NAME: Cycloprothrin.
EXP. CODE NUMBER: NK 8116.
OTHER CODE NUMBER: CAS 63935-38-6.

Chemistry

COMPOSITION: (RS) Alpha-cyano-3-phenoxybenzyl (RS)-2,2-dichloro-1-(4-ethoxyphenyl) cyclopropanecarboxylate.
 FAMILY: Pyrethroid.

PROPERTIES: Colorless, viscous liquid; Boiling point 140-145°C at 10⁻²mmHg; vapor pressure 1.6 × 10⁻⁴ mmHg at 20°C. Tech is yellow to brown.

Action/Use

ACTION: Insecticide with contact kill action.
USE: Controls insect pests in paddy rice, horticulture and fruit trees.

FORMULATIONS: Emulsifiable concentrate, dust, granule.

Registration Notes

OUTSIDE U.S.: Registered in Japan, Korea, Indonesia.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 10 ppm (48 h). Bee: Oral LD₅₀ 0.321 µg/bee; Contact LD₅₀ 0.432 µg/bee. Bird: Oral LD₅₀ 5000 mg/kg.
SOLUBILITY: In water 0.091 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: IV
TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg.

Emergency Guidelines

EMERGENCY TELEPHONE: 03 3212 4360.

Cycloxydim — see Focus*.

Cycloxydime — see Focus*.

Cycluron

Identification

COMMON NAMES: Cycluron (ISO, BSI, WSSA); COMU (JMAF).

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

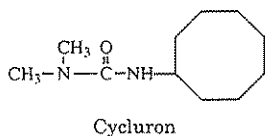
CODE NUMBERS: CAS 2163-69-1; SHA 035504; EINECS 218-493-8.

OTHER NAME: OMU.

DISCONTINUED NAME: Trixabon* (+ chlorbufam + dimexan) (Atochem Agri BV); Alipur* (+ chlorbufam) (BASF AG).

Chemistry

COMPOSITION: 3-Cyclooctyl-1,1-dimethylurea (CAS 8CI).



Action/Use

ACTION: Herbicide.

Cycocel* — see Chlormequat Chloride; Plant Growth Regulator.

Cycocel-Extra* — see Chlormequat Chloride.

Cycogan* — see Chlormequat Chloride.

Cycostalk* — see Chlormequat Chloride.

Cyd-X* Liquid

BP: InStar Products, Div. of Crop Genetics International (Cyd-X Liquid*)

Chemistry

COMPOSITION: Naturally occurring *Cydia pomonella* granulosis virus.

PROPERTIES: Tan to brown color. Mild chemical odor. Neutral pH.

Action/Use

ACTION: Insecticide.

USE: For control of codling moth larvae.

FORMULATIONS: Liquid suspension.

Registration Notes

U.S.: Registration pending.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

TOXICITY: Essentially nontoxic to mammals and non-target insect species.

PROTECTIVE CLOTHING: Safety glasses with side shields for eye and face protection. If potential exists for significant skin contact, wear imperious clothing, such as whole bodysuit, gloves, apron, and/or boots, as appropriate. Material does not have established exposure limits; if not used in chemical fume hood, and there is a potential for significant exposure, wear a NIOSH/MSHA approved positive pressure air supplied respirator.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes, skin, or clothing. Compound not likely to be hazardous by skin contact, but advisable to wash thoroughly after handling. Use with adequate ventilation. Keep container tightly closed. Do not mix with strong acids, bases or chlorinated water. Do not consume food, drink or tobacco in an area where contamination with product is possible. Stable at normal temperatures and storage conditions.

Emergency Guidelines

FLASHPOINT: Not fully investigated; handle as fire and explosion hazard.

FIRE EXTINGUISHING MEDIA: Use media appropriate for surrounding material.

FIRST AID: **Eyes**, immediately flush with plenty of water for at least 15 minutes and call physician. **Inhalation**, remove to fresh air. If not breathing, give artificial respiration. If breathing difficult, give oxygen. Call physician. **Ingestion**, call physician immediately.

EMERGENCY TELEPHONE: Medical: 410-381-3800 (InStar Products, Div. of Crop Genetics International).

Cyfluthrin — see Baythroid*.

Cyfluthrine — see Baythroid*.

Cygon* — see Dimethoate.

Cyhexatin

BP: Chemia S.p.A. (Metaran*, Triran*, Triran FA*)
ELF Atochem Agri B.V. (Pennstyl*)
OXON Italia S.p.A. (Acarstin*, Oxotin*)

Identification

COMMON NAME: Cyhexatin (ISO, ANSI, ESA, BSI).

CODE NUMBERS: CAS 13121-70-5; SHA 101601; OMS 3029 (WHO); ENT-27395-X.

ADDITIONAL TRADE NAME: Araclol F* (Diachem S.P.A.).

DISCONTINUED NAMES: Dowco 213*, Plictran*.

Chemistry

COMPOSITION: Tricyclohexylhydroxystannane (CAS).

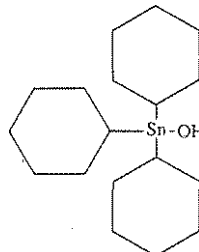
Action/Use

ACTION: Acaricide.

USE: Controls plant-feeding mites, resistant to many other acaricides, in almonds, walnuts, hops, ornamentals and some fruits.

FORMULATIONS: Flowable, wettable powder.

COMBINATIONS: Plidion* (+ tetradifon) (Chemia S.p.A.).



Cyhexatin

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 550 mg/l (24 h) (goldfish). Bee: Nontoxic. Bird: LD₅₀ (Dietary) 3189 mg/kg (duck); 520 mg/kg (8 da.) (quail). (Oral) 650 mg/kg (hen).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: III.

TOXICITY: (Rat) Oral LD₅₀ 540 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

Cylan* Insecticide (phosfolan) — Discontinued by American Cyanamid Co.

Cymag* — see Sodium Cyanide.

Cymbaz* — see Cypermethrin.

Cymbush* — see Cypermethrin.

Cymetox*

(Discontinued by American Cyanamid)

Identification

COMMON NAMES: Demephion (BSI for a reaction product comprising demephion-O and demephion-S); demethion-O (ISO, BSI); demethion-S (ISO, BSI).

CODE NUMBERS: CAS 682-80-4 (demethion-O); CAS 2587-90-5 (demethion-S); CAS 8065-62-1 (both isomers).

DISCONTINUED TRADE NAMES: Atlasetox* (Atlas); Tinox* (Cyanamid); Pyracide* (BASF).

Chemistry

COMPOSITION: Demethion-O: O,O-dimethyl O-2-methylthioethyl phosphorothioate (IUPAC).

Demethion-S: O,O-dimethyl S-2-methylthioethyl phosphorothioate (IUPAC).

Action/Use

ACTION: Insecticide.

Cymoxanil

BP: Du Pont Agricultural Products (Curzate*)
HELM AG

Identification

COMMON NAME: Cymoxanil (ANSI, BSI, ISO).

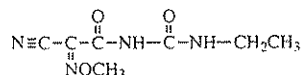
EXP. CODE NUMBER: DPX 3217.

OTHER CODE NUMBERS: CAS 57966-95-7; EINECS 261-043-0.

Chemistry

COMPOSITION: 2-Cyano-N-[(ethylamino)carbonyl]-2-(methoxyimino)acetamide (CAS).

PROPERTIES: Pure, white crystalline solid, melting point 160-161°C. Specific gravity 1.31 at 25°C. Vapor pressure 6 × 10⁻⁷ mm Hg at 25°C (extrapolated). Decomposes into natural plant constituents (sugars, proteins). Solubility in dimethylformamide, 18.5g/100g solvent; acetone 10.5; chloroform 10.3; methanol 4.1; benzene 0.2; and hexane < 0.1.



Cymoxanil

Action/Use

ACTION: Fungicide.

USE: For Peronosporales fungi such as downy mildew of grapes; late blight of potatoes. Postinfection application halts development of disease for spray program flexibility. Curzate* reduces inoculum.

COMBINATIONS: Aviso* DF and Aviso* S (+ metiram) (BASF AG); Euparen* Ramato Micro CM* (+ copper oxychloride + dichlofluanid) (Bayer AG); Pulsan* and Ripost* M (+ oxadixyl + mancozeb) (Sandoz)

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Agro Ltd.); Curtine-V* (+ mancozeb) (VAPCO); Aviso* Cup (+ copper oxychloride + metiram); Curzate* M8 (+ mancozeb).

Registration Notes
U.S.: Not marketed.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 18.7 mg/l (96 h) (rainbow trout); 13.5 mg/l (bluegill). Bee: Nontoxic. Bird: (a.i.) LC₅₀ 2847 ppm (8 d) (quail); >10,000 ppm (mallard).

SOIL PARTICLE ADSORPTION: Normal conditions, half-life in soil < 2 weeks.

SOLUBILITY: In water, 1000 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1100 mg/kg. (Rabbit); Dermal LD₅₀ >3000 mg/kg (a.i.).

SPILL CONTROL/CLEANUP: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Cyperator* — see Cypermethrin.

Cynem* — see Zinophos*.

Cynoff* — see Cypermethrin.

Cynogan* Herbicide (bromacil) — Discontinued by Makhteshim-Agan.

Cyclane*
(Discontinued by American Cyanamid Co.)

Identification

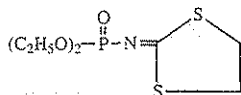
COMMON NAME: Phosfolan (BSI, ISO-E); phospholan (ISO-F).

CODE NUMBERS: CAS 947-02-4; SHA 268300.

DISCONTINUED NAME: Cylan* (American Cyanamid Co.).

Chemistry

COMPOSITION: 2-(Diethoxyphosphinylimino)-1,3-dithiolane.



Phosfolan

Action/Use

ACTION: Systemic insecticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech: (Rat): Oral LD₅₀ 8.9 mg/kg. (Mouse): 12.1 mg/kg. (Rabbit): Dermal LD₅₀ 23 mg/kg. (Guinea Pig): 54 mg/kg.

Cyometrinil — Discontinued by Ciba-Geigy.

CYP* — see Cyanofenphos; Surecide*.

Cypendazole

Identification

COMMON NAME: Cypendazole (ISO, BSI, JMAF).

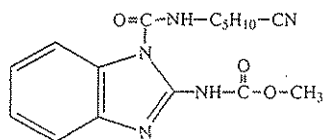
EXP. CODE NUMBER: DAM 18654 (Bayer AG).

OTHER CODE NUMBER: CAS 28559-00-4.

DISCONTINUED NAME: Folcidin* (Bayer AG).

Chemistry

COMPOSITION: 1-(5-cyanopentylcarbamoyl)benzimidazol-2-ylcarbamate (IUPAC).



Cypendazole

Action/Use

ACTION: Fungicide with systemic properties.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >2500 mg/kg. Dermal >1000 mg/kg (7 days).

Cyperm* — see Cypermethrin.

Cypercopal* Insecticide (cypermethrin) — Discontinued by Gilmore Inc.

Cypermethrin* — see Cypermethrin; Dimethoate.

Cyferfan* — see Cypermethrin; Endosulfan.

Cyperguard* — see Cypermethrin.

Cypherhard* Tech — see Cypermethrin.

Cypermethrin* — see Cypermethrin.

Cypermethrin* — see Cypermethrin.

Cypermethrin

BP: Amco Pesticides Ltd.

American Cyanamid Co. (Barricade*, Electron*, Folcord*, Ripcord*)

Atabay Agrochemicals & Veterinary Products Inc.

BASF India Ltd. (Basathrin*)

Bharat Pulverising Mills Ltd. (Cypermethrin*, Cyperkill*)

Chimac-Agriphar S.A. (Cythrine*)

Chinoin Pharmaceutical & Chemical Works Co. Ltd.

Fersol Indústria E Comércio Ltda.

FMC Corp. (Ammo*, Arrivo*, Cynoff*, Prevail* FT)

Gharda Chemicals Ltd. (Cyperguard*)

Gilmore, Inc.

HELM AG

Hubei Sanonda Co., Ltd. (Grand*)

Khatau Junker Ltd. (Khatau Cyp*)

Krishi Rasayan

Lucky Ltd.

Mitchell Cotts Chemical Ltd. (Cyperkill*)

National Organic Chemical Ind. Ltd. (Cilcord*)

Paushak Ltd. (Cyporin*)

Point Enterprise S.A. (Tech.)

Rallis India (Ralthrin*)

Rotam Group (Rocyper*)

Roussel Uclaf Corp.

Sanachem (Pty) Ltd. (Cypersan*)

Sanex Inc. (Cypermex*)

Sulphur Mills Ltd. (Cypersul*)

Sundat (S) Pte Ltd. (Sunmerin*)

ZENECA Ag Products (Cymbush*)

ZENECA Agrochemicals (Cymbush*, Kafil Super*)

ZENECA Professional Products (Demon*)

ZENECA Public Health (Cypermator*, Demon*)

Identification

COMMON NAMES: Cypermethrin (ISO-E, ANSI, BSI, BP/BAN); cyperméthrine (ISO-F).

EXP. CODE NUMBERS: FMC 30980; FMC 45806 (FMC Corp.); PP383 (ICI); LE 79-600 (Rhône-Poulenc Ag Co.); WL-43467 (Shell International Chemical); CCN52; NRDC 149.

OTHER CODE NUMBERS: CAS 52315-07-8; SHA 109704; OMS 2002 (WHO).

ADDITIONAL TRADE NAMES: Punisx* (Agsin Pte. Ltd.); Agromethrin*, Atamethrin* (Atabay); Aimcocyper* (All India Medical Corp.); Cekumethrin* (Cequisa); Cythrine* (Chimac-Agriphar S.A.); Cymbaz* (C.M.I. Ltd.); Fligene CI* (Diachem S.P.A.); Devicyper* (Devidayal (Sales) Pvt. Ltd.); Cypersun* EC (Gupta Chemicals Pvt. Ltd.); Drago* (Inquiport, S.A.); Siperin* (Jewain-Joffe Industry Ltd.); Vegfru Colt* (Pesticides India); Cibeite* (Probelte, S.A.); Cyper* (Vin-export S.A.); Polytrin*.

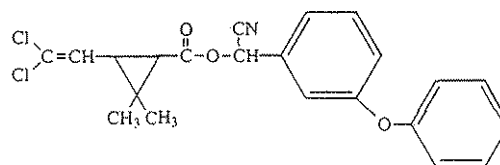
DISCONTINUED NAME: Cypercopal* (Gilmore, Inc.).

Chemistry

COMPOSITION: (±)-α-Cyano-3-phenoxybenzyl (±)-cis,trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate.

PROPERTIES: Pure isomers, colorless crystals.

Tech: Yellow-brown viscous semi-solid. Melting point 60-80°C. Soluble in methanol, acetone, xylene, methylene dichloride.



Cypermethrin

Action/Use

ACTION: Insecticide.

USE: For many pests, particularly lepidoptera in cotton, fruit, and vegetables. Ammo* 2.5EC, Ammo* WSB for hickory shuckworm, yellow and black pecan aphid, pecan nut casebearer, pecan weevil in pecans; beet armyworm, cabbage looper, alfalfa looper in lettuce; cotton bollworm, tobacco budworm, boll weevil, pink bollworm, lygus bug,

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Cyperméthrine

cabbage looper, cotton leafperforator, cutworms, thrips, beet armyworm, flea beetle, cotton fleahopper, saltmarsh caterpillar in cotton. Aids in suppression of cotton aphid, whitefly. ULV in vegetable oil carrier for cotton. Demon[®] WP for cockroaches, other domestic pests, Demon[®] TC for termites. Cynoff[®] EC/WP/WSB for cockroaches and other pests. Prevail[®] FT for termites and other wood infesting insects.

FORMULATIONS: Emulsifiable concentrates, ULV, wettable powder.

COMBINATIONS: Chlorcyrin[®] (+ chlorpyrifos), Cyperdim[®] (+ dimethoate), Cyperfan[®] (+ endosulfan) (Chimac-Agriphar S.A.), Scipio[®] (+ ethion) (Rhône-Poulenc Ag Co.), Cybrom[®] (+ naled) (Vinexport S.A.).

Registration Notes

U.S.: Ammo[®], Arrivo[®]: Some or all applications may be RUP. OUTSIDE U.S.: Arrivo[®], Barricade[®], Electron[®], Folcord[®], Polytrin[®], Ripcord[®], Cymbush[®] 3E (ZENECA Agrochemicals) no longer available in U.S.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 2.0-2.8 µg/l (rainbow trout). Bee: Toxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING (Cynoff[®] WP/WSB); CAUTION (Ammo[®] 2.5EC, Ammo[®] WSB, Prevail[®] FT, Cynoff[®] EC).

TOXICITY CLASS: II (Cynoff[®] WP/WSB); III (Prevail[®] FT, Cynoff[®] EC). TOXICITY: (Rat): Oral LD₅₀ 250 mg/kg (corn oil); 4123 mg/kg (aqueous suspension); (Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Ammo[®] 2.5EC: Wear protective clothing, elbow-length chemical-resistant gloves, full face shield, boots, one-piece overalls, and jacket for mixing, loading or spraying; wash all protective clothing thoroughly after use especially the inside of gloves. Take off heavily contaminated clothing immediately.

HANDLING AND STORAGE CAUTIONS: Do not apply when weather conditions favor drift from treated areas. Do not contaminate lakes, streams, ponds. When using do not eat, drink, or smoke. Do not breathe spray. Wash hands and exposed skin before meals and after work. Wash out container thoroughly and dispose of safely. Store in original container in a cool, dry, well-ventilated, secure area out of reach of children and animals. Store in original container, tightly closed in a safe place.

Emergency Guidelines

FLASHPOINT: 240°F, 115.6°C (estimated). (Prevail[®] FT & Cynoff[®] EC 165°F).

FIRE EXTINGUISHING MEDIA: Water fog, foam, carbon dioxide, dry chemical, halogenated agents.

FIRST AID: Ammo[®]: Get immediate medical aid. Eyes, immediately flush for 15 minutes with large amounts of water. Skin, remove all contaminated clothing at once; thoroughly wash with soap and water. Ingestion, do NOT induce vomiting OR administer liquids. Vomiting should be induced only under professional supervision. Keep patient prone and quiet. ONLY A PHYSICIAN should induce vomiting as first aid for this slightly toxic substance due to increased risk of chemical pneumonia or pulmonary edema caused by aspiration of the hydrocarbon solvent.

EMERGENCY TELEPHONE: 800-331-3148, 716-735-3765 (FMC Corp.), 800-327-8633 (ZENECA Ag Products).

See Pyrethroids.

Cyperméthrine — see Cypermethrin.

Cypermex[®] — see Cypermethrin.

Cypersan[®] — see Cypermethrin.

Cypersul[®] — see Cypermethrin.

Cypersun[®] EC — see Cypermethrin.

Cyphenothrin — see Gokilaht[®].

Cyphénothrine — see Gokilaht[®].

Cypona[®] Insecticide (DDVP) — Discontinued by Hopkins Agricultural Chemical Co.

Cypona[®] E.C. — see Crotoxyphos.

Cyporin[®] — see Cypermethrin.

Cyprazine — see Outfox[®].

Cyprene[®] — see MTI-732.

Cyprex[®] Fungicide (dodine) — Discontinued by American Cyanamid Co.

Cyproconazole

BP: Sandoz Agro, Inc. (Sentinel[®])

Sandoz Agro Ltd. (Alto[®], Atemi[®], Sentinel[®])

Identification

COMMON NAME: Cyproconazole (BSI, ISO draft).

EXP. CODE NUMBER: SAN 619 F.

OTHER CODE NUMBER: CAS 94361-06-5.

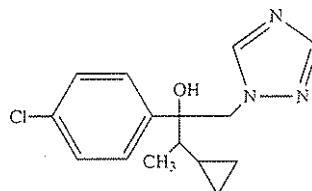
DISCONTINUED NAMES: Alto[®] 100 SL, Atemi[®] 10 Pepite, Atemi[®] 50 SL.

PESTICIDE DICTIONARY

Chemistry

COMPOSITION: 2-(4-chlorophenyl)-3-cyclopropyl-1-(1H-1,2,4-triazol-1-yl)butan-2-ol (IUPAC).

PROPERTIES: Light beige-brown, odorless, crystalline powder. Melting point 106-109°C; vapor pressure 0.03 mPa (20°C). Stable upon storage and in water. Moderately soluble in toluene and n-hexane. Soluble in acetone, ethyl acetate, dichloromethane, ethanol and acetonitrile.



Cyproconazole

Action/Use

ACTION: Broad spectrum fungicide with systemic and eradicated properties.

USE: For Ascomycetes, Basidiomycetes and Deuteromycetes diseases in wheat, barley, rye, oats, coffee, sugarbeets, stone and pome fruits, peanuts, turf.

FORMULATIONS: Emulsifiable concentrates, flowable suspension; concentrates, soluble liquids, wettable granules.

COMBINATIONS: Sportak[®] Delta (+ prochloraz) (AgrEvo UK Ltd.); Tiptor[®] (+ prochloraz) (Sandoz); Alto[®] Elite (+ chlorothalonil); Alto[®] Combi (+ carbendazim); Alto[®] BS (+ fentin acetate); Atemi[®] S (+ sulfur).

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bird: Slightly to moderately toxic. Bee: Nontoxic.

SOLUBILITY: In water 140 mg/l (22°C).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1020-1330 mg/kg. (Rabbit): Dermal >2000 mg/kg. Non-irritating to skin. Slightly irritating to eyes.

PROTECTIVE CLOTHING: Glasses, gloves and dust mask when handling bulk or spilled material.

HANDLING AND STORAGE CAUTIONS: Shelf-life in unopened containers over 2 years.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately (for 15 minutes) with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Ingestion, drink water and induce vomiting.

Cyprofuram

Identification

COMMON NAME: Cyprofuram (ISO, ANSI, BSI)

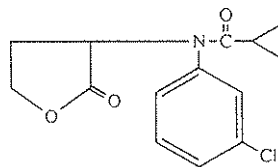
EXP. CODE NUMBER: SN 78 314.

OTHER CODE NUMBER: CAS 69581-33-5.

DISCONTINUED NAME: Stanza[®] (Schering AG)

Chemistry

COMPOSITION: N-(3-chlorophenyl)-N-(tetrahydro-2-oxo-3-furanyl)cyclopropanecarboxamide (CAS).



Cyprofuram

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 174 mg/kg. (Rabbit): Dermal >1000 mg/kg.

Cypromid — see Clobber[®].

Cypromide — see Clobber[®].

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Cyromazine

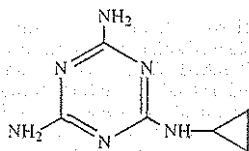
BP: Ciba (Armor*, Trigard*)
Ciba, Ltd. (Trigard*)

Identification

COMMON NAME: Cyromazine (ISO, ANSI, BSI).
EXP. CODE NUMBERS: AI3-52713, CGA-72662 (Ciba, Ltd.).
OTHER CODE NUMBERS: CAS 66215-27-8; SHA 121301; OMS-2014 (WHO).

Chemistry

COMPOSITION: N-cyclopropyl-1,3,5-triazine-2,4,6-triamine.
FAMILY: Triazine.
PROPERTIES: White crystalline solid. Melting point 219-222°C. Solubility in methanol 1.7%.



Cyromazine

Action/Use

ACTION: Insect growth regulator.
USE: Trigard* 75% WP foliar spray controls dipterous leafminers in vegetable crops, ornamentals. Armor* for Sciarid fly control in mushroom rooms. Larvadex*, feed premix.
FORMULATIONS: Feed premix, wettable powder.

Registration Notes

U.S.: Some or all uses may be RUP.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >89.7 mg/l (96 h) (bluegill); >87.9 mg/l (rainbow trout); >92.4 mg/l (catfish). Bird: (Oral) LD₅₀ >2510 mg/kg (mallard); 1785 mg/kg (quail); >6000 mg/kg (Peking duck). (Dietary) >5620 (mallard, quail).

SOLUBILITY: In water, 1.1% at 20°C (ph 7.5).

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3387 mg/kg. Dermal >3100 mg/kg.
PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemical, foam or carbon dioxide.
FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water and induce vomiting.

Cyrux* 25EC — see Cypermethrin.

Cytc* Insecticide/Acaricide (amitraz) — Discontinued 1992 by Schering AG.

Cytel* Insecticide (fenitrothion) — Discontinued 1989 by American Cyanamid.

Cytex*

BP: Atlantic & Pacific Research Inc.

Chemistry

COMPOSITION: Mixed cytokinins, mostly zeatin-like.
PROPERTIES: Brown liquid, pH 4.9, specific gravity, 1.045 at 15.6°C.

Action/Use

ACTION: Plant growth regulator.
USE: For use on citrus, cucumber, peach, pepper, pine, potato, and tomato. Acceptable on other crops as auxiliary soil chemical. For beet, cabbage, celery as fluid-drilling gel and/or pre-germinated seed.
FORMULATIONS: Water soluble concentrate.

COMBINATIONS: Possible synergisms with Captan, Ergostim*, Folian*.

Environmental Guidelines

SOLUBILITY: Highly soluble in water.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Keep from extreme heat, cold. Storage stability approx. 48 months.

Cythion* — see Malathion.

Cythriner* — see Cypermethrin.

Cytokinins

A group of plant growth regulators containing the naturally occurring adenine and zeatin, and the synthetics kinetin and adenine.

Cytovirin

Action/Use

ACTION: Antibiotic.
USE: Inhibits mosaic in beans, tomato.

Cytrol Amitrole-T* Herbicide (amitrole) — Discontinued 1967 by American Cyanamid.

Cytro-lane* — see Cytrolane*.

Cytrolane*

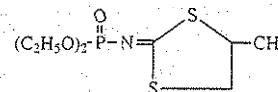
BP: American Cyanamid Co. (Cytrolane*, Cytro-lane*)

Identification

COMMON NAMES: Mephosfolan (BSI, ISO-E); mephospholan (ISO-F).
CODE NUMBERS: CAS 950-10-7; ENT-25991.

Chemistry

COMPOSITION: 2-(diethoxyphosphinylimino)-4-methyl-1,3-dithiolane (IUPAC), or diethyl N-(4-methyl-1,3-dithiolan-2-ylidene)phosphoramidate (CAS).



Mephosfolan

Action/Use

ACTION: Systemic insecticide.
USE: For leaf-feeding larvae, stem borers. For cotton leafworm Spodoptera littoralis, pink bollworm, spiny bollworm, jassids, whiteflies, aphids, thrips, and mites on cotton. Also aphids on hops.
FORMULATIONS: Emulsifiable concentrate, granules.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ 8.9 mg/kg. (Rabbit): Dermal 28.7 mg/kg.

2,4-D

- BP: Agrolinz (Austria)
Agrolinz, Inc. U.S.A.
All India Medical Corp. (Weedtox*)
Atabay Agrochemicals & Veterinary Products Inc. (2,4-D ester)
Atanor S.A. (Herbifen*)
Atul Products Ltd.
BASF AG (U46* D-Fluid)
Biesterfeld U.S., Inc.
Chemiekombinat AG Bitterfeld (Spritz-Hormin*)
Ciech-Agrochemia (Pol-Pielik*)
Crystal Chemical Inter-America (Crisalamina*, Crisamina*)
Defensa Indústria de Defensivos Agrícolas S.A.
Fersol Indústria e Comércio Ltda.
Gilmore, Inc.
HELM AG
Herbitécnica Defensivos Agrícolas Ltda. (Aminol 806*, Herbi-D 480*)
Hubei Sanonda Co., Ltd.
ISK Biosciences Corp. (Dacamine*)
Koruma Tarim A.S.
Krishi Rasayan
A.H. Marks & Co., Ltd.
Nissan Chemical Industries, Ltd. (2,4-D*)
Nitrokémia Ltd. (Dikamin*, Dikonirt*)
NuFarm Ltd. (2,4-D*)
PBI/Gordon Corp. (Amine 400 2,4-D Weedkiller, Dymec*, Hi-Dep*, LV 400 2,4-D Weedkiller)
Proficol El Carmen S.A. (2,4D ester Tech*)
Rhône-Poulenc Ag Co. (Amsol*, Debroussaillant 600*, DPC*, Esteron* 99C, Formula 40*, Herbidal*, Netagrone 600*, Super Weedone*, Weedar* 64, Weedone*)
Rotam Group (Rodamine*)
Sanachem (Pty) Ltd. (Sanaphen-D*)
Uniroyal Chemical Co. Inc. (Ded-Weed SULV*)

Identification

COMMON NAMES: 2,4-D (ISO, WSSA, BSI); 2,4-PA (JMAF).
EXP. CODE NUMBER: CA 38083010 (Ciech-Agrochemia).
CODE NUMBERS: CAS 94-75-7; CAS 93-76-3, SHA 082001 (Dacamine* 4D); EINECS 202-361-1.
ADDITIONAL TRADE NAMES: Miracle*, Weedtrol* (Agchem Mfg.); Lentemul* (Agrolinz, Austria); AGSCO 400* (AGSCO, Inc.); D-Amin* (Agsin Pte. Ltd.); Navigate* (Applied Biochemists, Inc.); Cornox*

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

(Atabay); Plantgard*, Tributon* (Chevron Chemical Co.); Dam*, Selectone D*, Stantox* (Chimac-Agriphar S.A.); Malerbane*, Malerbane Cereali* (Diachem S.P.A.); A-4D*, Barrage*, Weed Rhap* (Helena Chemical Co.); Salvo*, Savage* (Platte Chemical); Ester Tec*, Butil Ester Tec*, Isobutil Ester Tec*, Ester Proficol* (Proficol El Carmen S.A.); Solution* (Riverdale Chemical); Aqua-Kleen*, Lawn-Keep*, Planotox* (Rhône-Poulenc Ag Co.); Esterdefore*, Macondray* (VAPCO); Amoxone*, Chloroxone*, Crop Rider*, Dinoxol*, Dormone*, Emulsamine* BK, Emulsamine* E-3, Fernimine* and Fernoxone* (ZENECA Agrochemicals).

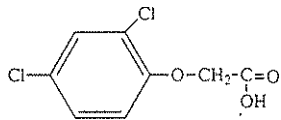
DISCONTINUED NAMES: Visko-Rhap* (+ 2,4-DP) (Agrolinz, Inc.); Ferrone*, Weed-Ag-Bar*, Weedatul* (Atul Products); Hedonal* (+ dichlorprop) (Bayer Ag Co.); Weed-B-Gon* (Chevron Chemical Co.); Weed Pro* (+ atrazine) (Cornbelt Chemical); DMA* 4 (Dow Chemical); Fernesta* (ICI Agrochemicals); Steriweed* (+ bromacil + dalapon) (ICI Australia Ltd.); Transamine* (+ 2,4,5-T) (Inter-Ag Corp.); Kaislantuh* (+ dalapon + 2,4,5-T) (Kemira Oy); Agrotect* (Miller Chemical & Fertilizer Corp.); Mecopar* (+ mecoprop) (NOR-AM); Phenaban 801* (PBI/Gordon); Pennamine* D (Pennwalt); Chipco* Turf Herbicide D, Chipco* Turf Kleen* (+ MCPP), Desormone* (+ dichlorprop), Rhodia*, Superomone Concentre* (+ MCPA), Weed Broom* (+ bromacil + DSMA) (Rhône-Poulenc Ag Co.); BH* 43 (+ maleic hydrazide) (SDS Biotech); Proponex* D (+ mecoprop) (Shell Chemicals UK Ltd.); Knoxweed* (+ EPTC) (Stauffer Chemical Co.); Ded-Weed* (+ dalapon + MCPA + silvex + 2,4,5-T) (TH Agriculture & Nutrition); Dicotox* (Union Carbide Australia); Vi Par* (+ MCPP) (Vineland Chemical); Weedez Wonder Bar*.

Chemistry

COMPOSITION: 2,4-dichlorophenoxyacetic acid.

FAMILY: Chlorinated phenoxy.

PROPERTIES: White powder. Melting point 140.5°C. Vapor pressure < 10⁻⁷ mbar. Acid not used customarily by itself, usually as an amine, salt or ester. Only slightly soluble in petroleum distillate. Soluble in alcohols. Esters are soluble in oils.



2,4-D

Action/Use

ACTION: Selective, hormone-type, translocated phenoxy compound used mainly as a postemergence herbicide.

USE: For grasses, wheat, barley, oats, rye, rice, hay, millet, rangeland, pasture, asparagus, fallowland, turf, sorghum, corn, sugarcane, and noncrop areas for postemergence control of Canada thistle, dandelion, annual mustards, ragweed, lambsquarters, and others. Some formulations for pine release, waterhyacinth control and prevention of seed formation; double-gee, wild radish, turnip and other broadleaf weeds in cereals. Many broadleaf crops (cotton, grape vines) are extremely sensitive. **FORMULATIONS:** Emulsion form (esters), aqueous solutions (salts), emulsifiable concentrate, wettable powder. The amine in largest production is the dimethylamine salt, others being the diethanolamine, trimethylamine, etc. As with amines which form salts with the 2,4-D acid, esters are made with a wide variety of alcohols.

COMBINATIONS: Tiller* (+ fenoxaprop-P-ethyl + MCPA) (AgrEvo USA Co.); Duplosan* DP/D (+ dichlorprop-P), U 46* Combi-Fluid (+ MCPA), U 46* KV-Combi-Fluid (+ mecoprop) (all BASF AG); Chimac Cop Special* (+ MCPP), Chimac Mixte* (+ 2,4-MCPA), Selectone G* (+ dicamba), Selectyl MD* (+ 2,4-MCPA), Trimonal* (+ dicamba + MCPA) (Chimac-Agriphar S.A.); MCPP-2,4-D (+ MCPP) (W.A. Cleary); Curtail* and Lontrel* 205 (+ clopyralid), Grazon* P + D, Pathway*, Tordon* 101 Mixture (all + picloram) (DowElanco); Herbanil 368* and Herbanil SC* (+ propanil) (Herbitecnica); 2 Plus 2* (+ MCPP) (ISK Biotech); Super Trimec* and Trimec* Brushmaster Brushkiller (+ dicamba + 2,4-DP), Trimec* 992, Trimec* Bentgrass, Trimec* Classic, Trimec* Southern (all with MCPP + dicamba), Trimec* Plus (+ MCPP + dicamba + MSMA), Vegemec* (+ prometon) (all PBI/Gordon); Trinatox D* (+ ametryn) (Pyosa); Brush Killer 2D + 2DP* (+ 2,4-DP), Dissolve* (+ mecoprop + dichlorprop), Triamine* and Tri-Ester* (+ 2,4-DP + mecoprop), Triplet* (+ mecoprop + dicamba), Turf D + DP* (+ 2,4-DP); Veteran* 520 and Veteran* 720 (+ dicamba) (Riverdale Chemical); Actril* DS (+ ioxynil), Envert* 171 and Weedone* 170 (+ dichlorprop), Trio* (+ bromoxynil + propanil) (Rhône-Poulenc Ag Co.); Weedmaster* (+ dicamba) (Sandoz Agro, Inc.); Stacker-D* (+ methyl-dymron) (SDS Biotech K.K.); Grasszin* D (+ bentazone).

Registration Notes

OUTSIDE U.S.: For rice in the Philippines. Crisalamina*, Crisamina*

(Crystal Chemical); Dacamine* (ISK Biosciences Corp.); Lentemul* (Agrolinz, Austria).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 377 mg/l (trout). Bird: LD₅₀ 500 mg/kg body wt. (quail).

SOLUBILITY: Only slightly soluble in water. Amine salts are soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (Dimethylamine salt); CAUTION (EC, WP).

TOXICITY CLASS: I (Dimethylamine salt) (eyes); Class III (EC, WP) (oral).

TOXICITY: (Rat): Oral LD₅₀ 699 mg/kg. Isopropyl: 700 mg/kg. Sodium Salt: 500-805 mg/kg. Usual application rates have no adverse effect on soil microorganisms.

PROTECTIVE CLOTHING: Chemical resistant or rubber gloves, protective eyewear, long-sleeved shirt, long pants, socks, shoes, and apron.

HANDLING AND STORAGE CAUTIONS: Handle carefully. Do not contaminate water, food or feed by product storage or disposal. Do not store near other agrochemicals or seeds. Do not use spray equipment contaminated with this product for any other purposes unless thoroughly cleaned with a suitable cleaner. The greatest danger to susceptible crops is spray drift and volatilization. Highly volatile esters may result in vapor damage to such crops, while low volatile esters such as butoxyethyl and isooctyl esters are less likely to cause damage, and salt formations are essentially non-volatile. Do not apply where irrigation water may be contaminated.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Disposed of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: Approx. 65°C (ester).

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. **Eyes,** flush with plenty of water. **Skin,** flush with plenty of water; remove contaminated clothing and clean before reuse. **Ingestion,** do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

2,4-D* — See 2,4-D.

D 50* Herbicide (2,4-D) — Discontinued by Shell Chemicals UK Ltd.

D 264* Insecticide (diazinon) — Discontinued 1989 by Drexel Chemical Co.

D 735 — see Carboxin.

D 1221 — see Carbofuran.

DAC 893 Herbicide (DCPA) — Discontinued by SDS Biotech.

Dacamine* — see 2,4-D.

Dacamax* — see Thiofanox.

Dacobre* — see Chlorothalonil.

Daconate* 6 — see MSMA.

Daconate* Super — see MSMA.

Daconil 2787* — see Chlorothalonil.

Dacthal*

BP: ISK Biosciences Corp. (Dacthal*)

Identification

COMMON NAMES: DCPA (WSSA); chlorthal-dimethyl (ISO, BSI)

TCTP (JMAF).

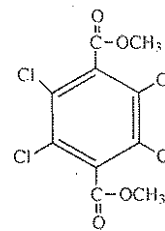
EXP. CODE NUMBER: DAC 893.

OTHER CODE NUMBERS: CAS 1861-32-1; SHA 078701.

Chemistry

COMPOSITION: Dimethyl tetrachloroterephthalate.

PROPERTIES: Melting point 156°C. Stable to ultra violet radiation. Thermally stable under normal storage conditions. Nonvolatile under normal field conditions. Vapor pressure 1.6 × 10⁻⁶ torr (25°C).



DCPA

ACTION: Selective herbicide.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

USE: Preemergence for smooth/hairy crabgrass, fall panicum, green/yellow foxtails, lovegrass, other annual grasses; broadleaf weeds such as black nightshade, burning nettle, carpetweed, common chickweed, dodder, field pansy, prostrate knotweed, lambsquarters, redroot pigweed, purslane, sandbur, nodding spurge, prostrate spurge, and spotted spurge. Tolerated by many crop plants. For Brassica (cole) crops, collards, cotton, cucumbers, eggplant, field beans, garlic, horseradish, kale, mustard greens, onions, peppers, potatoes, radish, seeded melons, squash, strawberries, sweet potatoes, tomatoes, turnips, turf, and ornamentals. Postemergence for *Veronica filiformis*.

FORMULATIONS: Flowables, granules, wettable powder.
COMBINATIONS: Decimate* (+ propachlor) (SDS Biotech).

Registration Notes

U.S.: Dacthal W-75* supplemental labeling only within Washington State for radish grown for seed.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

SOLUBILITY: Insoluble in water (0.5 ppm).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg. Inhalation LC₅₀ >19.4 mg/l (4 h). (Rabbit): Dermal LD₅₀ >2000 mg/kg. Slightly irritating to eye; non-irritating to skin.

Dadasul* — see DDVP.

DAEP — see Amiphos*.

Dagadip* — see Trithion*.

Dailon* — see Diuron.

Daimuron — see Dymron.

Dakar* — see Bromacil; Diuron; Terbutryn.

Dakota* — see Fenoxaprop-P-ethyl; MCPA.

Dakota TP Herbicide (fenoxaprop-P-ethyl + MCPA) — Discontinued 1994 by AgrEvo USA Co.

Dakuron* — see Pentanochlor.

Dalacide* — see Dalapon.

Dalapon

BP: HELM AG

Identification

COMMON NAMES: Dalapon (ANSI, BSI, WSSA); DPA (JMAF); propop (So. Africa).

CODE NUMBERS: CAS 75-99-0; SHA 28901; EINECS 200-923-0. Sodium Salt: CAS 127-20-8; SHA 28902. Magnesium Salt: CAS 29110-22-3.

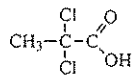
ADDITIONAL TRADE NAMES: Dalacide* (Diachem S.P.A.); Dalapon-Na* (Gramevin*); Unipon*.

DISCONTINUED NAMES: Basfapon* (BASF AG); Devipon* (Devidayal (Sales) Pvt. Ltd.); Radapon* (Dow Chemical Co.); Dalapon* 85 (Fermenta ASC); Revenge* (dalapon sodium salt + dalapon magnesium salt + TCA sodium salt) (Hopkins Agricultural Chemical Co.); Steriweed* (+ bromacil + 2,4-D) (ICI Australia Ltd.); Dowpon* M (Inter-Ag Corp.); Kaislantuhu* (+ 2,4-D + 2,4,5-T) (Kemira Oy); Ded-Weed* (+ 2,4-D + MCPA + silvex + 2,4,5-T) (TH Agriculture & Nutrition).

Chemistry

COMPOSITION: 2,2-dichloropropionic acid.

PROPERTIES: Acid itself not used directly. Commercial products usually sodium salt or mixed sodium + magnesium salts of dalapon. Sodium salt: yellowish, solid.



Dalapon

Action/Use

ACTION: Selective herbicide; growth regulator.

USE: For quackgrass, bermudagrass, johnsongrass, other perennial and annual grasses, cattails, rushes. Often preplant for established perennial grasses in cropland, noncropland areas, irrigation ditch banks. Translocates to the roots of most species as a growth regulator. Target* for severe infestations of perennial grasses in sugarcane, rubber, and oil palm.

FORMULATIONS: Water soluble powder.

COMBINATIONS: Chloropon* (+ 2,4-D); Target* and SLAM* (+ asulam) (Rhone-Poulenc Ag Co.).

Registration Notes

U.S.: Registered in 17 western U.S. states.

OUTSIDE U.S.: Target* in U.K.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 105 ppm (bluegill). Bird: (Dietary): LC₅₀ >5000 ppm (mallard, ring-necked pheasant, Japanese quail).

SOLUBILITY: Water soluble. (Dalapon-Na*).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Sodium 2,2-dichloropropionic acid: (Rat): Oral LD₅₀ 9330 mg/kg (male); 7570 mg/kg (female).

PROTECTIVE CLOTHING: Impermeable gloves and face shield.

HANDLING AND STORAGE CAUTIONS: Do not contaminate water, food or feed by storage or disposal. Do not reuse spray equipment for any purpose unless thoroughly cleaned with a suitable cleaner. Do not reuse container; destroy when empty.

SPILL CONTROL/CLEANUP: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

FIRST AID: Eyes and Skin, flush with plenty of water. Get medical aid if any irritation develops. Ingestion, induce vomiting if conscious.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Dalapon 85* Herbicide (dalapon) — Discontinued 1989 by Fermenta ASC.

Dalapon-Na* — see Dalapon.

Dal-E-Rad* Herbicide (MSMA) — Discontinued by Vineland Chemical.

Dal-E-Rad* 100 Herbicide (DSMA) — Discontinued by Vineland Chemical.

Dalmatian Insect Flowers — see Pyrethrum.

Dam* — see 2,4-D.

DAM 18654 — see Cypendazole.

Damekta 50%* Insecticide (DDT) — Discontinued by Diamond Shamrock de Mexico.

D-Amin* — see 2,4-D.

Daminozide

BP: Fine Agrochemicals Ltd. (Dazide*)
Uniroyal Chemical Co., Inc. (B-Nine*)

Identification

COMMON NAME: Daminozide (ANSI, BSI, ISO), SADH (ASHS); aminozide (ISO abandoned).

EXP. CODE NUMBER: B-995.

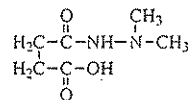
OTHER CODE NUMBERS: CAS 1596-84-5; SHA 035101.

DISCONTINUED NAMES: Alar* and Kylar* (Uniroyal), aminozide (ISO).

Chemistry

COMPOSITION: Butanedioic acid mono (2,2-dimethyl hydrazide) (CAS). Succinic acid 2,2-dimethyl hydrazide (CAS 8CI).

PROPERTIES: White, stable, crystals. Melting range 157-164°C.



Daminozide

Action/Use

ACTION: Growth retardant.

USE: B-Nine* for chrysanthemums, azaleas, hydrangeas, poinsettias, and many bedding plants.

FORMULATIONS: Water soluble powder.

Environmental Guidelines

HAZARDS: Fish: Practically nontoxic. LC₅₀ 360 mg/l (96 h) (rainbow trout); 650 mg/l (bluegill). Bee: Nontoxic. Bird: Practically nontoxic. LC₅₀ >5620 mg/kg (96 h) (quail).

SOLUBILITY: Water soluble, 100 gm/l.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 8400 mg/kg. (Rabbit): Dermal LD₅₀ >5000 mg/kg. Inhalation >147 mg/l. (Dog): Two yr. feeding study showed no effect at 7500 ppm (highest test dosage).

Damping-off

Decay of seeds in the soil or of young seedlings before or after emergence. Generally caused by seed- and soil-borne fungi. Most evident in young seedlings that topple over and die just after emergence from the soil (postemergence damping-off).

Danex* Insecticide (trichlorfon) — Discontinued 1992 by Makhteshim-Agan.

Danger — see Toxicity-Human.

Danibon* — see MTI-732.

Chemicals are cross-referenced by common and trade name

— Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Danicut* — see Amitraz.

Danifos*

(Discontinued by Kumiai Chemical Industry Co., Ltd.)

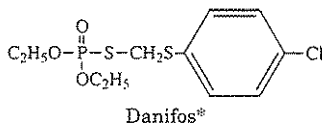
Identification

COMMON NAME: PTMD (JMAF).

CODE NUMBER: CAS 786-19-6.

Chemistry

COMPOSITION: S-(4-Chlorophenyl)thio)methyl O,O-diethyl phosphorothioate.



Action/Use

ACTION: Insecticide.

Danimen* — see Fenpropathrin.

Danitol* — see Fenpropathrin.

Danitron* — see Fenpyroximate.

Dapacryl* Acaricide/Fungicide (binapacryl) — Discontinued 1987 by Hoechst AG.

Daphene* Insecticide (dimethoate) — Discontinued by Zuellig Pte.

Dart* — see Glyphosate; Teflubenzuron.

Dartone* — see Phosalone; Teflubenzuron.

Darvan* — see Dispersant; Lignosulfonates.

Dasanit*

(Discontinued 1990 by Bayer AG)

Identification

COMMON NAME: Fensulfothion (BSI, ISO, ESA).

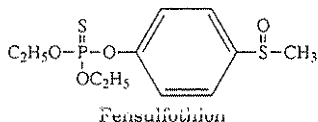
EXP. CODE NUMBERS: Bay 25141; S 767.

OTHER CODE NUMBERS: CAS 115-90-2; SHA 032701; OMS 37 (WHO); ENT-24945.

ADDITIONAL TRADE NAME: Terracur P*.

Chemistry

COMPOSITION: O,O-Diethyl O-[4-(methylsulfinyl)phenyl] phosphorothioate (CAS).



Action/Use

ACTION: Nematicide/insecticide.

Environmental Guidelines

SOLUBILITY: Barely soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 5 mg/kg; Dermal approx. 15 mg/kg.

Emergency Guidelines

ANTIDOTE: Administer atropine sulfate in large therapeutic doses. Repeat as necessary to the point of tolerance. 2-PAM is antidotal and may be administered in conjunction with atropine.

Dash* — see Glufosinate-ammonium.

Dasul* — see Nicosulfuron.

DATC* Herbicide (diallate) — Discontinued by Monsanto Agricultural Co.

Dawson 100* (methyl bromide) — Discontinued 1984 by Ferguson Fumigants.

DAXAD*

BP: Hampshire Chemical Corp. (DAXAD* High Activity)

Action/Use

ACTION: Dispersant, emulsifier, wetting agent.

Daxtron*

(Discontinued by Dow Chemical)

Identification

COMMON NAME: Pyriclor (WSSA).

CODE NUMBERS: CAS 1970-40-7; SHA 482800.

Chemistry

COMPOSITION: 2,3,5-Trichloro-4-pyridinol (CAS).

Action/Use

ACTION: Systemic herbicide.

Safety Guidelines

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 80 mg/kg.

Days To Harvest

The minimum number of days permitted by law between the final application of a particular pesticide and the harvest of the crop. (Same as Preharvest Interval.)

Dazide* — see Daminozide.

Dazoberg* — see Dazomet.

Dazomet

BP: BASF AG (Basamid*)

UCB Chemicals Corp.

Identification

COMMON NAMES: Dazomet (BSI, ISO, WSSA, JMAF); tiazon (USSR); DMMT (superseded WSSA).

EXP. CODE NUMBER: N-521 (Stauffer Chemical Co.).

OTHER CODE NUMBERS: CAS 533-74-4; SHA 035602; EINECS 208-576-7.

ADDITIONAL TRADE NAMES: Dazoberg* (Diachem S.P.A.), Mylone*, Prezervit*.

DISCONTINUED NAMES: Crag* 974 (Union Carbide Corp.), Microfume* (Miller Chemical & Fertilizer Corp.).

Chemistry

COMPOSITION: Tetrahydro-3,5-dimethyl-1,3,5-thiadiazine-2-thione.

PROPERTIES: Tech: Solid, crystalline, white-slightly gray, weakly pungent, melting point 103-105°C. Barely soluble in organic solvents.



Action/Use

ACTION: Bactericide, fungicide; herbicide; nematicide; slimicide.

USE: For soil fungi, nematodes, bacteria, germinating weeds, soil insects. Preplant in seed beds for tobacco, nurseries, greenhouses, substrates for potted plants, turf, ornamentals. Anti-microbial in slimicide preparations.

FORMULATIONS: Dust, granule, tracking powder.

Registration Notes

U.S.: Mylone* for witchweed control in North and South Carolina only.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.16 mg/l (trout). Bird: LD₅₀ 415 mg/kg (bobwhite quail). Bee: Nontoxic.

SOLUBILITY: Decomposes in water to yield fumigant vapor.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 519 mg/kg; Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Required.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes, skin, or clothing. Store in cool, dry place, out of children's reach. Wash thoroughly with soap and water after handling and before eating or smoking.

SPILL CONTROL/CLEANUP: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: Give activated charcoal for small doses. Gastric lavage may be indicated for large doses.

FIRST AID: Get medical aid. Skin, wash thoroughly. Ingestion, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC).

Dazzel* Insecticide (diazinon) — Discontinued by Zuellig Pte.

2,4-DB

BP: Atanor S.A. (Venceweed*)

Cedar Chemical Corp. (Butoxone*)

Defensa Indústria de Defensivos Agrícolas S.A.

A.H. Marks & Co., Ltd.

Rhone-Poulenc Ag Co. (Butyrac*, Embutone*, Embutox Plus*)

Universal Crop Protection Ltd.

Identification

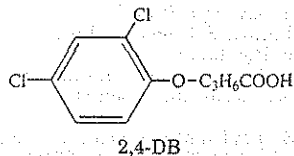
COMMON NAME: 2,4-DB (ISO, BSI, WSSA).

EXP. CODE NUMBER: M&B 2878.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

OTHER CODE NUMBERS: CAS 94-82-6; SHA 030801.
 ADDITIONAL TRADE NAME: Dublex* (Chimac-Agriphar S.A.).
 DISCONTINUED NAMES: Campogran* D (+ bentazone) (BASF AG).

Chemistry
 COMPOSITION: 4-(2,4-Dichlorophenoxy)butyric acid.
 PROPERTIES: White crystalline solid. Melting point 120°C. Very soluble in alcohol, acetone, ether. Slightly in benzene, toluene, kerosene.



Action/Use
 ACTION: Selective, hormone-type herbicide.
 USE: Butoxone*, Butyrac* for seedling alfalfa, birdsfoot trefoil and alsike, ladino and red clover; postemergence for established alfalfa, peanuts, soybeans. Embutone* for broadleaf weeds in alfalfa. Embutox Plus* in cereals.
 COMBINATIONS: Campogran* (+ bentazone) (BASF AG); Legumex* Extra (+ benazolin + MCPA) (Hoechst Schering AgrEvo GmbH).

Environmental Guidelines
 HAZARDS: Fish: (Salt/ester) LC₅₀ 4 mg/l (96 h) (rainbow trout). Bee: Nontoxic.
 SOLUBILITY: Practically insoluble in water.

Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: III.
 TOXICITY: Butoxone* (Rat): Oral LD₅₀ >2000 mg/kg. (Rabbit): Dermal >10,000 mg/kg. Butoxone Ester*: 10,000 mg/kg. Butyrac*: 700 mg/kg.

PROTECTIVE CLOTHING: Plastic gloves, goggles, apron, dust mask.
 HANDLING AND STORAGE CAUTIONS: Handle carefully. Do not contaminate water, food, or feed by storage or disposal. Do not apply when weather conditions favor drift from targeted area. Do not freeze. If allowed to freeze, remix before using.

SPILL CONTROL/CLEANUP: Liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines
 FLASHPOINT: Butoxone* >200°F (TTC).
 FIRST AID: Get medical aid. Eyes, flush immediately with continuous irrigation of flowing water for at least 30 minutes. If cornea burned, instill antibiotic steroid preparation frequently. Skin, promptly wash with plenty of soap and water for at least 15 minutes while removing contaminated clothing. Wash clothes before reuse. Inhalation, remove to fresh air. Ingestion, give large quantities of water, induce vomiting.
 DBCP — see Dibromochloropropane.

DB-Green*
 F: AGSCO, Inc.

Chemistry
 COMPOSITION: Maneb + lindane.
 PROPERTIES: Dyed green to give noticeable color.

Action/Use
 ACTION: Insecticide-fungicide seed treatment.
 USE: Mostly on small grain seed at planting.
 FORMULATIONS: Dry, liquid.

Safety Guidelines
 PROTECTIVE CLOTHING: Pesticide respirator, rubber or impermeable gloves, goggles or safety glasses, hat, long sleeve shirt, long pants.
 HANDLING AND STORAGE CAUTIONS: Use in well ventilated area, avoid excessive heat and moisture.

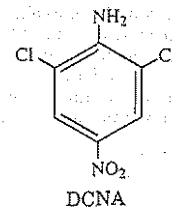
Emergency Guidelines
 FIRE EXTINGUISHING MEDIA: Water, CO₂, foam.
 FIRST AID: Get medical aid. Eyes, flush with plenty of water. Skin, wash with soap and water. Inhalation, remove to fresh air and apply artificial respiration if needed. Ingestion, induce vomiting.

DBP — see Dibutyl Phthalate.
 DCBN — see Prefix*.
 DCMA — see Dicryl.
 DCMO — see Carboxin.
 DCMOD — see Oxycarboxin.
 DCMU — see Diuron.

DCNA
 BP: Gowan Co. (Botran*)
 Kuo Ching Chemical Co., Ltd.

Identification
 COMMON NAMES: Dicloran (BSI), CNA (JMAF).
 TRIVIAL NAME: DCNA.
 CODE NUMBERS: CAS 99-30-9; SHA 031301.
 ADDITIONAL TRADE NAMES: Botran* 30C (Gustafson); Allisan*, Regesan*; Kiwi Lustr 277*; Resisan*.

Chemistry
 COMPOSITION: 2,6-Dichloro-4-nitroaniline.



Action/Use
 ACTION: Fungicide.
 USE: Active against Botrytis, Monilinia, Rhizopus, Sclerotinia and Sclerotium species. For greenhouse cucumbers, endive, garlic, grapes, lettuce, onions, Irish potatoes, hothouse rhubarb, snap beans, greenhouse tomatoes, plant bed sweet potatoes, and ornamental plants. Preharvest: apricots, nectarines, peaches, plums, prunes, and sweet cherries.

FORMULATIONS: Dust and wettable powder.
 COMBINATIONS: Botec* (+ captan) (Gowan Co.); Dicap* Peanut Seed Protectants; Captan-DCNA (+ captan); Decco Salt No. 20* (+ benomyl), Decco Salt No. 22* (+ thiophanate-methyl).

Environmental Guidelines
 HAZARDS: Bee: Nontoxic.
 SOLUBILITY: Dispersible.

Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg.
Emergency Guidelines
 FIRST AID: Get immediate medical aid. Eyes, flush with clean water for at least 15 minutes. Skin, remove contaminated clothing; wash affected area with soap and water. Ingestion, drink warm water and induce vomiting by use of finger or syrup of ipecac. Follow with milk and a mild cathartic (milk or magnesia). Never give fluids or induce vomiting if patient is unconscious or having convulsions.

DC-Oil* — see Dichloropropene.
 D-CON* — see Phosphamidon.
 DCPA — see Dacthal*; Propanil.
 DCPC — see Qikron*.
 DCPM — see Neotran*, Neosappiran*.
 DCU — see Dichloralurea.
 D-D 92* — see Dichloropropene.

DDA
Chemistry
 COMPOSITION: Bis(chlorophenyl) acetic acid.
 PROPERTIES: Product of degradation of DDT. Loss of one molecule of hydrochloric acid (dehydrohalogenation) results in DDE; further degrades to DDA by loss of two more molecules HCl.
 See DDT.

DDD — see TDE.
 DDE
Identification
 CODE NUMBER: CAS 72-55-9.

Chemistry
 COMPOSITION: Dichlorodiphenyldichloroethylene.
 PROPERTIES: Product of degradation of DDT. Loss of one molecule of hydrochloric acid (dehydrohalogenation) results in DDE; further degrades to DDA by loss of two more molecules HCl.

DDT
 BP: Biesterfeld U.S., Inc.
 EniChem Synthesis S.p.A.
 Hindustan Insecticides Ltd. (Hildit*)

Identification
 COMMON NAMES: DDT (ISO, BSI, JMAF, ESA), Zeidane (France), pp' Zeidane.
 CODE NUMBERS: CAS 50-29-3; SHA 029201.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

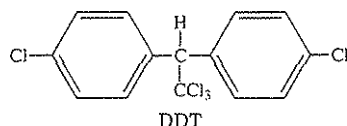
ADDITIONAL TRADE NAMES: Anofex*, Chlorophenothane, Dede-lo*, Pentachlorin*, Rukseam*, Zerdane*.

DISCONTINUED NAMES: Digmar* (All India Medical Corp.); Helio-tox* (+ toxaphene) (BFC Chemical); Genitox*, Gesapon*, Gesarol*, Gexarex*, Gyron*, Ixodex*, Kopsol*, Neocid* (Ciba-Geigy Ltd.); Damekta 50%* (Diamond Shamrock de Mexico); Didimac* (ICI Agro-chemicals); Noita-koisumu* (+ lindane) (Kemira Oy); Micro DDT 75* and R50* (Rumianca S.p.A.); Arkotine* (Shell International Chemical Co. Ltd.).

Chemistry

COMPOSITION: Dichloro diphenyl trichloroethane. Principal Isomer Present: 1,1,1-Trichloro-2,2-bis(p-chlorophenyl) (ethane not <70%).

PROPERTIES: DDT is extremely nonvolatile. Crystallization point min. 90 C; acidity (as sulfuric acid) max. 0.3% in weight; water: max. 1.0% in weight. DDT is unstable in the presence of alkalies and therefore is incompatible with alkaloid nicotine and dolomite. Bordeaux mixture, ferbam, and some clays may cause a slight decomposition. Soluble in apolar organic solvents. Limited solubility in aliphatic oils.



Action/Use

ACTION: Insecticide, contact poison.

USE: First described in 1874 by Othmar Zeidler, German chemist, its insecticidal value was not uncovered until 1939 through the work of Paul Muller in Switzerland. Brought into the U.S. for testing in September 1942, it was later imported in quantity and by early 1944, domestic production for military use was under way. DDT gained rapidly in popularity because of its very high toxicity to insects, relatively low hazard to warm-blooded animals and the fact that discovery came when rotenone and pyrethrum supplies were very low due to WW II. Later it was found that DDT is accumulative in the fatty tissue of warm-blooded animals and that special care was required for application to dairy cattle and animals raised for their food value. Build-up of red spider mites often occurs after application of DDT. The fact that a number of major insect pests have shown their capacity to develop a hereditary resistance to DDT has resulted in some displacement by other chemicals. Also used as mosquito vector control for the eradication of malaria in many countries. Cucurbits, young tomato plants, and beans are injured by normal dosages and DDT may accumulate in the top soil layer where heavy applications are made annually to crops such as apples.

FORMULATIONS: Aerosols, dusts, emulsifiable concentrates, granules, solutions, wettable powders. Space sprays (home use) with kerosene and a small amount of methylnaphthalene or xylene to produce 5% solutions. Methylnaphthalene, xylene, cyclohexanone, isophorone, tetralin, or cumene used as solvents for emulsion concentrates. Due to caking tendency either before or after grinding, often mixed with an equal amount of pyrophyllite or talc before grinding. Addition of a wetting agent forms a wettable powder; further dilution forms a dust.

Registration Notes

U.S.: All uses, except emergency public health uses, and a few other uses permitted on a case basis, cancelled as of January 1, 1973.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Almost insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 113 mg/kg. (Formulations vary).

Emergency Guidelines

FIRST AID: Gastric and intestinal lavage, adsorption therapy (carbon, oatmeal gruel), symptomatic treatment.

DDT, Antiresistant — see Antiresistant DDT.

DDVP

- BP:** All India Medical Corp.
Amvac Chemical Corp. (Fly Fighter*)
Bharat Pulverising Mills Ltd. (Marvex Super*)
Chemol Trading Ltd. Co. (Unifos*)
Ciba, Ltd. (Nogos*, Nuvan*)
Defensa Indústria de Defensivos Agrícolas S.A.
Denka International B.V. (Denkavepon*, Spritex*, Spritex Super*)
Fersol Indústria E Comércio Ltda.
Hubei Sanonda Co., Ltd. (Charge*)

- Jin Hung Fine Chemicals Co., Ltd.
Khatau Junker Ltd. (Khatau Divos*)
Lupin Agrochemicals (I) Ltd.
Makhteshim-Agan (Divipan*)
National Organic Chemical Ind. Ltd. (Vapona*)
Nippon Soda Co., Ltd. (Phosvit*)
Paushak Ltd. (Nuvalex*)
Pesticides India. (Vegfru Divap*)
Q.E.A.C.A. S.A. (DDVP 100*)
Quimica Lucava, S.A. de C.V. (Lucaphos*)
Sanachem (Pty) Ltd.
Sudarshan Chemical Industries Ltd. (Suchlor*)
United Phosphorus Ltd. (Doom*)

Identification

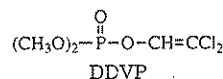
COMMON NAMES: DDVP (JMAF), dichlorvos (ISO, BSI, BAN, ESA).
CODE NUMBERS: CAS 62-73-7; SHA 084001; OMS 14 (WHO); ENT-20738 EINECS 200-547-7.

ADDITIONAL TRADE NAMES: Acivap* (Agro Chemicals Industries Ltd.); Dede vap*, Mafu, Oku* (Bayer AG); Cekusan* (Cequisa); Chimac DVP* (Chimac-Agriphar S.A.); Devikol* (Devidayal (Sales) Pvt. Ltd.); Didivane 50EC* (Diachem S.P.A.); Herkol*, Marvex Super*, No-Pest* Strips, Prentox* DDVP, Vapona*, Verdican*, Verdipor*, Verdisol*, Elastrel* (Fermenta Animal Health); Fly-Die* (Hopkins Agricultural Chemical Co.); Dadasul* (Sulphur Mills Ltd.); De De Vap* (VAPCO).
DISCONTINUED NAMES: Unitox* (Chemol Trading Ltd. Co.); Duravos* (Fermenta Animal Health); Cypona*, Duo-Kill*, Vapora II* (Hopkins Agricultural Chemical Co.); Apavap* (KenoGard AB); Benfos*, Derriban*, Derribante* (Quimica Estrella); Vaponite* (Shell Chemical Co.).

Chemistry

COMPOSITION: 2,2-Dichlorovinyl dimethyl phosphate (IUPAC) or 2,2-Dichloroethenyl dimethyl phosphate (CAS).

PROPERTIES: Colorless liquid. Specific gravity 1.423. Vapor pressure 2.9 × 10³ mbar at 20°C. Boiling point 117°C/10 mm. Miscible in dichloromethane, 2-propanol, toluene. Barely soluble in kerosene.



Action/Use

ACTION: Contact, stomach poison acting as fumigant, insecticide.

USE: Controls household, public health, stored product insects. Controls mushroom flies, aphids, spider mites, caterpillars, thrips, white flies in glasshouse crops, outdoor fruit, vegetables. Benfos* for weevils in stored grain.

FORMULATIONS: Aerosols, soluble concentrates.

COMBINATIONS: Ransbeck* (+ phosalone) (Rhône-Poulenc Ag Co.); Saftrotin* Aerosol (+ propetamphos) (Sandoz Agro, Inc.); Piran* (+ chlordane + dibromochloropropane + synergist) (Tamogan Ltd.); Golden Decoy*, Fly-Bate*.

Registration Notes

U.S.: Amvac is the only manufacturer of tech. DDVP.

OUTSIDE U.S.: Doom*, Nogos*, Nuvan*. Concentrates sold under the name of Vaponite* are for professional pest control use only.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 1.0 mg/l (24 h) (bluegill). Bee: Toxic.

SOLUBILITY: Barely soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ approx. 50 mg/kg. Dermal approx. 300 mg/kg.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, food, feed.

Emergency Guidelines

FLASHPOINT: +175°F.

FIRE EXTINGUISHING MEDIA: Do not use water; smother with foam, CO₂, dry.

ANTIDOTE: Atropine for DDVP poisoning. 2-PAM is also antidotal and may be used in conjunction with atropine. Morphine is contraindicated chemical.

FIRST AID: Get medical aid. Ingestion, induce vomiting.

EMERGENCY TELEPHONE: Medical: 800-228-5635 Ext. 169 (Hazard Information Services); Transportation: 800-424-9300 (CHEMTREC).

DDVP 100* — see DDVP.

Deactivator

Some chlorinated hydrocarbon insecticides such as aldrin, chlordane, endrin and toxaphene are susceptible to breakdown when combined

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with certain carriers or diluents in dust formulations. The action is caused by catalytic action of acidic centers on the surface of some diluents and carriers. Such diluents must be avoided or the acidic sites on the active carriers must be neutralized with deactivators. Urea and hexamethylene tetramine have been found satisfactory for this purpose.

Deadline* — see Metaldehyde.

Deal* — see Mancozeb.

De De Vap* — see DDVP.

2,4-DEB

Identification

CODE NUMBERS: CAS 94-83-7; SHA 030603.

Chemistry

COMPOSITION: 2,4-Dichlorophenoxyethyl benzoate.

Action/Use

ACTION: Herbicide.

Debantic* — see Tetrachlorvinphos.

Debroussillant 600* — see 2,4-D.

Decabane* Herbicide (dichlobenil) — Discontinued by Shell Chemical Co. Ltd.

Decabaz* — see Deltamethrin.

Decafentin — see Stannoram*.

Decamethrin — see Decis*, Pyrethroids.

n-Decanol

BP: Drexel Chemical Co. (Antak*, Sucker Agent 504*)
Fair Products, Inc. (Fair-Tac*)

Identification

CODE NUMBER: CAS 112-30-1.

Chemistry

COMPOSITION: n-Decanol.

Action/Use

ACTION: Contact plant growth regulator.

USE: Tobacco sucker control.

FORMULATIONS: Emulsifiable concentrate.

Safety Guidelines

SIGNAL WORD: CAUTION (Antak*).

TOXICITY CLASS: IV (Antak*).

TOXICITY: Slightly toxic. Mild eye, skin irritant.

PROTECTIVE CLOTHING: Wear safety glasses. Remove contaminated clothing and wash before reuse.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin and eyes. Harmful if swallowed. Avoid breathing of spray mist. May cause irritation of nose, throat and skin. Causes substantial but temporary eye injury. Do not get in eyes or on skin and clothing. Wash thoroughly with soap and water after handling. Store under lock and key in a ventilated room, secure from access by unauthorized persons and children. Store in a cool, dry area away from any heat or ignition source.

Emergency Guidelines

FIRST AID: Get medical aid. Ingestion, drink promptly a large quantity of milk, egg whites, gelatin solution, or if these are not available, drink large quantities of water. Avoid alcohol.

Decarbofuran

(Discontinued by Bayer AG)

Identification

COMMON NAME: Decarbofuran (ISO, BSD).

EXP. CODE NUMBER: BAY 62863 (Bayer AG).

OTHER CODE NUMBER: CAS 1563-67-3.

Chemistry

COMPOSITION: 2,3-Dihydro-2-methylbenzofuran-7-yl methylcarbamate.

Action/Use

ACTION: Insecticide.

Decazolin

Chemistry

COMPOSITION: 1-(α,α -Dimethyl)- β -acetoxypropionyl-3-isopropyl-2,4-dioxodecahydroquinazoline.

Decco* 20S* — see Thiabendazole.

Decco* 273 Aerosol — see Chlorpropham.

Decco* 276 EC — see Chlorpropham.

Decco* Salt No. 20 — see DCNA; Benomyl.

Decco* Salt No. 22 — see DCNA; Thiophanate-methyl.

Deccoquin 305* — see Ethoxyquin.

Deccoscaid* 282 — see Coraza*.

Deccotane*

(Discontinued 1989 by Atochem North America)

Identification

TRIVIAL NAME: Butylamine (ISO-E).

CODE NUMBER: CAS 13952-84-6.

ADDITIONAL TRADE NAME: Frucote*.

Chemistry

COMPOSITION: (RS)-2-aminobutane or (RS)-sec-butylamine (IUPAC).

Action/Use

ACTION: Fungistat.

Safety Guidelines

TOXICITY: Toxic and irritant; pH reduced toward neutral, so less than Tutane*.

Deccoziil* — see Imazalil.

Dechlorane* — Discontinued.

Deciduous Plants

Plants that drop their leaves once a year, as compared to plants that retain their foliage for two years or longer (evergreens).

Decimate* — see Dacthal*.

Decis* — see Deltamethrin.

Decomposition

Breakdown of matter by bacteria or fungi. It changes the chemical makeup and physical appearance of materials.

Decontaminate

The removal or breakdown of any pesticide from any surface, such as a piece of equipment.

Decoy* — see Polytrap*.

Decrotox* — see Crotoxyphos.

De-Cut* — see Maleic Hydrazide.

Decyde*

(Discontinued by MicroGeneSys, Inc.)

Identification

COMMON NAME: Codling moth granulosis virus.

Action/Use

ACTION: Selective microbial insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Nontoxic.

Dedelo* — see DDT.

Dedevap* — see DDVP.

Ded-Weed* Herbicide (2,4-D + dalapon + MCPA + silvex + 2,4,5-T) — Discontinued by TH Agriculture & Nutrition.

Ded-Weed* Silvex LV — see Silvex.

Ded-Weed* SULV — see 2,4-D.

DEF 6*

BP: Bayer AG (DEF 6*)

Miles Inc. (DEF 6*)

Identification

TRIVIAL NAMES: Butifos, tribufos, tribufate (proposed).

EXP. CODE NUMBER: B-1776 (Chemagro).

OTHER CODE NUMBERS: CAS 78-48-8; SHA 074801 (DEF*).

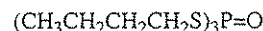
DISCONTINUED NAMES: Ortho Phosphate Defoliant* (Chevron Chemical Co.); De-Green*; E-Z-Off D*; Fos-Fall A*.

Chemistry

COMPOSITION: S,S,S-Tributyl phosphorotrithioate (IUPAC).

FAMILY: Organophosphorus compound.

PROPERTIES: Colorless-to-amber liquid; specific gravity, 1.06 at 20°C.



Active Ingredient of DEF 6*

Action/Use

ACTION: Defoliant.

USE: For cotton.

FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.72 mg/l (96 h) (bluegill). Bird: LC₅₀ 1643 mg/kg (5 d) (bobwhite).

SOLUBILITY: Soluble in water 2.3 × 10⁻⁶ g/l at 20 °C.

Safety Guidelines

SIGNAL WORD: DANGER (6 EC); WARNING (tech).

TOXICITY CLASS: I (6 EC); II (tech).

TOXICITY: (Rat) Oral LD₅₀ ca. 250 mg/kg b.w.; Dermal LD₅₀ 1000 mg/kg b.w.

PROTECTIVE CLOTHING: Goggles should be used to prevent liquid splashes from getting into eyes, and wear chemical-resistant gloves, apron, and shoe covers. Avoid skin contact. Wear long sleeve shirt and trousers.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry area. Minimum temperature 0°F and maximum temperature not to exceed 100°F average temperature for 30 days. Store in an area designated

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

specifically for pesticides. Do NOT store near any materials intended for use or consumption by humans or animals. Consult label for further instructions and directions for disposal of containers and waste.

Emergency Guidelines

FLASHPOINT: 130.0°F TCC.

FIRE EXTINGUISHING MEDIA: Water; carbon dioxide; dry chemical; foam.

ANTIDOTE: Atropine sulfate in large therapeutic doses. Repeat as necessary to point of tolerance. 2-PAM also antidotal and may be administered in conjunction with atropine.

EMERGENCY TELEPHONE: 816-242-2582 (Miles Inc.).

De-Feather*

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: 10% Active Silicone Antifoam.

Action/Use:

ACTION: Food Grade Silicone Antifoam.

USE: Designed for prevention or suppression of foam formation in aqueous solutions.

FORMULATION: Concentrated liquid.

De-Fend* Insecticide (dimethoate) — Discontinued by TH Agriculture & Nutrition.

Deflocculator

A dispersing agent used to retard settling of solid particles in a suspension, especially when the particles tend to clump together and settle out rapidly. Emulsifiers are often effective deflocculators. See Dispersant.

Defoal* — see Magnesium Chlorate.

Defoamer* — see Foam Suppressant.

Defol* — see Sodium Chlorate.

De-Fol-Ate* — see Sodium Chlorate.

Defoliant

A preparation intended for causing leaves to drop from crop plants such as cotton, soybeans or tomatoes, usually to facilitate harvest. A list of defoliants includes DEF*, Folex*, magnesium chlorate, paraquat, sodium chlorate, sodium polyborates. Compare with desiccant.

Defolit* (thidiazuron) — Discontinued by Schering AG.

Deftor* — see Metoxuron.

Defy*

(Discontinued 1989 by Kalo, Inc.)

Identification

COMMON NAME: 2,4-D Acetate.

Action/Use

ACTION: Selective broadleaf herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rabbit): Dermal LD₅₀ 2115 mg/kg. Non-irritating to skin.

Degesch Calcium Cyanide A-Dust* Fumigant (calcium cyanide) — Discontinued 1988 by Degesch America, Inc.

Degesch Calcium Cyanide G* Fumigant (calcium cyanide) — Discontinued by Degesch America, Inc.

Degesch Phostoxin* — see Aluminum Phosphide.

Degesch Plate* — see Magnesium Phosphide.

Degradation

The process by which a chemical compound is reduced to a less complex compound by the action of microorganisms, water, air, sunlight, or other agents.

De-Green* Defoliant (butifos) — Discontinued.

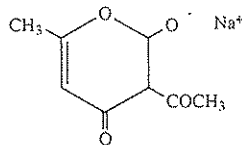
Dehydroacetic Acid**Identification**

TRIVIAL NAME: Dehydroacetic acid.

ADDITIONAL TRADE NAMES: DHA, Harven* (sodium salt) (Dow Chemical).

Chemistry

COMPOSITION: 3-Acetyl-6 methyl-2,4 pyrandione.



Sodium Dehydroacetate

Action/Use

ACTION: Dip fungicide as the sodium salt.

USE: Mold preventative for processed fruits, vegetables. Formerly as a dip or wrapper impregnant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1000 mg/kg.

Deiquat — see Diquat Dibromide.

Deksonal* Fungicide (fenaminosulf + PCNB) — Discontinued.

Delan* — see Dithianon.

Delan-Col* — see Dithianon.

Deleaf* Defoliant (merphos) — Discontinued by Rhone-Poulenc Ag Co.

Delicia* Fumigant (aluminum phosphide) — Discontinued by Delicia GmbH.

Delicia-Gastoxin* Fumigant (aluminum phosphide) — Discontinued by Delicia GmbH.

Delnav* Insecticide (dioxathion) — Discontinued 1989 by NOR-AM Chemical.

Delsene* — see Carbendazim.

Delsene* M Fungicide (carbendazim + maneb) — Discontinued by Du Pont.

Deltamethrin

BP: Roussel Uclaf (Agrovot) (Decis*)

Roussel Uclaf Corp. (Decis*, K-Obiol*, K-Othrine*)

Sanex Inc. (Deltex*)

Identification

COMMON NAMES: Deltamethrin (ISO-E, BSI); deltaméthrine (ISO-F); decamethrin (rejected proposal).

EXP. CODE NUMBERS: NRDC 161; RU 22974.

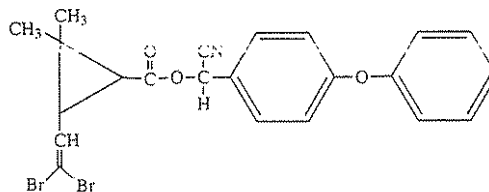
OTHER CODE NUMBERS: CAS 52918-63-5; SHA 209400; OMS 1998 (WHO).

ADDITIONAL TRADE NAMES: Decabaz* (Agro Chemicals Industries Ltd.); Grap* (Agsin Pte. Ltd.); Butoflin*, Butox*, Deltarin*, Terminator*, Vapcothoin* (VAPCO).

Chemistry

COMPOSITION: (S)- α -cyano-m-phenoxybenzyl (1R, 3R)-3-(2,2-dibromovinyl)-2,2 dimethylcyclopropane carboxylate.

PROPERTIES: Crystalline, odorless powder, almost white. Molecular weight: 505.2; melting point 98 to 101°C. Stability very good; no breakdown after 6 months at 40°C. Soluble in acetone, ethanol, dioxan, and most aromatic solvent.



Deltamethrin

Action/Use

ACTION: Insecticide.

USE: K-Othrine*: Household, public health uses for flying, crawling insects. Decis*: cotton, market garden crops, fruit crops, field crops; grapevines, etc. for Coleoptera, Homoptera, Lepidoptera; may be used alone, except against mites.

FORMULATIONS: Emulsifiable concentrates, flowable, thermal fogging concentrates, ULV, wettable powder.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: Practically insoluble in water (<0.00ppm).

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: Decis*: Tech (in oily solvent) (Rat): Oral LD₅₀ 128.5 mg/kg; (in aqueous suspension) >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

K-Othrine*: Tech (Rat): Oral LD₅₀ 128.5 mg/kg - >5000 mg/kg (varies by formulation, carrier, test conditions). (Rabbit): Dermal LD₅₀ >2000 mg/kg. Flowable, ULV and WP practically nontoxic.

HANDLING AND STORAGE CAUTIONS: Avoid contact with mouth, eyes, and skin especially with undiluted EC. Store in original containers away from foodstuffs and animal feed.

Emergency Guidelines

FIRST AID: Treat symptomatically.

Deltaméthrine — see Deltamethrin; Pyrethroids.

Deltarin* — see Deltamethrin.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Deltex* — see Deltamethrin.
Deltic* Insecticide (dioxathion) — Discontinued 1989 by NOR-AM Chemical.
Demand* — see Lambdacyhalothrin.
Demand* CS — see Lambdacyhalothrin.
Demecor* — see Dimethoate; Endosulfan.
Demephion — see Cymetox*.

Demephion-O

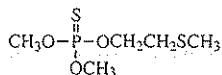
Identification

COMMON NAME: Demephion-O (ISO).

Chemistry

COMPOSITION: O,O-Dimethyl O-2-(methylthio)ethyl phosphorothioate.

PROPERTIES: Differs from demeton methyl (Meta-Systox*) in having the ethyl group replaced by methyl.



Demephion-O

Action/Use

ACTION: Insecticide.

Demephion-S

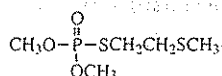
Identification

COMMON NAME: Demephion-S (ISO).

Chemistry

COMPOSITION: O,O-Dimethyl S-[2-(methylthio)ethyl] phosphorothioate.

PROPERTIES: Isomeric with demephion-O.



Demephion-S

Action/Use

ACTION: Insecticide.

Demeton — see Systox*.

Demeton Methyl — see Metasystox*.

Demeton-O

Identification

COMMON NAMES: Demeton-O (ISO, BSI); mercaptosfos (USSR).

Chemistry

COMPOSITION: O,O-Diethyl O-2-(ethylthio)ethyl phosphorothioate.

See Systox*.

Demeton-O-Methyl

Identification

COMMON NAMES: Demeton-O-methyl (ISO, BSI); methyl-mercaptosfos (USSR).

ADDITIONAL TRADE NAME: Devisystox* (Devidayal (Sales) Pvt. Ltd.).

Chemistry

COMPOSITION: O,O-Dimethyl O-2-(ethylthio)ethyl phosphorothioate.

Demeton-S

Identification

COMMON NAMES: Demeton-S (ISO, BSI); mercaptosfos teolery (USSR).

Chemistry

COMPOSITION: O,O-Diethyl S-2-(ethylthio)ethyl phosphorothioate.

See Systox*.

Demeton-S-Methyl — see Metasystox* (i).

Demeton-S-Methyl Sulfoxid — see Metasystox*-R.

Demise* Turf Herbicide (2,4-D acetate) — Discontinued.

Demon* — see Cypermethrin.

Demos NF* Insecticide (dimethoate + piperonyl butoxide) — Discontinued 1989 by Agrimont S.p.A.

Demosan* Fungicide (chloroneb) — Discontinued by Du Pont Agricultural Products.

DeMoss* Moss/Algicide — see Fatty Acids, Pesticidal; Soaps, Pesticidal.

Denapon* — see Carbaryl.

Denarin* — see Triforine.

Denatonium Benzoate — see Bitrex*; Vilex*.

Denatonium Saccharide — see Super Vilex*.

Dencre* — see Dimethoate.

Denka-Flybait* — see Methomyl; Muscalure.

Denka-Flylure* — see Muscalure.

Denkavepon* — see DDVP.

Density — see Specific Gravity.

2,4-DEP — see Falone*.

DEP — see Trichlorfon.

Dépaléthrin — see *d-trans* Allethrin.

Depon* — see Fenoxaprop-ethyl.

Deposit

The amount of pesticide remaining on the plant, plant part, or other surface at any time after it is applied.

Deposit Builder

A material or mixture of additive materials which in optimum quantity improves the retention of a suspended formulation on a treated surface, reducing loss in the run-off of the liquid spray.

Dequiman* — see Dithiocarbamates.

Dermal Toxicity — see Toxicity by Skin Absorption.

Derby* — see Metolachlor; Simazine.

Derosal* — see Carbendazim.

Derriban* Insecticide (DDVP) — Discontinued by Quimica Estrela.

Derribante* Insecticide (DDVP) — Discontinued by Quimica Estrela.

Derringer* — see Piperonyl Butoxide; Resmethrin.

Derris* — see Rotenone.

Derris Resins

Resinous extractives from derris root. Used in preparing formulations containing rotenone along with the various other less active principles of the root.

See Rotenone.

Derris Species

Formerly the most important plant sources of rotenone-containing roots. Grown principally in Malaysia and East Indies. U.S. industry now depends on Lonchocarpus species from South America, mostly Peru.

See Rotenone.

Dervan* — see Sodium Chlorate.

2,4-DES

(Discontinued by Mirfield Agricultural Chemical)

Identification

COMMON NAME: 2,4-DES (ISO).

Chemistry

COMPOSITION: 2,4-Dichlorophenoxyethyl sulfuric acid.

Action/Use

ACTION: Herbicide.

2,4-DES-Na — see Sesone.

Desecol* — see Magnesium chlorate.

Desgan* — see Tilt*.

Desherbant Legumes* — see Linuron.

Des-l-Cate* — see Endothall.

Desiccant

A material used primarily for the control of unwanted plant tops. A list of desiccants includes arsenic acid, dinoseb, endothall, sodium chlorate.

Compare defoliant.

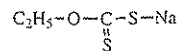
Desiccant L-10* Herbicide (arsenic acid) — Discontinued by ELF Atochem North America, Inc.

Desicorn*

(Discontinued by Ishihara Sangyo Kaisha, Ltd.)

Chemistry

COMPOSITION: Sodium ethylxanthogenate.



Sodium Ethylxanthogenate

Action/Use

ACTION: Desiccant.

Desiquat* — see Diquat Dibromide.

Desmedipham

BP: AgrEvo USA Co. (Betanex*)

Hoechst Schering AgrEvo GmbH (Betanal* AM)

Kemira Agro Oy (Kemifam* D)

Identification

COMMON NAMES: Desmedipham (ISO-E, BSI, ANSI, WSSA); desmediphane (ISO-F).

EXP. CODE NUMBERS: EP-475 (AgrEvo USA); SN 38107; ZK 14494.

OTHER CODE NUMBERS: CAS 13684-56-5; SHA 104801.

Chemistry

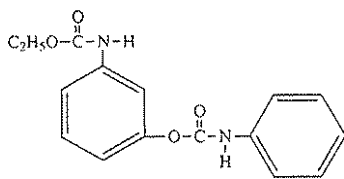
COMPOSITION: Ethyl 3'-phenylcarbamoyloxy-carbanilate (IUPAC); ethyl [3-[(phenylamino)carbonyl]oxyphenyl]carbamate (CAS).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

PROPERTIES: Colorless crystals, melting point 120°C.



Desmedipham

Action/Use

ACTION: Postemergence herbicide.

USE: For buckwheat, goosefoot, kochia, lambsquarters, London rocket, mustard, nightshade, ragweed, redroot pigweed, shepherdspurse in sugar beets.

FORMULATIONS: Emulsifiable concentrate.

COMBINATIONS: Betamix* (+ phenmedipham) (AgrEvo USA Co.); Betanal* Compact (+ phenmedipham), Betanal Progress* (+ phenmedipham + ethofumesate) (Hoechst Schering AgrEvo GmbH); Kenifam* Pro FL (+ phenmedipham + ethofumesate), Kemifam* S (+ phenmedipham) (Kemira Agro Oy).

Registration Notes

OUTSIDE U.S.: Betanal AM*.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 3.8 mg/l (4 days) (rainbow trout); 13.4 mg/l (sunfish; perch). Bee: Nontoxic. Bird: (Oral) LD₅₀ 2480 mg/kg (quail).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Betamix* (Rat): Oral LD₅₀ 4100 mg/kg. (Rabbit): Dermal >2000 mg/kg.

Betanex* (Rat): >10,250 mg/kg. (Rabbit): >2000 - <10,000 mg/kg.

PROTECTIVE CLOTHING: Goggles.

HANDLING AND STORAGE CAUTIONS: Do not store below -20°C. Avoid breathing spray mist or contact eyes, skin.

Emergency Guidelines

FLASHPOINT: 147°F.

FIRE EXTINGUISHING MEDIA: CO₂, dry chemical, foam, water.

FIRST AID: Get medical aid. **Eyes,** flush with plenty of water for 15 minutes. **Skin,** remove contaminated clothing and wash exposed area with soap and water. **Ingestion,** do NOT induce vomiting. Have stomach emptied by gastric lavage.

EMERGENCY TELEPHONE: 302-892-3000 (AgrEvo USA Co.).

Desmel — see Tilt*.

Desmetryn — see Semeron*.

Desmetryne — see Semeron*.

Desormone* Herbicide (2,4-D + dichlorprop) — Discontinued 1993 by Rhone-Poulenc Ag Co.

Desormone Prairies* Herbicide (2,4-D + 2,4-DP + picloram) — Discontinued by Pehiney Progil.

Dessin* — see Dinobuton.

Destun* Herbicide (perfluidone) — Discontinued 1982 by 3M Co.

Detergent

A cleaning substance such as soap. The term is often applied to synthetic preparations alone as opposed to "natural" detergents (soaps) made from fats and lye. Detergents are surface active agents (surfactants), many having applications in pesticide formulations as emulsifiers and wetting agents.

Deteriorate

To break down or wear away; to decay.

Determination of Dietary Risk

Dietary oncogenic risk is the product of exposure and the Q*. The Q* is a quantitative expression of the oncogenic potency of a pesticide. A high Q* indicates that a compound has a strong oncogenic potential. It is an estimate of the expected tumor (malignant and benign) incidence expected to occur from low levels of pesticides contained in the human diet. It is considered a conservative approach, but EPA routinely uses it in its dietary risk assessments. The dietary risk of a pesticide is calculated by EPA as follows: Exposure × Q* = Dietary Oncogenic Risk. The Q* is used in conjunction with the carcinogen classification system. See Carcinogenicity Categorization.

Dethdiet* — see Red Squill.

Dethmore* — see Warfarin.

Detia Gas Ex-B* — see Celphos.

Detmol MA 96* — see Malathion.

Detoxify

To make a poisonous chemical harmless and incapable of being toxic

to plants and animals.

Detsun* — see Perfluidone.

Deviban* — see Chlorpyrifos.

Devicarb* — see Carbaryl.

Devicopper* — see Copper Oxychloride.

Devicyper* — see Cypermethrin.

Devifenvalerate* — see Fenvalerate.

Devigon* — see Dimethoate.

Devikol* — see DDVP.

DeVine*

(Discontinued 1993 by Abbott Laboratories)

Identification

COMMON NAME: *Phytophthora palmivora*.

Chemistry

COMPOSITION: Spores of selective strain of this naturally occurring fungus.

Action/Use

ACTION: Biological herbicide. Mycoherbicide.

Safety Guidelines

TOXICITY: Initial evidence indicates lack of mammalian toxicity.

Devipon* Herbicide (dalapon) — Discontinued by Devidayal (Sales) Pvt. Ltd.

Deviquin* — see Quinalphos.

Devistin* — see Carbendazim.

Devisulfan* — see Endosulfan.

Devisulfur* — see Sulfur.

Devisulphan* — see Endosulfan.

Devisystox* — see Demeton-O-methyl.

Devithion* — see Methyl Parathion.

Devizeb* Fungicide (zineb) — Discontinued by Devidayal Pvt.

Devour*

BP: Crystal Chemical Inter-America

Action/Use

ACTION: Feeding stimulant.

USE: Apply with insecticides to control Lepidoptera order.

Devrinol* — see Napropamide.

DEX — see Herbisan 5*.

Dextrone* — see Paraquat.

Dexuron* — see Diuron; Paraquat.

DFA — see Diphenylamine.

DFDT

(Discontinued)

Identification

ADDITIONAL TRADE NAMES: GIX*; Fluorogesarol*.

Chemistry

COMPOSITION: 1,1,1-Trichloroethane-2,2-bis(p-fluorophenyl).

Action/Use

ACTION: Insecticide (less residue persistence than DDT).

D-Foam*

F: Knapp Manufacturing (D-Foam*)

Chemistry

PROPERTIES: Green liquid with bland odor. Nonionic surfactant blend.

Action/Use

ACTION: Wetting agent, spreader.

USE: With herbicides, defoliants, desiccants, insecticides, fungicides to increase surface wettability, spreadability, penetration.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

D-Fome*

(Discontinued 1989 by Rigo Co.)

Action/Use

ACTION: Foam prevention/suppressant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

DG Plus*

BP: SANAG (DG Plus*)

Chemistry

COMPOSITION: Octyl phenoxy ethanol containing 5 moles ethylene oxide, polyacrylamide polymer, polysaccharide polymer.

PROPERTIES: Opaque viscoelastic slurry.

Action/Use

ACTION: Deposition aid.

USE: Apply by air or ground with water emulsifiable pesticide concentrates.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: WARNING.
TOXICITY CLASS: II.
TOXICITY: Nontoxic.

DHA — see Dehydroacetic Acid.

Diacon* — see Methoprene.

Diacur* — see Diazinon.

DiaFil* — see Diatomaceous Earth.

Diafos* — see Chlorpyrifos; Diazinon.

Diagran* — see Diazinon.

Dialam* — see Asulam; Diuron.

Dialfor — see Torak*.

Dialifos — see Torak*.

Dialiphos — see Torak*.

Dialkyl Sodium Sulfo Dicarboxylate — see Pear-Clean.

Di-Allate — see Diallylate.

Diallylate

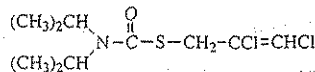
Identification

COMMON NAMES: Diallylate (ISO-F, WSSA); di-allate (ISO-E, BSI).
CODE NUMBER: CAS 2303-16-4.

DISCONTINUED NAMES: Avadex*, DATC* (Monsanto Agricultural).

Chemistry

COMPOSITION: S-2,3,-dichloroallyl di-isopropyl(thiocarbamate).



Diallylate

Action/Use

ACTION: Selective herbicide.

Safety Guidelines

SIGNAL WORD: WARNING.
TOXICITY CLASS: II.

Diamant* Herbicide (bentazone + dicamba) — Discontinued 1994 by BASF AG.

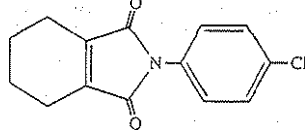
Diamate*

BP: Mitsubishi Kasei Corp. (Diamate*)

Identification

COMMON NAME: Chlorphthalim (JMAF).

EXP. CODE NUMBERS: MK-616 (Mitsubishi Kasei Corp.).



Chlorphthalim

Action/Use

ACTION: Preemergence herbicide.

Registration Notes

OUTSIDE U.S.: In Japan for broadleaf and grass control in turf.

Diamakta* 50% — Discontinued by Diamond Shamrock de Mexico.

Diametan — see Sulfogen*.

Diamidafos — see Nellite*.

Dianat* — see Banvel*.

Dianex* — see Methoprene.

Dianon* — see Diazinon.

Diapadrin* — see Dicrotophos.

Diapause

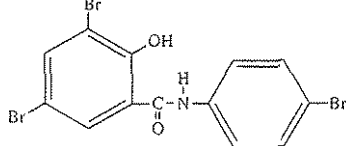
A physiological state of arrested development, generally resulting from physical stimuli, such as temperature and light, that provides the insect a means of surviving unfavorable periods.

Diaphene*

(Discontinued by Pfister Chemical)

Identification

OTHER NAME: Bromsalans.



Diaphene*

Chemistry

COMPOSITION: A halogenated salicylanilide. 3,5-dibromo-N-(4-bromophenyl)salicylamide.

Action/Use

ACTION: Fungicide, bactericide molluscicide.

Diaract* — see Teflubenzuron.

Diatect* Multipurpose Insecticide

BP: Diatect International Inc.

Identification

CODE NUMBER: SHA 42850-2.

Chemistry

COMPOSITION: Pyrethrum, tech piperonyl butoxide, diatomaceous earth.

FAMILY: Silica.

PROPERTIES: White, odorless powder. Boiling point >3900°F; specific gravity 2.35.

Action/Use

ACTION: Insecticide.

USE: May be used on edible crops growing outdoors or in greenhouse up to and including the day of harvest. See label.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >50,000 kg/l.

SOLUBILITY: In water 0.5-2.0%.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

PROTECTIVE CLOTHING: Respirator when concentration exceeds recommended TLV.

HANDLING AND STORAGE CAUTIONS: Store in original container in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FLASHPOINT: None. Will not burn.

FIRST AID: **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. **Inhalation**, remove to fresh air.

Diater* Herbicide (diuron) — Discontinued 1993 by Rhone-Poulenc Ag Co.

DiaTerr-Fos* — see Diazinon.

Diatomaceous Earth

BP: Celite Corp./World Minerals Inc. (Celite*, Kenite*)

CR Minerals Corp. (DiaFil*)

Eagle-Picher Minerals, Inc. (Celatom*)

Identification

CODE NUMBERS: CAS 61790-53-2; SHA 072605 (diatomaceous earth). CAS 7631-86-9 (silicon dioxide).

OTHER NAMES: Infusorial Earth; Kieselguhr.

Chemistry

PROPERTIES: Stable, essentially inert. Approx. 90% silica. Oil absorption, 135-185%; screen analysis, 325 mesh; bulk density, 8-15 lb./cu. ft.; pH7. Compatible, stable with toxicants. Free-flowing for good grindability. Inert, with some solubility in strong acids or alkalis.

Action/Use

ACTION: Inert carrier, diluent used in dry concentrates. Bulking, conditioning agent for dusts. Inert carrier for dry pesticides. Anti-caking agent, soil conditioner, and turf soil supplement.

FORMULATIONS: Graded granule sizes.

Safety Guidelines

TOXICITY: Nontoxic.

PROTECTIVE CLOTHING: Dust mask.

HANDLING AND STORAGE CAUTIONS: Avoid creating, breathing quantities of dust.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-527-7315 (CR Minerals Corp.); 702-333-7605 (Eagle-Picher Minerals Inc.); 805-736-1221 (Celite Corp.).

Environmental Guidelines

SOLUBILITY: Negligible in water.

Diatomite* — see Diatomaceous Earth.

Diazajet* — see Diazinon.

Diazan* (drosolure) — Discontinued by Tamogan Ltd.

Diazatol* — see Diazinon.

Diazide* — see Diazinon.

Diazinon

BP: Biesterfeld U.S., Inc.

Ciba (D.z.n., Sarolex*)

Ciba, Ltd. (Basudin*, Neocidol*)

Drexel Chemical Co.

ELF Atochem North America, Inc. (Knox Out* 2FM)

Gilmore, Inc.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Makhteshim-Agan (Diazol*)
Nippon Kayaku Co., Ltd.
PT. Petrosida Gresik

Identification

COMMON NAME: Diazinon (BSI, ISO, ANSI, ESA, BAN, JMAF).
EXP. CODE NUMBER: G-24480.
OTHER CODE NUMBERS: CAS 333-41-5; SHA 057801; OMS 469 (WHO); ENT 19507.

ADDITIONAL TRADE NAMES: Adizon* (Atabay); Chimac Diazo*, Diacur*, Diazonyl* (Chimac-Agriphar S.A.); Diagran, Dianon*, Dia-Terr-Fos*, Diazajet*, Diazatol*, Diazide*, Dizinon*, Dyzol*, Garden-tox*, Kayazinon*, Kayazol*, Nipsan*, Spectracide*.

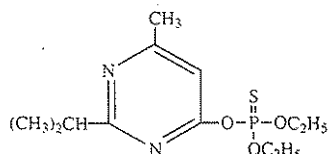
DISCONTINUED NAMES: Agrox* 3-Way (+ captan + lindane) (Chipman Chemicals); Alfa-tox* (+ methoxychlor) (Ciba-Geigy); D 264* (Drexel Chemical Co.); Bean Seed Protectant* (+ captan + streptomycin) (Hopkins Agricultural Chemical Co.); Drawizon* (Wacker-Chemie GmbH); PT 265* (Whitmire Research Laboratories); Dazzle*, Fezudin* (Zuelling Pte.).

Chemistry

COMPOSITION: O,O-diethyl O-[6-methyl-2-(1-methylethyl)-4-pyrimidinyl] phosphorothioate (CAS 9CI); O,O-diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate (8CI).

FAMILY: Phosphorothioate.

PROPERTIES: Colorless oil, d_4^{20} 1.116-1.118, n_D^{20} 1.4978-1.4981. Tech is pale-to-dark brown liquid, at least 90% pure. Miscible with ethanol, acetone, xylene, soluble in petroleum oils.



Active ingredient of Diazinon

Action/Use

ACTION: Insecticide, nematicide.

USE: For soil insects and pests of fruits, vegetables, tobacco, forage, field crops, range, pasture, grasslands, ornamentals. For cockroaches and other household insects; grubs, nematodes in turf; seed treatment and fly control.

FORMULATIONS: Dust, emulsifiable and oil solutions, granules, seed dressings, ULV, wettable powder, microencapsulated.

COMBINATIONS: Diafos* (+ chlorpyrifos) (Chimac-Agriphar S.A.); Kick-Start* (+ carboxin + lindane) (Helena Chemical Co.); Ethioneton* 4 (+ thiometon) (Sandoz Agro Ltd.); Kernel Guard* (+ captan + lindane) (Trace Chemicals, Inc.); Agrox* 2-Way (+ captan), Agrox* D-L Plus (+ captan + lindane) (Wilbur-Ellis).

Registration Notes

U.S.: Knox Out* 2FM for pest control use for cockroaches, silverfish, ants, flies, and fleas in residential buildings, non-food areas of industrial, institutional, and commercial buildings. Bait used to control scavenger yellowjackets in the eleven contiguous western states.

OUTSIDE U.S.: In rice for stemborers, leafhoppers.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: In water at room temperature 0.004%.

Safety Guidelines

SIGNAL WORD: CAUTION or WARNING (varies with formulation).

TOXICITY CLASS: II or III (varies with formulation).

TOXICITY: Tech (Rat): Oral LD_{50} 1250 mg/kg. Inhalation LC_{50} 5.4 mg/l (4 h). (Rabbit): Dermal >2020 mg/kg. Mild eye, skin irritation. 4E: 542 mg/kg. (Rabbit): 600 mg/kg. Severe eye, mild skin irritation. 4EC: 5.4 mg/l.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FLASHPOINT: 180°F.

FIRE EXTINGUISHING MEDIA: Dry chemical, foam or carbon dioxide.

ANTIDOTE: Atropine, toxogonin.

FIRST AID: Get medical aid. **Eyes**, flush with plenty of water for at least 15 minutes. **Skin**, wash with soap and water. Product absorbed through skin. **Inhalation**, move to fresh air. Do NOT breathe spray mist.

Ingestion, if conscious, give water or milk. Do NOT induce vomiting.

Diazoben* (fenaminosulf) — Discontinued by Mobay Chemical Corp.

Diazol* — see Diazinon.

Diazonyl* — see Diazinon.

Dibam* — see Sodium Dimethyl Dithiocarbamate.

Dibavit* — see Prochloraz.

Dibex* Insecticide/Acaricide (nated) — Discontinued by Hopkins Agricultural Chemical Co.

Dibrom* — see Naled.

Dibrome* — see Ethylene Dibromide.

Dibromochloropropane**Identification**

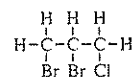
COMMON NAME: DBCP (JMAF).

CODE NUMBERS: CAS 96-12-8; SHA 011301.

ADDITIONAL TRADE NAMES: Nemaforme*, Nemanax*, Nemaset*, DISCONTINUED NAMES: BCC 12* and Oxy DBCP* (Occidental Chemical); Fumazone* (Dow Chemical); Nemagon* (Shell Chemical Co.); Nematocide* (Amvac Chemical Corp.).

Chemistry

COMPOSITION: 1,2-Dibromo-3-chloropropane (principal constituent).



Dibromochloropropane

Action/Use

ACTION: Soil fumigant.

COMBINATIONS: Piran* (+ chlordane + DDVP + synergist) (Tamogan Ltd.).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD_{50} 170-300 mg/kg. (Mouse): Oral LD_{50} 257 mg/kg (male), 260-410 mg/kg (female). (Rabbit): Dermal LD_{50} 1420 mg/kg. Overexposure can cause reduced sperm count in human males.

Dibromure d'Éthylène — see Ethylene Dibromide.

Dibutalin — see Butralin.

Dibutyl Phthalate**Identification**

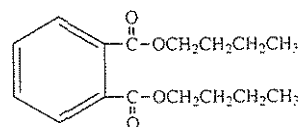
COMMON NAMES: Dibutyl phthalate (ISO-E, BSI); phthalate de butyle (ISO-F).

TRIVIAL NAME: DBP.

CODE NUMBERS: CAS 84-74-2; SHA 028001.

Chemistry

COMPOSITION: Dibutyl phthalate (IUPAC): dibutyl 1,2-benzenedicarboxylate (CAS).



Dibutyl Phthalate

Action/Use

ACTION: Insect repellent.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD_{50} 8000 mg/kg. Generally non-irritating.

DIC 1577 — see Tantizon*.

Dicamate* — see Mancozeb; Zineb.

Dicamba — see Banvel*.

Dicap Peanut Seed Protectant* — see DCNA.

Di-Captan*

(Discontinued by American Cyanamid Co.)

Identification

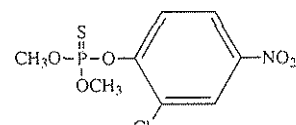
COMMON NAME: Dicapthon (ESA).

EXP. CODE NUMBERS: AC 4124, EI 4124 (American Cyanamid).

OTHER CODE NUMBERS: CAS 2463-84-5; OMS 214 (WHO); ENT 17035.

Chemistry

COMPOSITION: O-(2-Chloro-4-nitrophenyl) O,O-dimethyl phosphorothioate (CAS).



Dicapthon

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

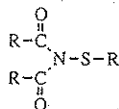
TOXICITY: (Rat): Oral LD₅₀ 400 mg/kg.

Dicaphon — see Di-Captan*.

Dicarbam* Insecticide (carbaryl) — Discontinued by BASF AG.

Dicarboximides (Sulfenimides)

A group of fungicides, including captan, folpet, and captafol, having the following basic chemical structure:



Dicarboximides

The dicarboximides are some of the safest pesticides. They are used as seed treatments and as protectants against mildews, late blight, and other plant diseases.

Dicarzol* — see Carzol*.

Dichlobenil

BP: PBI/Gordon Corp. (Barrier*, Dyclomec*, Norosac*)
Solvay Duphar B.V. (Casoron*)
Uniroyal Chemical Co., Inc. (Casoron*)

Identification

COMMON NAME: Dichlobenil (ANSI, BSI, CSA, ISO, WSSA).

EXP. CODE NUMBERS: H 133 (Philips-Duphar B.V.); NIA 5996 (FMC Corp.).

OTHER CODE NUMBERS: CAS 1194-65-6; SHA 027401.

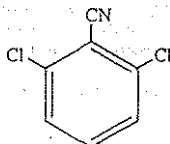
DISCONTINUED NAMES: Decabane*, Prefix D* (Shell Chemical Co. Ltd.); Du-Sprex* (Duphar B.V.).

Chemistry

COMPOSITION: 2,6-dichlorobenzonitrile (IUPAC and CAS).

FAMILY: Benzonitrile.

PROPERTIES: White to yellowish brown crystalline powder. Melting point 139-146°C. Vapor pressure 4 × 10⁻⁶ mbar at 20°C. Stable to heat, acids; hydrolyzed by alkali to the benzamide. Slightly soluble in most organic solvents.



Dichlobenil

Action/Use

ACTION: Herbicide.

USE: Casoron*, Dyclomec*, Norosac* for selective weed control in cranberry bogs, ornamentals, nurseries, fruit orchards, vineyards, public green areas; total weed control (industrial sites, railway lines and under asphalt).

FORMULATIONS: Granules, wettable powder.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 18 mg/l (48 h) (guppy). Bee: Nontoxic. Bird: Slight. LC₅₀ 1500 ppm (pheasant); >5200 ppm (mallard, Japanese quail).

SOLUBILITY: In water 21 mg/l at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >3160 mg/kg. (Mouse, male): Oral LD₅₀ 2126 mg/kg. (Rabbit): Dermal LD₅₀ 1350 mg/kg. Toxic to germinating seeds; absorbed by roots.

PROTECTIVE CLOTHING: Minimum safe handling recommendation for pesticides.

HANDLING AND STORAGE CAUTIONS: Store in a dry place. Do not store with propagative structures such as seeds, bulbs, tubers, nursery stock, etc., or with food or feed products.

Emergency Guidelines

FLASHPOINT: Nonflammable.

Dichlofenthion

Identification

COMMON NAMES: Dichlofenthion (ISO, BSI, ANSI, BAN); ECP (JMAF).

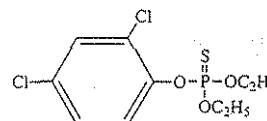
CODE NUMBERS: CAS 97-17-6; SHA 028601; ENT 17470.

ADDITIONAL TRADE NAME: Diclophenthion* (Sintesul S.A.); VC-13 Nemacide*.

DISCONTINUED NAMES: Tri-VC 13* (Atochem Agri BV); Mobilawn* (Mobil Chemical).

Chemistry

COMPOSITION: O-2,4-dichlorophenyl O,O-diethyl phosphorothioate (IUPAC).



Dichlofenthion

Action/Use

ACTION: Nematicide, insecticide.

Environmental Guidelines

HAZARDS: (Formulations) Fish: Toxic. Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 270 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine.

Dichlofenthion — see Dichlofenthion.

Dichlofluandim — see Euparen*.

Dichlofluandide — see Euparen*.

Dichlone

Identification

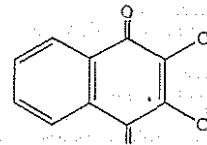
COMMON NAME: Dichlone (ISO, BSI, JMAF).

CODE NUMBERS: CAS 117-80-6; SHA 029601; ENT 3776.

DISCONTINUED NAMES: Phygon* (Uniroyal Chemical Co., Inc.); Quintar* 540F (Hopkins Agricultural Chemical Co.).

Chemistry

COMPOSITION: 2,3-Dichloro-1,4-naphthoquinone (IUPAC).



Dichlone

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1300 mg/kg. (Rabbit): Dermal LD₅₀ 5000 mg/kg.

Dichloralurea

Identification

COMMON NAMES: DCU (WSSA); dichloralurea (ISO-E, BSI); dichloraluréa (ISO-F).

CODE NUMBER: CAS 116-52-9.

DISCONTINUED NAME: Crag 2* (Rhône-Poulenc Ag Co.).

Chemistry

COMPOSITION: 1,3-Bis(2,2,2-trichloro-1-hydroxyethyl)urea.

Action/Use

ACTION: Preemergence herbicide.

USE: Formerly for sugar beets, certain other field, vegetable crops.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 2000 mg/l (96 h) (rainbow trout).

SOIL PARTICLE ADSORPTION: In the intermediate stages of metabolism in soil, plants, monochlorourea and chloral degrade to the major metabolite trichloroacetic acid (TCA). Residues in rape at harvest are <.02 mg DCU/kg and <.04 mg TCA/kg.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 6800 mg/kg.

Emergency Guidelines

FIRST AID: Do NOT use castor oil as a purgative.

Dichloraluréa — see Dichloralurea.

Dichlorfenidim — see Diuron.

Dichlorfluandim — see Euparen*.

Dichlormate — see Rowmate*.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Dichlorobenzenes — see Ortho-Dichlorobenzene; Para-Dichlorobenzene.

Dichlorodinitromethane — see GASPA.

Dichloroethane — see Ethylene Dichloride.

Dichloroethyl Ether

(Discontinued by Union Carbide, Intermediates)

Identification

COMMON NAME: Dichloroethyl ether (ESA).

CODE NUMBER: CAS 111-44-4.

ADDITIONAL TRADE NAME: Chlorex*.

Chemistry

COMPOSITION: 2,2'-Dichloroethyl ether.

Action/Use

ACTION: Corn earworm oil; soil fumigant.

Dichloronitroethane — see Ethide*.

Dichlorophen

Identification

COMMON NAMES: Dichlorophen (BSI, ISO-E), antiphen, dichlorophène (ISO-F).

CODE NUMBER: CAS 97-23-4.

Chemistry

COMPOSITION: Bis(5-chloro-2-hydroxyphenyl)methane.

Action/Use

ACTION: Fungicide, bactericide.

USE: Protects horticultural benches, other materials from molds.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Guinea Pig): Oral LD₅₀ 1250 mg/kg.

Dichlorophène — see Dichlorophen.

Dichlorophenoxyacetic Acid — see 2,4-D.

1,2-Dichloropropane — see Propylene Dichloride.

Dichloro-1,2,propane — see Propylene Dichloride.

Dichloropropene

BP: American Cyanamid Co. (D-D 92*)

DowElanco (Telone*, Telone II*, Condor*)

Identification

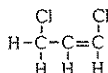
COMMON NAME: Dichloropropene (ISO-E, BSI).

CODE NUMBERS: CAS 542-75-6; SHA 029001.

Chemistry

COMPOSITION: 1,3-Dichloropropene.

PROPERTIES: Colorless-to-straw-colored liquid. Specific gravity (H₂O):1)=1.214 (20°C). Boiling point 229°F, 104-114°C. Vapor pressure (20°C): 3.7 Pa. D-D 92* soluble in hydrocarbon, halogenated solvents, esters, ketones.



1,3-Dichloropropene

Action/Use

ACTION: Nematicide, soil fumigant.

USE: Preplant for nematode, disease, insect control on a variety of crops. See label for variances on dosage rates, waiting periods, etc.

FORMULATIONS: Tech.

COMBINATION: Telone* C-17 (+ chloropicrin).

Registration Notes

U.S.: Telone* II is RUP.

OUTSIDE U.S.: D-D 92*, Telone II*, Condor*.

Environmental Guidelines

SOLUBILITY: In water 0.15%. D-D 92* very soluble in water.

Safety Guidelines

SIGNAL WORD: WARNING (Telone* II).

TOXICITY CLASS: II (Telone* II).

TOXICITY: D-D 92 (Rat): Oral LD₅₀ 127 mg/kg; Dermal LD₅₀ 423 mg/kg. Severely irritating to skin, eyes and upper respiratory tract.

Telone* II (Rat): Oral LD₅₀ 224 mg/kg (female); 300 mg/kg (male). Inhalation LC₅₀ 904 (female); 855-1035 (male). (Rabbit): Dermal LD₅₀ 333 mg/kg.

PROTECTIVE CLOTHING: One-piece long-sleeve, long pant coveralls, liquid proof hat, gloves, boots, and goggles or face shield. Wash all clothing, aerate shoes, before reuse; dispose of properly if contaminated. Product rapidly penetrates leather, and rubber boots should be worn. Whenever exposed to the atmosphere or when it is suspected that vapor is present in the atmosphere, approved respiratory protection must be used; also by tractor drivers, field applicators during calibration, filling operations and during small spills, repairs, transfers, sampling or when working in poorly ventilated areas. Not required when chisels are down and the equipment is sealing chisel channels.

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin contact. Wash well before eating, drinking, smoking, and after work. Do not contaminate food, feedstuffs, drugs, domestic water, seeds, plants, fertilizers, or other pesticide chemicals. Do not ship or store with food, feeds, drugs, or clothing. Avoid heat, open flame; do not flame-cut or weld containers. Do not handle or store in containers made of aluminum, magnesium, or alloys of these metals. Store in tightly-closed original container in cool, well aired, secure area away from dwellings, or foodstuffs. Outside, store drums on sides to avoid accumulation of rain water in recessed areas. Triple rinse containers and dispose of rinsate in field just treated. After aeration dispose of containers by state or local approved procedures. Do not pollute surface or underground water supplies.

Emergency Guidelines

FLASHPOINT: Telone* II 92°F; 25°C (TCC). Flammable. DD-92*: 25°C.

FIRE EXTINGUISHING MEDIA: Water fog, foam, alcohol foam, CO₂, dry chemical.

ANTIDOTE: Unknown.

FIRST AID: Get immediate medical aid. **Eyes**, flush immediately with water at least 15 minutes. **Skin**, wash thoroughly with soap, water. **Inhalation**, remove to fresh air. Keep patient lying down and warm. Give artificial respiration if breathing has stopped.

Dichloropropionate — see Hico DCPAS*.

Dichloropropionic Acid — see Dalapon.

Dichloroprop

BP: BASF AG (U46* DP-Fluid)

CFPI (Corasil*)

A.H. Marks & Co., Ltd. (Optica* DP)

Nufarm U.K. Ltd.

Rhone-Poulenc Ag Co. (Weedone* 2,4-DP)

Universal Crop Protection Ltd. (Polymone*)

Identification

COMMON NAMES: Dichloroprop (BSI, ISO, WSSA), 2,4-DP (USSR).

EXP. CODE NUMBER: RD 406 (Boots Co.).

OTHER CODE NUMBERS: CAS 120-36-5; SHA 031401; EINECS 204-390-5.

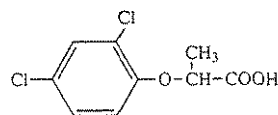
ADDITIONAL TRADE NAMES: Lentemul* (Agrolinz, Austria); Kildip* (Seritox* 50, (Rhone-Poulenc Ag Co.).

DISCONTINUED NAMES: Cornoxynil*, Mayclene*, Visko-Rhar* (+2,4-D) (Agrolinz, Inc.); Basagran* Ultra (+ bentazone + ioxynil); Graminon-Plus* and Herbatox* (+ isoproturon), Ultima* Plus (+ bentazone + MCPA), Vega* (+ bentazone + cyanazine) (BASF AG); Hedonal* (+ 2,4-D), Tribunil-Combi* (+ methabenzthiazuron) (Bayer AG); Tetroxone* M (+ bromoxynil + ioxynil + MCPA) (ICI Agrochemicals); Desormone* (+ 2,4-D) (Rhone-Poulenc Ag Co.); Cornox RK*, Polyclene* (Schering AG).

Chemistry

COMPOSITION: (RS)-2-(2,4-dichlorophenoxy)propionic acid.

PROPERTIES: Tech solid, yellowish-to-colorless, melting point 117.5-118.1°C. Vapor pressure < 1 × 10⁻⁶ mbar. Solubility at room temperature in xylene 4.9%; toluene 6.2%; ethanol 153%; heptane 0.5% w/v.



Dichloroprop

Action/Use

ACTION: Systemic hormone-type herbicide.

USE: Brush control on rangeland, rights-of-way, aquatic weeds. More selective than 2,4-D. Control of *Polygonum* spp., *Galium aparine* (cleavers), *Stellaria* (chickweed) and others, in cereals, pastures, turf, alone or mixed with other hormone type phenoxy herbicides (e.g. MCPA).

FORMULATIONS: Invert emulsion of butoxyethanol, dichloroprop, aqueous solution (potassium or amine salt), isooctyl and butyl esters, soluble concentrates (600-720 g/l).

COMBINATIONS: Basagran* DP (+ bentazone), Triagran* (+ bentazone + MCPA), U 46* Super (+ MCPA + mecoprop), U 46* DP-M-Fluid (+ MCPA) (BASF AG); Superselectyl* (+ MCPA + MCPP) (Chimac-Agriphar S.A.); Actril* 3 (+ ioxynil + MCPA), Actril* S (+ bromoxynil + ioxynil + MCPA), Envert* 171 and Weedone* 170 (+ 2,4-D) (Rhone-Poulenc Ag Co.); Brush Killer 2D + 2DP (+ 2,4-D), Dissolve* (+ 2,4-D + MCPP), Triamine* and Tri-Ester* (+ 2,4-D + MCPP), Triamine* II and Tri-Ester* II (+ MCPA + MCPP) (Riverdale Chemical); Banlene Solo* (+ ioxynil + dicamba) (Schering AG).

Registration Notes

OUTSIDE U.S.: Lentemul* (Agrolinz, Austria).

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Environmental Guidelines

HAZARDS: Dimethylamine salt: Fish: LC₅₀ 165 mg/l (48 h) (bluegill); Isooctyl ester: 16 mg/l; Butoxyethanol ester: 1.1 mg/l (bluegill); 100-220 mg/l (96 h) (trout). Bird: LD₅₀ >250 <500 mg/kg body weight. Bee: Nontoxic.

SOLUBILITY: At room temperature in water 825 ppm.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech: Oral LD₅₀ 875-1470 mg/kg; Dermal LD₅₀ >4000 mg/kg. HANDLING AND STORAGE CAUTIONS: Harmful if swallowed. Avoid contact with eyes, skin, and mucous membranes of the respiratory tract. Avoid long-term exposure to small amounts. Avoid spray drift to susceptible broadleaf plants that are desirable. If stored below freezing, may be necessary to warm to 40°F and agitate before using.

PROTECTIVE CLOTHING: Goggles, long-sleeved shirt, and pants.

SPILL CONTROL/CLEANUP: Liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: 70-80°C (ester).

FIRST AID: Get medical aid. Eyes, flush with plenty of water. Absorption therapy, promotion of diuresis, liver protection therapy, heart and circulation control. Ingestion, do NOT induce vomiting unless advised by a physician.

Dichlorprop-P

BP: BASF AG (Duplosan® DP)

Identification

COMMON NAME: Dichlorprop-P (BSI, ISO, WSSA).

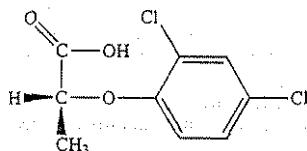
CODE NUMBERS: CAS 15165-67-0; SHA 031463.

DISCONTINUED NAMES: Vega Plus* (+ bentazone + ioxynil) (BASF AG).

Chemistry

COMPOSITION: (+)-(R)-2-(2,4-dichlorophenoxy)propionic acid.

PROPERTIES: Tech: beige solid, melting point 117-118°C. Bulk density ca. 600-700 g/l. Solubility: Tech in ether ca. 70 g/100 g; acetone >100 g/100 g; ethanol >100 g/100 g.



Dichlorprop-P

Action/Use

ACTION: Systemic hormone-type herbicide.

USE: Postemergence control of *Polygonum* spp., *Galium aparine* (cleavers), chickweed, among others, in cereals, pastures, alone or mixed with other hormone type phenoxy herbicides. Optical active isomer needs approximately half the application rate as conventional material.

FORMULATIONS: Aqueous solution (600 g/l).

COMBINATIONS: Basagran® DP-P (+ bentazone), Basagran® Ultra-P (+ bentazone + ioxynil), Duplosan® DP/D (+ 2,4-D), Duplosan® DP-M (+ MCPA), Duplosan® Super (+ mecoprop-P + MCPA), Estrad® Duplo (+ fluoroglycofen-ethyl), Trenox® (+ bentazone + fluoroglycofen-ethyl) (all BASF AG).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >100 mg/l (96 h) (trout). Bee: Nontoxic. Bird: LD₅₀ 250-500 mg/kg (quail).

SOLUBILITY: Tech in water 600 mg/l.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ >825 < 1470 mg/kg. Dermal >4000 mg/kg.

PROTECTIVE CLOTHING: Goggles, long-sleeved shirt and pants.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes, skin, and clothing. Do not eat, drink while handling. Keep out of the reach of children.

SPILL CONTROL/CLEANUP: Liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage

should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. Eyes, flush with plenty of water. Absorption therapy, promotion of diuresis, liver protection therapy, heart and circulation control. Ingestion, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC).

Dichlorure d'Éthylène — see Ethylene Dichloride.

Dichlorvos — see DDVP.

Dichlozoline — see Sclex*.

Diclobutrazol — see Vigil*.

Diclofop-Methyl — see Hoelon® 3EC.

Dicomezine — see Monguard*.

Diclofenthion* — see Dichlofenthion.

Dicloran — see DCNA.

Diclotron® Herbicide (dichlobenil + fluometuron) — Discontinued by Midox Ltd. U.K.

Dicofol

BP: Hindustan Insecticides Ltd. (Hilfol®)
Makhteshim-Agan (Acarin®, Mitigan®)
Rohm and Haas Co. (Kelthane®)

Identification

COMMON NAMES: Dicofol (BSI, ESA, ISO); kelthane (JMAF).

EXP. CODE NUMBERS: FW-293 (Rohm and Haas Co.).

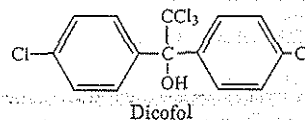
CODE NUMBERS: CAS 115-32-2; SHA 010501; ENT 23648.

ADDITIONAL TRADE NAMES: Dicomite* (All India Medical Corp.); Cekudifol* (Cequisa); Spincid* (Chimac-Agriphar S.A.); Difol* (Sulphur Mills Ltd.).

Chemistry

COMPOSITION: 2,2,2-trichloro-1,1-bis(4-chlorophenyl)ethanol (IUPAC) or 4,4'-dichloro-α-(trichloromethyl)benzhydrol (CAS 8CI).

PROPERTIES: Amber emulsion (41.1%). Specific gravity at 20°C, 1.130. At 20°C wt./gal. 9.4.



Dicofol

Action/Use

ACTION: Acaricide.

USE: Many fruit, vegetable, ornamental, field crops for various mite species.

FORMULATIONS: Emulsifiable concentrate and wettable powder.

COMBINATION: Vapcothion* (+ tetradifon) (VAPCO).

Registration Notes

OUTSIDE U.S.: Hilfol® 18.5 EC for cotton, citrus, apples, pears, peaches, plum, apricots, figs, cherries, mango, jute, ornamentals, roses, grapes, and tea. May be added to regular sprays used for insect, disease control.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: WARNING, CAUTION (Varies with formulation).

TOXICITY CLASS: II, III (Varies with formulation).

TOXICITY: (Rat): Oral LD₅₀ 570-595 mg/kg; Dermal LD₅₀ >5000 mg/kg.

(Mouse): Oral LD₅₀ 669-675 mg/kg. (Rabbit) Dermal LD₅₀ 2000-5000.

PROTECTIVE CLOTHING: Gloves for mixing, loading, or applying.

HANDLING AND STORAGE CAUTIONS: Avoid skin contact, inhalation of mist. Wash thoroughly after use. Harmful if swallowed. Store above 40°F, away from feed, foodstuffs, or any body of water.

Emergency Guidelines

FLASHPOINT: 193°C; 379°F (open cup).

FIRST AID: Get immediate medical aid. Eyes, flush with plenty of water for at least 15 minutes. Skin, wash with soap and water. Inhalation, remove to fresh air. Apply respiration if breathing is irregular or stopped. Ingestion, if no other treatment available, induce vomiting by giving victim 1-2 glasses of water and inserting finger in back of throat. Repeat until vomit fluid is clear. Do NOT induce vomiting or give anything by mouth to an unconscious person.

Dicomite* — see Dicofol.

Diconal® Herbicide (phenisopham) — Discontinued 1986 by NOR-AM Chemical.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Dicontal* — see Fenitrothion; Trichlorfon.

Dicotox* Herbicide (2,4-D) — Discontinued by Union Carbide Australia.

Dicoumarin* — see Dicumarol*.

Dicron* — see Dicrotophos.

Dicrotophos

BP: Amvac Chemical Corp. (Bidrin*)
Ciba, Ltd. (Carbicon*, Ektafos*)
Hui Kwang Chemical Co., Ltd. (Dicron*)

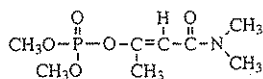
Identification

COMMON NAME: Dicrotophos (BSI, ISO, ESA).
EXP. CODE NUMBERS: SD 3562 (Shell Chemical Co.); C709 (Ciba-Geigy Ltd.).
OTHER CODE NUMBERS: CAS 141-66-2; OMS 253 (WHO); ENT 24482; EINECS 205-494-3.

Chemistry

COMPOSITION: (E)-2-Dimethylcarbamoyl-1-methylvinyl dimethyl phosphate.

PROPERTIES: Specific gravity 1.2 at 60/60°F. Miscible in acetone, alcohol, isobutanol, hexylene glycol, xylene. Very slightly soluble in kerosene, diesel fuel.



Dicrotophos

Action/Use

ACTION: Contact, systemic insecticide.
USE: For cotton pests, coffee borer. Enters plant tissue rapidly to enable many beneficial insects to survive.
FORMULATIONS: Water soluble concentrate (240 g/l, 1000 g/l), ULV spray.

Registration Notes

U.S.: Bidrin*: Some or all applications may be RUP. Carbicon* (500, 1000 SCW, 250 ULV) for agronomic waterless spraying.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >1000 mg/l (24 h) (harlequin). Bee: Toxic.

SOLUBILITY: Miscible in water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 17-22 mg/kg. (Rabbit): Dermal 224 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes, skin, mouth, clothing. Do not breathe vapors. Do not use or store in or around home. Avoid food, feed products. Keep away from heat and open flame.

Emergency Guidelines

FLASHPOINT: >200°F (TCC).

ANTIDOTE: Atropine for Bidrin. 2-PAM also antidotal; may be used in conjunction with atropine. Morphine is contraindicated. See label.

EMERGENCY TELEPHONE: Medical: 800-228-5635 Ext. 169 (Hazard Information Services); Transportation: 800-424-9300 (CHEMTREC).

Dicryl

(Discontinued 1973 by FMC Corp.)

Identification

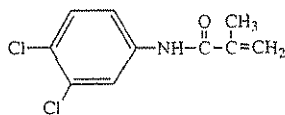
COMMON NAMES: Dicryl (WSSA); chloranocryl (BSI, ISO).

EXP. CODE NUMBERS: DCMA, NIA 4556 (FMC).

OTHER CODE NUMBERS: CAS 2164-09-2; SHA 032601.

Chemistry

COMPOSITION: 3',4'-dichloro-2-methylacrylanilide.



Dicryl

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3160 mg/kg.

Dictran* — see Dimension*.

Dicumarol*

Identification

OTHER NAMES: Dicoumarin*, Melitoxin*.

Action/Use

ACTION: Rodenticide.

USE: Superseded by warfarin.

Dicuran* — see Chlorotoluron.

Dicusat E* — see Warfarin.

Dicusat M* — see Chlorophacinone.

Didigam* Insecticide (DDT + lindane) — Discontinued by ICI Agrochemicals.

Didigam* S Insecticide (carbaryl + lindane) — Discontinued by SOPRA, France.

Didimac* Insecticide (DDT) — Discontinued by ICI Agrochemicals.

Didivane 50EC* — see DDVP.

Dielathion* Insecticide (malathion) — Discontinued 1993 by Rhone-Poulenc Ag Co.

Dieldrex* Insecticide (dieldrin) — Discontinued 1991 by Shell Chemical Co. Ltd.

Dieldrin

Identification

COMMON NAMES: Dieldrin (ISO-E, BSI, ESA, JMAF, BAN for material containing >85% HEOD); HEOD (Canada); dieldrine (ISO-F for material containing >85% HEOD).

CODE NUMBERS: CAS 60-57-1; SHA 045001; OMS 18 (WHO); ENT 16225; EINECS 200-484-5.

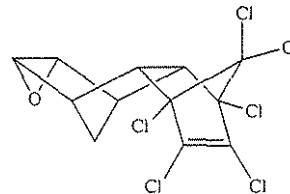
ADDITIONAL TRADE NAME: Panoram D-31*.

DISCONTINUED NAMES: Alvit*, Dieldrex*, Dieldrite* (Shell Chemical Co. Ltd.); Octalox* (Velsicol Chemical Corp.).

Chemistry

COMPOSITION: (1R,4S,4aS,5R,6R,7S,8S,8aR)-1,2,3,4,10,10-hexachloro-1,4,4a,5,6,7,8,8a-octahydro-6,7-epoxy-1,4:5,8-dimethanonaphthalene (principal: HEOD), not over 15% related compounds.

PROPERTIES: Soluble in aromatic solvents; moderately in acetone.



Principal constituent of Dieldrin

Action/Use

ACTION: Insecticide.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.037 mg/l (goldfish); 0.008 mg/l (bluegill). Bee: Toxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 37-87 mg/kg. Dermal 60-90 mg/kg.

Emergency Guidelines

ANTIDOTE: Serious intoxication can lead to convulsions which should be treated with Diazepam and Phenobarbitone.

Dieldrite* Insecticide (dieldrin) — Discontinued 1991 by Shell Chemical Co. Ltd.

Dienochlor

BP: Sandoz Agro, Inc. (Pentac*, Pentac* Aquaflo)

Identification

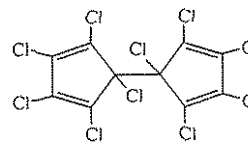
COMMON NAMES: Dienochlor (ISO-E, BSI); diénochloré (ISO-F).

CODE NUMBERS: CAS 2227-17-0; SHA 027501; ENT 25718.

Chemistry

COMPOSITION: Bis(pentachloro-2,4-cyclopentadien-1-yl) or deca-chlorobis(2,4-cyclopentadien-1-yl).

PROPERTIES: Tan crystalline solid. Melting point 122-123°C. Decomposes at 250°C. Very low phytotoxicity of formulations. Solubility slight in hot alcohol, aliphatic hydrocarbons, acetone. Moderate in aromatic hydrocarbons.



Dienochlor

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Miticide.

USE: For most plant damaging mites on ornamentals. Pentac® Aqua-flow for non-food use on indoor ornamental crops, interior plantings. Pentac® WP for non-food use only on indoor floral crops.

FORMULATIONS: Flowable, wettable powder.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING (eye).

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 3160 mg/kg. (Rabbit): Dermal LD₅₀ >3160 mg/kg. Slight eye irritation. Not a human skin primary irritant nor sensitizer.

HANDLING AND STORAGE CAUTIONS: Avoid eye contact, inhalation of spray mist. Wash thoroughly after handling. Store in original container in a dry place separate from reducing agents. Products stable for minimum of 2 years with normal storage. Do not reuse empty package. Triple rinse and empty flushings into spray tank. Dispose of empty package in accordance with local, state, or Federal regulations. Do not contaminate food, feed, ponds, lakes, waterways including sewers and domestic water supplies.

Emergency GuidelinesFIRST AID: Get medical aid. Symptomatic treatment. **Eyes**, immediately flush with a directed stream of water for at least 15 minutes. **Skin**, wash with soap and water. **Inhalation**, remove to fresh air.

Diethyl-Ethyl — see Antor*.

Diethofencarb

BP: Sumitomo Chemical Co., Ltd.

Identification

COMMON NAMES: Diethofencarb (ISO-E, BSI); diétofencarb (ISO-F).

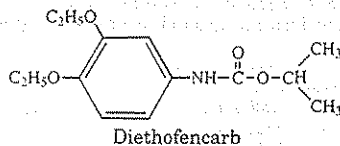
EXP CODE NUMBERS: S-32165*, S-1605*.

CODE NUMBER: CAS 87130-20-9.

Chemistry

COMPOSITION: Isopropyl 3,4-diethoxyphenyl carbamate (IUPAC).

PROPERTIES: Solid, melting point 100.3°C. Soluble in most organic solvents.

**Action/Use**

ACTION: Fungicide.

USE: For benzimidazole-resistant strains of various fungi. Strong activity against strains of *Botrytis cinerea*.

COMBINATIONS: Sumico* (+ carbendazim); Sumiblend* (+ procymidone); Getter* (+ thiophanate-methyl).

Environmental Guidelines

SOLUBILITY: In water 26.6 ppm at 25°C.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. Dermal >5000 mg/kg.

PROTECTIVE CLOTHING: Gloves, goggles or face shield.

HANDLING AND STORAGE CAUTIONS: Avoid contact with mouth, eyes, skin. Store in original container away from food, animal feed.

Diethion — see Ethion.

Di-Farmon*

(Discontinued 1979 by Farm Protection Ltd.)

Action/Use

ACTION: Broad spectrum herbicide.

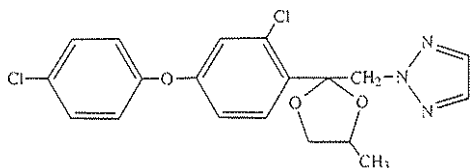
Difenaconum — see Ratak*.

Difenoconazole

BP: Ciba, Ltd. (Dividend*, Geyser*, Score*)

Identification

COMMON NAME: Difenoconazole.



EXP. CODE NUMBER: CGA 169374 (Ciba, Ltd.)

OTHER CODE NUMBER: CAS 119446-68-3.

Chemistry

COMPOSITION: 3-chloro-4-[4-methyl-2-(1H-1,2,4-triazol-1-ylmethyl)-1,3-dioxolan-2-yl]phenyl 4-chlorophenyl ether (IUPAC).

Action/Use

ACTION: Systemic fungicide.

USE: For foliar use and seed treatment for cereals. Broad spectrum for Ascomycetes, Basidiomycetes, and Deuteromycetes diseases on wheat, sugar beet, peanuts, oil seed rape, pome fruit, stone fruit, grapes, vegetables, and tropical crops.

FORMULATIONS: Foliar use: WP, EC. Seed treatment: water dispersible powder (WS), foliar concentrate (FS).

COMBINATION: Beret Combi* (+ fenpiclonil), Celeste Combi* and Celeste Extra* (+ fludioxonil) (Ciba, Ltd.).

Registration Notes

OUTSIDE U.S.: Sold in Europe, Japan, and New Zealand. Worldwide in registration and development as foliar fungicide and/or cereal seed treatment.

Environmental GuidelinesHAZARDS: Fish: Toxic. *Daphnia*: Toxic. Birds: Practically nontoxic.

Honey Bees: Practically nontoxic. Earthworms: Practically nontoxic.

SOIL PARTICLE ADSORPTION: Low soil mobility by strong adsorption to soil particles.

Safety Guidelines

TOXICITY CLASS: III (WHO) (slight acute toxicity).

TOXICITY: Tech. (Rat): Oral LD₅₀ 1453 mg/kg; dermal LD₅₀ 2010 mg/kg. (Rabbit): Nonirritant to eyes, skin.

PROTECTIVE CLOTHING: Goggles, long-sleeved shirt and pants, boots. Rubber gloves for undiluted formulation Score*.

HANDLING AND STORAGE CAUTIONS: Avoid skin contact and vapor inhalation.

Emergency Guidelines

FLASHPOINT: >63°C (Score* EC).

FIRST AID: Get medical attention. **Eyes**, wash with plenty of water. **Skin**, wash with water and remove contaminated clothing. **Ingestion**, administer medicinal charcoal in large quantity of water. Treat symptomatically.

Difenoxuron — see Lironion*.

Difenson — see Ovex*.

Difenzoquat Methyl Sulfate — see Avenge*.

Diflubenzuron

BP: Hoechst-Roussel Agri-Vet Co. (Vigilante*)

Solvay Duphar B.V. (Dimilin*)

Mirooyal Chemical Co., Inc. (Dimilin*, Micromite*)

Identification

COMMON NAME: Diflubenzuron (ISO, ANSI, BSI, ESA).

EXP. CODE NUMBERS: DU 112307 (Philips-Duphar B.V.), PDD 6040-I, PH 60-40, TH 6040.

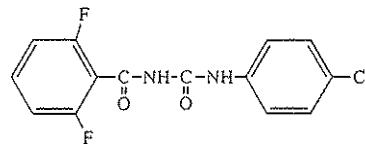
OTHER CODE NUMBERS: CAS 35367-38-5; SHA 108201; OMS 1804 (WHO); ENT-29054.

Chemistry

COMPOSITION: 1-(4-chlorophenyl)-3-(2,6-difluorobenzoyl)urea (IUPAC).

FAMILY: Substituted benzoylurea.

PROPERTIES: White crystalline solid. Tech melting point 210-230°C. Almost insoluble in apolar solvents. Moderate to good in most polar-to-very polar solvents.

**Action/Use**

ACTION: Insecticide, larvicide, oviicide, insect growth regulator acting by interference with deposition of insect chitin.

USE: For wide range of leaf feeding, certain other insects in forestry, woody ornamentals, and fruit. Certain major pests of cotton, soybeans, citrus, vegetables, and ornamentals. Vigilante* to control the breeding of flies in cattle manure.

FORMULATIONS: Granular, oil dispersible concentrate, suspension concentrate, wettable powder, flowable.

Registration Notes

U.S.: Some or all applications may be RUP. No commercial registered combinations with other pesticides

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

OUTSIDE U.S.: Wide variety of uses in Europe and elsewhere.

Environmental Guidelines

HAZARDS: Fish: LC_{50} 140 mg/l (96 h) (rainbow trout); 135 mg/l (bluegill). Bee: Nontoxic. Bird: Dietary: LC_{50} >4640 ppm (8 days) (mallard duck). SOIL PARTICLE ADSORPTION: In soil, rapidly degraded by a microbiological process. Half life in soil of WP (avg. particle sizes 2-3 micron) is 3-4 days.

SOLUBILITY: Almost insoluble in water (approx. 0.1 ppm).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD_{50} >4640 mg/kg. Dermal >10,000 mg/kg. (Rabbit): Non-irritating to skin; slight to eye.

PROTECTIVE CLOTHING: Minimum pesticide safe handling recommendations.

HANDLING AND STORAGE CAUTIONS: Store in a dry location.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water spray, dry chemical.

EMERGENCY TELEPHONE: 203-723-3670 (Uniroyal Chemical Co.).

Diflufenican

BP: Rhone-Poulenc Ag Co.

Identification

COMMON NAME: Diflufenican (ISO).

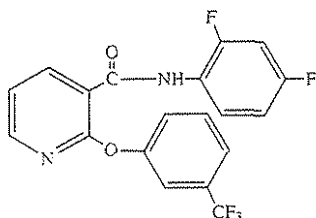
EXP. CODE NUMBER: MB 38544.

CODE NUMBER: CAS 83164-33-4.

Chemistry

COMPOSITION: 2,4-difluoro-2-(α,α,α -trifluoro-m tolyloxy)nicotinamide.

PROPERTIES: White crystalline solid. Melting point 161-162°C. Soluble to 10% in acetone, DMF; 5% in cyclohexanone, acetophenone; to 3.5% in isophorone; to 2% in xylene; to 1% in aromasol H; to < 1% in cyclohexane, ethylcellulosolve, kerosene.



Diflufenican

Action/Use

ACTION: Contact herbicide.

USE: For winter cereals, lupins. Complementary spectrum of activity allows use in mixtures with other herbicides, particularly the substituted ureas and HBN herbicides. Residual, pre and early postemergence control of cleavers, speedwells, pansies, etc.

COMBINATIONS: Cougar*, Javelin*, Panther*, Quartz* (+ isoproturon), Ioniz* VR (+ isoproturon + ioxynil + MCPP) (Rhone-Poulenc Ag Co.); Zodiac* TX (+ isoproturon) (Rhone-Poulenc Agrochimie S.A.); Penikan* (+ isoproturon); Lazeril* (+ ioxynil + CMFP); Modown* DF (+ bifenoxy); Ardent* (+ trifluralin); First* (+ HBN); Tigrex* (+ MCPA).

Registration Notes

OUTSIDE U.S.: Brodal* in Australia. First*, Ioniz*, Lazeril*, Quartz GT*, Zodiac* TX in France. Fenikan* in Germany. Cougar* in Ireland. Javelin*, Panther*, Ardent* in U.K.

Environmental Guidelines

SOLUBILITY: Soluble in water approx. 0.05 ppm.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD_{50} >2000 mg/kg. Dermal >2000 mg/kg.

Difol* — see Dicofol.

Difolatan* Fungicide (captafol) — Discontinued by SOPRA.

Difloran

Chemistry

COMPOSITION: 2,2-Bis(4-fluoroethoxyphenyl)propane.

Action/Use

ACTION: Rodenticide.

Digermin* — see Trifluralin.

Digmar* Insecticide (DDT) — Discontinued 1993 by All India Medical Corp.

Dihydropyrene — see Indalone*.

Dihydrorotenone

Identification

CODE NUMBERS: CAS 6659-45-6; SHA 071001.

Chemistry

PROPERTIES: Produced by hydrogenation of rotenone to resist detoxification by sunlight, avoiding major reduction in insecticidal value.

Action/Use

ACTION: Insecticide.

Dikamin* — see 2,4-D.

Dikar*

(Discontinued in the U.S. by Rohm and Haas Co.)

Chemistry

COMPOSITION: Mancozeb + dinocap.

Action/Use

ACTION: Fungicide-acaricide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD_{50} >5000 mg/kg.

Dikegulac Sodium

BP: PBI/Gordon Corp. (Atrimec*)

Identification

COMMON NAME: Dikegulac sodium.

CODE NUMBER: CAS 62508-35-7.

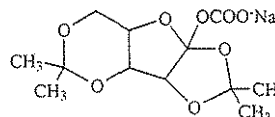
DISCONTINUED NAME: Atrinal* (Ciba-Geigy).

Chemistry

COMPOSITION: Sodium salt of 2,3,4,6-di-O-isopropylidene- α -L-xylo-2-hexalofuranosonic acid (IUPAC).

FAMILY: Sugar derivative.

PROPERTIES: White powder, melting point >300°C. Solubility in alcohol 230 g/l. Insoluble in acetone (< 10 g/l), hexane, etc.



Dikegulac Sodium

Action/Use

ACTION: Systemic plant growth regulator.

USE: Pinching agent on azaleas, many other ornamentals. Growth retardant for shrubs, hedges, and ground covers. Trunk injection for tree growth.

FORMULATIONS: Liquid concentrate.

Environmental Guidelines

HAZARDS: Fish: LC_{50} >5000 ppm (rainbow trout). Bee: Nontoxic.

Bird: LC_{50} >50,000 ppm (mallard).

SOLUBILITY: In water 590 g/l.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD_{50} 31,000 (male); 18,000 mg/kg (female).

(Mouse): Oral LD_{50} 19,500 mg/kg. (Rabbit): Dermal LD_{50} >1000 mg/kg.

PROTECTIVE CLOTHING: Protective gloves.

HANDLING AND STORAGE CAUTIONS: Protect from freezing.

Emergency Guidelines

FLASHPOINT: Nonflammable.

FIRE EXTINGUISHING MEDIA: Water spray, dry chemical, CO₂, foam.

FIRST AID: Eyes, flush with plenty of water. Skin, remove solid clothing, flush areas with plenty of water.

Dikonirt* — see 2,4-D.

Dilan*

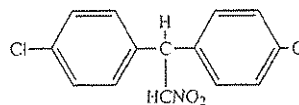
(Discontinued 1975 by Commercial Solvents Corp.)

Identification

CODE NUMBERS: CAS 117-26-0; SHA 056602.

Chemistry

COMPOSITION: Where R is C₂H₅: 1,1-bis(4-chlorophenyl)-2-nitrobutane (Bulan*); where R is CH₃: 1,1-bis(4-chlorophenyl)-2-nitropropane (Prolan*).



R = 2 parts C₂H₅
1 part CH₃

Active Ingredient of Dilan*

Action/Use

ACTION: Insecticide.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 475-600 mg/kg.

Dillic* — see Cacodylic Acid.

Diluent

A material liquid or solid serving to dilute the technical toxicant to field strength for adequate plant coverage, maximum effectiveness and economy. May be used directly with technical toxicant to dilute to field strength sprays or dusts, but usually are blended with wettable powders and dust concentrates previously prepared with carriers. Solid diluents and carriers are considered to be inert although certain attapulgitic, kaolin clays, and diatomites aid in increasing toxic effectiveness, probably due to physical properties which induce starvation (food barrier-digestive clogging); desiccation (aridity-adhesion) and abrasion (increased toxicant penetration to membranes). Dust diluents can be classed according to their low or high bulk density, the weight of the dust occupying a definite volume. Low-bulk types include calcium silicate, diatomaceous earth, Fuller's Earth, hydrated alumina, silica gel. Examples of high-bulk density diluents are calcium carbonate, some clays, pyrophyllite and talc. Mixtures of both are often used to prepare formulations with practical bulk-density values along with resistance to caking during storage at high temperatures. In selecting a solid diluent, many properties should be carefully considered, most important being: compatibility, adhesion, lack of abrasion, particle size and shape, flowability, bulk density, low moisture, uniformity, and effective cost. The most widely used solid diluents are kaolin clays, pyrophyllites and talcs. Attapulgitic and diatomites, local clays, limestone products and other minerals are also used. Botanical flours are occasionally used and ground sulfur serves as a diluent in addition to its pesticidal function in cotton dusts and other toxicants. See Attapulgitic Clay; Carrier; Diatomaceous Earth; Dusts; Fuller's Earth; Kaolin.

Diluex* — see Attapulgitic Clay; Dusts; Fuller's Earth.

Dimanin A

BP: Bayer AG (Bayclean*)

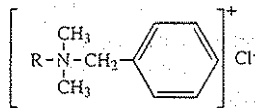
Identification

EXP. CODE NUMBER: AS 61789-71-7 (Bayer AG).

Chemistry

COMPOSITION: Alkyldimethylbenzylammonium chloride.

PROPERTIES: Colorless liquid. Slight characteristic smell.



Active Ingredient of Dimanin A

Action/Use

ACTION: Algicide, bactericide.

USE: Controls algae, bacteria in cooling and air conditioning systems, glasshouses, etc.

FORMULATIONS: Aerosols, emulsifiable concentrates.

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ approx. 290 mg/kg.

PROTECTIVE CLOTHING: Wear suitable protective clothing, gloves and eye/face protection.

HANDLING AND STORAGE CAUTIONS: Store in original container away from children, food, feed. See label.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Sprayed water jet, foam, extinguishing powder, CO₂, sand.

FIRST AID: Eyes, rinse thoroughly with water. Skin, wash immediately with plenty of soap and water. Call doctor immediately.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 3.6 mg/l (12 h) (rainbow trout).

SOLUBILITY: Miscible in water.

Dimate* — see Dimethoate.

Dimate 267* Insecticide (dimethoate) — Discontinued by American Cyanamid.

Dimecron* — see Phosphamidon.

Dimefox

Identification

COMMON NAME: Dimefox (BSI, ISO).

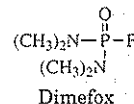
CODE NUMBERS: CAS 115-26-4; SHA 443100.

TRADE NAMES: Hanane*, Terra-Sytam*.

DISCONTINUED NAMES: Pestox XIV* (Fisons Ltd.); Wacker S14/10* (Wacker-Chemie GmbH).

Chemistry

COMPOSITION: Bis(dimethylamino)fluorophosphine oxide.



Dimefox

Action/Use

ACTION: Systemic acaricide-insecticide.

Safety Guidelines

SIGNAL WORD: DANGER. POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 1-2 mg/kg. Dermal 5 mg/kg. Vapor toxicity hazard is high.

Emergency Guidelines

ANTIDOTE: Atropine, toxogonin.

Dimefurion

Identification

CODE NUMBER: CAS 34205-21-5.

Chemistry

COMPOSITION: 2-tert butyl-4-(2-chloro-4-(3,3-dimethylureido) phenyl) 1,3,4-oxadiazolin-5-one.

Action/Use

ACTION: Selective herbicide.

USE: For oilseed rape, protein peas.

COMBINATIONS: Pradone Kombi*, Pradone Plus*, Pradone TS* (+ carbetamide) (Rhône-Poulenc Ag. Co.); Clerdone* (+ clopyralid); Dribble* (+ bentazone).

Registration Notes

U.S.: Not marketed.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1000 mg/kg; (Mouse): 10,000 mg/kg.

Dimehypo — see Hope*.

Dimelone*

Identification

COMMON NAME: Dimethyl carbate.

CODE NUMBERS: CAS 5826-73-3; SHA 021501.

Chemistry

COMPOSITION: Dimethyl cis-bicyclo(2,2,1)-5-heptane-2,3-dicarboxylate.

Action/Use

ACTION: Insect repellent.

Dimension* Turf Herbicide

BP: Rohm and Haas (Dictran*, Dimension*)

Identification

COMMON NAME: Dithiopyr (ISO-E, BSI, ANSI).

CODE NUMBER: CAS 97886-45-8.

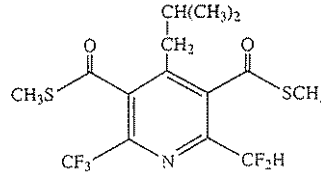
DISCONTINUED TRADE NAMES: Kalcorn* (+ pyrazosulfuron-ethyl); Lazo* (+ bromobutide + pyrazolate); Lyton* (+ bomobutide) (all Monsanto).

Chemistry

FAMILY: Pyridine.

COMPOSITION: S,S'-Dimethyl 2-(difluoromethyl)-4-(2-methylpropyl)-6-(trifluoromethyl)-3,5-pyridinedicarbothioate (CAS).

PROPERTIES: (ai) Pale, yellow, crystalline solid. Faint sulfur-like odor. Vapor pressure (25°C) 4 x 10⁻⁶ mm Hg. Melting point 65° C.



Dithiopyr

Action/Use

ACTION: Herbicide.

USE: For control of annual and small-seeded broadleaf weeds in turf.

Registration Notes

OUTSIDE U.S.: Dictran* in Japan.

Environmental Guidelines

HAZARDS: (ai) Fish: LC₅₀ (96h) 0.7 mg/l (bluegill). Bee: Dermal LD₅₀ 81 µg/bee (honeybee). Bird: Oral LD₅₀ >2250 (bobwhite quail).

SOLUBILITY: (ai) 1.38 ppm in water at 20° C.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 3600 mg/kg. Dermal LD₅₀ >5000 mg/kg.FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, give large quantities of water and do NOT induce vomiting.**Dimephenthoate** — see Phenthoate.**Dimepiperate** — see Yukamate*.**Dimet* Insecticide (dimethoate)** — Discontinued by Zuellig Pte.**Dimetan***

(Discontinued by Ciba-Geigy)

Identification

OTHER NAME: Dimethan.

EXP. CODE NUMBER: G 19258 (Ciba-Geigy Ltd.).

CODE NUMBERS: CAS 122-15-6; ENT 24728.

Chemistry

COMPOSITION: 5,5-dimethyl-3-oxo-1-cyclohexen-1-yl dimethylcarbamate (CAS) or 5,5-dimethyl dihydroresorcinol dimethylcarbamate.

Action/Use

ACTION: Systemic insecticide.

Dimethametryn — see Avirosan*; Bentazone.**Dimethan** — see Dimetan*.**Dimethenamid** — see Atrazine; Frontier*; Guardsman*.**Dimethenthoate** — see Phenthoate.**Dimethipin** — see Harvade*.**Dimethirimol** — see Milcurb*; Systemic Fungicides.**Dimethoat* Tech 95%** — see Dimethoate.**Dimethoate**

BP: All India Medical Corp. (Dimetox*)

American Cyanamid Co. (Roxion*)

BASF AG (Perfekthion*, Rebelate*)

CHEMIE AG Bitterfeld-Wolfen (Bi* 58 EC)

Cheminova Agro A/S (Chemathoate* 96%)

Chimac-Agriphar S.A. (Chimac Dim*, Dimate*, Dimezyl*)

Drexel Chemical Co.

HELM AG

Hubei Sanonda Co., Ltd. (Denere*)

ISAGRO (Rogor*)

Khatau Junker Ltd. (Khatau Digor*)

Krishi Rasayan

Rallis India Ltd. (Rogor*, Tafgor*)

Shimung Corp.

Sumitomo Chemical Co., Ltd.

Sundat (S) Pte. Ltd. (Stinger* 40EC)

Identification

COMMON NAMES: Dimethoate (ANSI, BSI, ESA, ISO, JMAF); fosfamid (USSR).

CODE NUMBERS: CAS 60-51-5; SHA 035001; OMS 111 (WHO); OMS 594 (WHO); ENT 24650; EINECS 200-480-3.

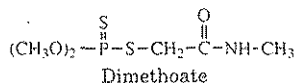
ADDITIONAL TRADE NAMES: Acioate* (Agro Chemicals Industries Ltd.); Trounce* (Agstin Pte. Ltd.); Devigon* (Devidayal (Sales) Pvt. Ltd.); Chimigor 40* (Diachem S.P.A.); Romethoate* (Rotam Group); Cygon* (Wilbur-Ellis Co.); Dimethoat*, Dimethoate*, Dimethogen*, Trimetion*.

DISCONTINUED NAMES: Demos NF* (+ Piretro* + piperonyl butoxide), Rogodan*, Rogodial* (+ phenthoate), Sevigor*, Vantal* (+ DDT) (Agrimont S.p.A.); Dimate 267*, Dimethoate 267*, Fostion MM* (American Cyanamid); Cekuthoate*, Daphene*, Devigon*, Dimet* (F.E. Zuellig Pte.); De-Fend* (TH Agriculture & Nutrition).

Chemistry

COMPOSITION: O,O-dimethyl S-methylcarbamoylmethyl phosphorodithioate.

PROPERTIES: White crystalline solid, mercaptan odor, melting point 45-48°C. Highly soluble in chloroform, methylene chloride, benzene, toluene, alcohols, esters, ketones. Slightly in xylene, carbon tetrachloride, aliphatic hydrocarbons.

**Action/Use**

ACTION: Systemic insecticide-acaricide.

USE: For a wide range of insects, such as aphids, thrips, planthoppers, white flies, mites on ornamental plants, alfalfa, apples, corn, cotton, grapefruit, grapes, lemons, melons, oranges, pears, pecans, safflower, sorghum, soybeans, tangerines, tobacco, tomatoes, watermelons.

wheat, other vegetables. Residual wall spray in farm buildings for houseflies.

FORMULATIONS: Aerosol spray, dust, emulsifiable concentrate, ULV concentrate.

COMBINATIONS: Salut* and Saluthion* (+ chlorpyrifos) (BASF AG); Chlormezyl* (+ chlorpyrifos), Cyperdim* (+ cypermethrin), Demecor* (+ endosulfan) (Chimac-Agriphar S.A.).

Registration Notes

OUTSIDE U.S.: Clifton Dimethoate 40*.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ = 30.2 mg/l (rainbow trout). Bee: LD₅₀ (24h) 0.12 µg/bee (topical).

SOLUBILITY: In water 2.5% at 70°F/21°C.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech: (Rat): Oral LD₅₀ 235 mg/kg. Dermal >400 mg/kg.

PROTECTIVE CLOTHING: Impermeable gloves, boots, body-covering clothing, wide-brimmed hat, and respirator in case of insufficient ventilation. See label.

HANDLING AND STORAGE CAUTIONS: Harmful or fatal if swallowed, inhaled, or absorbed through skin. May cause eye irritation. Avoid eye, skin, clothing contact. Do not breathe dust. Use with adequate ventilation. Repeated careless use may cause cholinesterase inhibition. Wash thoroughly after handling. Biological activity remains practically unvaried for 2 years under environmental conditions, provided stored in unopened, undamaged original containers, in shaded, cool, well-aired places, inaccessible to animals and unauthorized persons. Recommended temperature <25°C/77°F. Crystals may form in formulations stored at <32°F/0°C. Stable for minimum of one year at <25-30°C/77-86°F. Will decompose rapidly when heated to temperatures above 80°C and explosion may be induced. Never heat above 35°C and local heating should be avoided. Stack containers to permit air circulation at bottom and inside of piles. Do not contaminate food, feed products.

SPILL CONTROL/CLEANUP: Liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: Tech 107°C (Pensky-Martens closed tester). Perfekthion* (EC) 44°C.

COMBUSTION PRODUCT: Thermal decomposition (e.g. fire) may produce dimethylsulfide, methyl mercaptane, carbon monoxide, carbon dioxide, phosphorus pentoxide nitrogen oxides.

FIRE EXTINGUISHING MEDIA: Dry chemicals, carbon dioxide for small fires. Water spray or foam for larger fires.

ANTIDOTE: Atropine, Pralidoxime, PAM, 2-PAMCl, 2-PAMM may be adjunct to atropine.

FIRST AID: Get medical aid. Skin, remove contaminated clothing, flush areas with plenty of water. Ingestion, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

See Fitos B/77*, which contains ethyl homolog of dimethoate.

Dimethoate-met — see Folimat*.**Dimethoate 267* Insecticide (dimethoate)** — Discontinued by American Cyanamid.**Dimethogen*** — see Dimethoate.**Dimethomorph**

BP: American Cyanamid Co. (Acrobat*, Forum*)

Identification

COMMON NAMES: Dimethomorph (ISO-E, BSI); diméthomorphe (ISO-F).

EXP. CODE NUMBERS: CME 151, WL 127294 (Shell International Chemical Co. Ltd.).

OTHER CODE NUMBER: 110488-70-5.

Chemistry

COMPOSITION: (E,Z)-4-[3-(4-chlorophenyl)-3-(3,4-dimethoxyphenyl)acryloyl]morpholine (IUPAC).

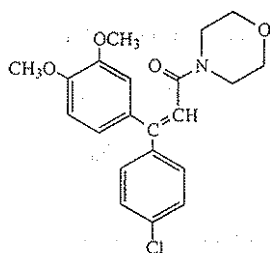
PROPERTIES: Colorless to grey crystalline powder. Melting point: 125°-149°C. Vapor pressure: 9.7 × 10⁻⁷ pascals at 25°C (E isomer). 1.3 × 10⁻⁶ pascals at 25°C (Z isomer). Thermally and hydrolytically stable.**Action/Use**

ACTION: Fungicide.

USE: Active against oomycete fungi, *Plasmopara* on vines and *Phytophthora* on potatoes and tomatoes. No cross resistance to phenylamide-resistant fungi.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

FORMULATIONS: Dispersible concentrate, suspension concentrate and wettable powder.
COMBINATIONS: Acrobat MZ* (+ mancozeb).



Dimethomorph

Registration Notes

U.S.: Not yet registered in U.S.
OUTSIDE U.S.: Marketed as Acrobat* and Forum*.

Environmental Guidelines

HAZARDS: Fish: Low toxicity. Bee: Nontoxic.
SOLUBILITY: Water: 18 mg/l at pH 7 at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3900 mg/kg. Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Fine dust clouds may be explosive mixtures with air. Avoid raising a dust cloud. Avoid contact with skin, eyes, nose and mouth. Wash all exposed skin before eating, drinking, smoking or using the toilet. Store in secure, well ventilated building away from foodstuffs and animal feed. Keep out of reach of children.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry powder, CO₂, foam or water spray.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting.

Dimethrin

(Discontinued by McLaughlin Gormley King)

Identification

COMMON NAMES: Dimethrin (ISO-E, ANSI, BSD); diméthrine (ISO-F).
CODE NUMBERS: CAS 70-38-2; SHA 034101; ENT 21170.

Chemistry

COMPOSITION: 2,4-Dimethylbenzyl(1RS)-cis,trans-2,2-dimethyl-3-(2-methyl prop-1-enyl)cyclopropanecarboxylate (IUPAC).

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ >15 mg/kg.

See Pyrethroids.

Dimethrine — see Dimethrin.

Dimethyl Arsenic Acid — see Cacodylic Acid.

Dimethyl Carbate — see Dimelone*.

Dimethyl Dixanthogen — see Tri-P.E.*.

Dimethyl Phthalate

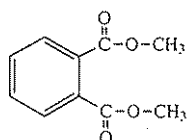
BP: Eastman Chemical Company (Eastman* DMP Plasticizer)

Identification

CODE NUMBERS: CAS 131-11-3; SHA 028002

Chemistry

COMPOSITION: Dimethyl phthalate, DMP.



Dimethyl phthalate

Action/Use

ACTION: Insect repellent.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 8200 mg/kg.

Dimethyl Sulfoxide

BP: Gaylor Chemical Corp.

Identification

CODE NUMBERS: CAS 67-68-5; SHA 000177.

Chemistry

COMPOSITION: Dimethyl sulfoxide (DMSO).

PROPERTIES: Miscible with most organic solvents except straight chain (paraffinic) hydrocarbons.

Action/Use

ACTION: Reacts with strong oxidizing agents, acid chlorides, acid anhydrides.

FORMULATIONS: Liquid.

Registration Notes

U.S.: An exemption has been established by the EPA from the requirements of tolerance for DMSO when used as an inert solvent with pesticides O,O'-diethyl O-(2 isopropyl-6-methyl-4-pyrimidinyl)phosphorothioate or carbaryl (1-naphthyl methylcarbamate) in or on raw agricultural commodities, peas without pods, pea vines or dried vines as hay and whole pea crop as forage.

Environmental Guide

SOLUBILITY: Miscible with water.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 18,000 mg/kg.

PROTECTIVE CLOTHING: Rubber gloves, goggles.

HANDLING AND STORAGE CAUTIONS: Avoid skin contact, inhalation, ingestion. Store away from oxidizing agents, heat and ignition sources.

Emergency Guidelines

FLASHPOINT: 192°F (closed cup).

FIRE EXTINGUISHING MEDIA: Water, foam, dry chemical, CO₂.

FIRST AID: Get immediate medical aid. Eyes, flush thoroughly with running water, including under eyelids, for at least 15 minutes. Skin, remove contaminated clothing, wash skin. Inhalation, remove to fresh air. If breathing has stopped, provide artificial respiration. Keep warm. Ingestion, do NOT induce vomiting.

EMERGENCY TELEPHONE: 504-732-8663 (Gaylor); 800-424-9300

CHEMTREC.

Dimethyl T* — see Dacthal*.

Dimethyl Xanthic Disulfide — see Tri-P.E.*.

Dimethylamine Salt of Dicamba — see Banvel*.

Dimethylformamide

Identification

CODE NUMBERS: CAS 68-12-2; SHA 366200.

Action/Use

ACTION: Solvent, co-solvent.

USE: Only as preemergence application prior to formation of edible parts of food plants; seed, transplant treatment. Also part of the USDA witchweed quarantine program, postemergent in field corn, after silking, tasseling.

Dimetox* — see Dimethoate.

Dimexan — see Tri-P.E.*.

Dimexano — see Tri-P.E.*.

Dimezyl* — see Dimethoate.

Dimilin* — see Diflubenzuron.

Dimite* — see Qikron*.

Dinate* (DSMA) — Discontinued 1986 by Cumberland International Corp.

Dinex — see DN-111*.

Diniconazole

BP: Hubei Sanonda Co., Ltd.

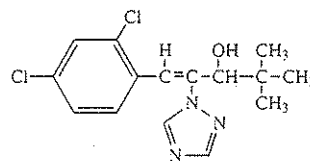
Sumitomo Chem. Co., Ltd. (Spotless*, Sumi-8*, Sumi-Eight*)

Identification

COMMON NAME: Diniconazole (ISO draft, ANSI, BSD).

EXP. CODE NUMBERS: S-3308L, XE-779L.

CODE NUMBER: CAS 83657-18-5.



Diniconazole

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: (E)-(RS)-1-(2,4-dichlorophenyl)-4,4-dimethyl-2-(1H-1,2,4-triazol-1-yl)-pent-1-en-3-ol (IUPAC).

PROPERTIES: Off-white crystalline solid. Melting point 134-156°C. Good stability. Soluble in xylene, acetone, methanol, chloroform; less in xylene, hexane.

Action/Use

ACTION: Systemic fungicide.

USE: Grape, fruit crops, peanuts, wheat, bananas, coffee, barley, wheat (seed/fohar), vegetables and ornamentals for control of powdery mildew, scab, leaf spot, smuts, bunts, rust, etc.

FORMULATIONS: Emulsifiable concentrate, water dispersible granule (WDG), wettable powder.

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

SOLUBILITY: Very slightly in water.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 639 mg/kg (male); 474 mg/kg (female). Dermal >5000 mg/kg.

PROTECTIVE CLOTHING: Protective gloves, long sleeve shirt when handling. Launder before reuse. Wear a dust mask while mixing or loading.

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin, mouth contact. Store in original containers away from foodstuffs, animal feed.

Emergency Guidelines

FIRST AID: **Eyes**, flush immediately with fresh water for at least 15 minutes while holding eyes open. **Skin**, thoroughly wash with soap and water. **Ingestion**, give water or milk to drink. Get medical aid before inducing vomiting.

Dinitramine

BP: Wacker-Chemie GmbH (Cobex*)

Identification

COMMON NAME: Dinitramine (BSI, ISO, ANSI, WSSA).

EXP. CODE NUMBER: USB-3584.

OTHER CODE NUMBER: CAS 29091-05-2; EINECS 2494192.

DISCONTINUED NAME: Cobexo* (U.S.B. Chemical Corp.).

Chemistry

COMPOSITION: N,N'-Diethyl- α,α,α -trifluoro-3,5-dinitrotoluene-2,4-diamine (CAS 8CI).

PROPERTIES: Yellow crystalline powder. Boiling point >200°C. Vapor pressure at 25°C, 479. Melting point 98-99°C. Solubility: In g/100g solvent at 25°C: in ethanol 14; acetone 132; dimethylformamide 151.

Action/Use

ACTION: Selective preemergence herbicide.

USE: For many annual grasses, broadleaf weeds in cotton, groundnuts, soybeans, sunflowers.

FORMULATIONS: Emulsifiable concentrate.

COMBINATIONS: With common herbicides.

Registration Notes

U.S.: Not registered.

Environmental Guidelines

SOLUBILITY: In g/100g solvent at 25°C: in water 0.001.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: A.I. (Rat): Oral LD₅₀ 3000 mg/kg; (Rabbit): Dermal LD₅₀ 6800 mg/kg.

Cobex*: (Rat): Oral LD₅₀ 3700 mg/kg; (Rabbit): Dermal LD₅₀ 2000 mg/kg.

PROTECTIVE CLOTHING: Gloves, goggles.

HANDLING AND STORAGE CAUTIONS: Mildly irritating to eyes provided eyes washed out immediately; mild irritation to skin. Store at 5-30°C. Keep out of the reach of children and away from food, feedstuffs.

Emergency Guidelines

FLASHPOINT: Form. 32°C (Abel-Pensky closed cup).

Dinitro* Herbicide (dinoseb) — Discontinued by Cedar Chemical Corp.

Dinitro Compounds

Includes various dinitro derivatives of cresol and phenol used as insecticides and herbicides. Because as herbicides they are not translocated, sufficient amounts must be applied to thoroughly wet the plants for contact action.

See DN-111*, DNAP, dinoseb, DNOC.

Dinitrobutylphenol — see dinoseb.

Dinitrocresol — see DNOC.

Dinitrocyclohexylphenol — see DN-111*.

Dinitro-o-sec-amyphenol — see DNAP.

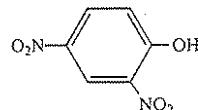
Dinitrophenol**Identification**

CODE NUMBERS: CAS 61614-62-8; SHA 392200.

ADDITIONAL TRADE NAME: Chemox* PE.

Chemistry

COMPOSITION: 2,4-Dinitrophenol (IUPAC).



Dinitrophenol

Action/Use

ACTION: Insecticide, acaricide, fungicide.

USE: Dormant spray primarily for aphids, mites. Fungicide for certain mildews, molds.

FORMULATIONS: Spray.

Safety Guidelines

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 30 mg/kg. Phytotoxic to green plants.

Dinoben*

(Discontinued)

Identification

CODE NUMBERS: CAS 88-86-8; SHA 028101.

Chemistry

COMPOSITION: 2,5-Dichloro-3-nitrobenzoic acid, sodium salt.

Action/Use

ACTION: Preemergence herbicide.

Dinobuton

BP: Probelte, S.A. (Acarelte*)

Identification

COMMON NAME: Dinobuton (BSI, ISO).

EXP. CODE NUMBERS: MC 1053 (Murphy Chemical Ltd.); UC 19786 (Rhone-Poulenc Ag Co.).

OTHER CODE NUMBERS: CAS 973-21-7; SHA 228700; OMS 1056 (WHO); ENT 27244.

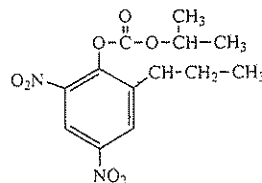
ADDITIONAL TRADE NAMES: Dessin*, Dinofen*, Drawinol*, Talar*.

DISCONTINUED NAME: Acrex* (KenoGard AB).

Chemistry

COMPOSITION: 2-sec-butyl-4,6-dinitrophenyl isopropyl carbonate.

PROPERTIES: Pale yellow solid. tech melting point 57-60°C. Hydrolyzed by alkali to parent phenol dinoseb. Soluble in aliphatic hydrocarbons, aromatic solvents, ethanol, fatty oils. Highly soluble in lower aliphatic ketones, aromatic hydrocarbons.



Dinobuton

Action/Use

ACTION: Acaricide, fungicide.

USE: For phytophagous mites on deciduous fruits, citrus, cucumber, cotton, vegetables, outdoor tomatoes, hops; powdery mildew on apples, cucumbers, hops and some other crops.

FORMULATIONS: Emulsifiable liquid, concentrate in aromatic solvent.

COMBINATIONS: Acrelto Forte* (+ tetradifon). Do not combine with carbaryl.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bird: Toxic. Bee: Toxic.

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 140 mg/kg. (Rabbit): Dermal LD₅₀ 3200 mg/kg.

PROTECTIVE CLOTHING: Gloves, respirator filter.

HANDLING AND STORAGE CAUTIONS: Store >0° in well-ventilated, secure area out of reach of children and animals. Toxic by inhalation and ingestion.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation**, remove to fresh air. **Ingestion**, apply stomach pump and wash stomach with 5% sodium bicarbonate solution. Do NOT supply antipyretics.

Dinocap

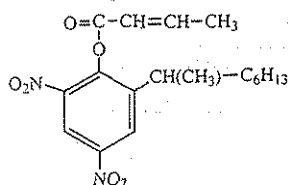
Identification

COMMON NAMES: Dinocap (BSI, CSA, ISO); DPC (JMAF).
CODE NUMBERS: CAS 39300-45-3; SHA 036001; ENT 24727.
ADDITIONAL TRADE NAMES: Cekucap* 25WP (Cequisa); Mildane* (Diachem S.P.A.); Crotothane* (May & Baker Ltd.).

Chemistry

COMPOSITION: 2,4-dinitro-6-octyl-phenyl-crotonate, 2,6-dinitro-4-octyl-phenyl crotonate, and nitrooctyl-phenols (principally dinitro). Mixture of 1-methylheptyl, 1-ethylhexyl and 1-propylpentyl isomers of the octyl 8-carbon chain.

PROPERTIES: Dark brown liquid.



Action/Use

ACTION: Foliage fungicide, acaricide.
USE: For powdery mildew diseases, certain species of mites on various fruit, vegetable crops, ornamentals.
FORMULATIONS: Dust, liquid concentrate, wettable powder.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic.
SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: Tech (Rat): Oral LD₅₀ 980 mg/kg.

Emergency Guidelines

FIRST AID: Symptomatic treatment. **Ingestion**, flush stomach with 5% sodium carbonate solution and medicinal charcoal suspension, then give 15-30 g sodium sulfate in 0.5 l/water.

Dinocton-4

(Discontinued 1975 by Murphy Chemical Ltd.)

Identification

COMMON NAME: Dinocton-4.
EXP. CODE NUMBER: MC 1947 (Murphy Chemical Ltd.).

Chemistry

COMPOSITION: Methyl 2,6-dinitro-4-octylphenyl carbonate (where octyl comprises a reaction mixture of 1-ethylhexyl and 1-propylpentyl).

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 1650 mg/kg. Dermal 3000 mg/kg.

Dinocton-o

(Discontinued 1975 by Murphy Chemical Ltd.)

Identification

COMMON NAME: Dinocton-o.
EXP. CODE NUMBER: MC 1945 (Murphy Chemical Ltd.).
OTHER CODE NUMBERS: CAS 8069-76-9; SHA 561400.

Action/Use

ACTION: Nonsystemic acaricide, fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 1250 mg/kg.

Dinofen* — see Dinobuton.

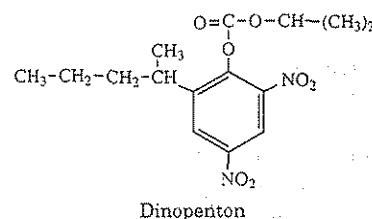
Dinopenton

Identification

COMMON NAME: Dinopenton (ISO).
CODE NUMBERS: CAS 5386-57-2; SHA 511300.

Chemistry

COMPOSITION: 2-(1-Methylbutyl)-4,6-dinitrophenyl isopropylcarbonate (IUPAC).



Action/Use

ACTION: Acaricide.

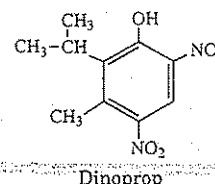
Dinoprop

Identification

COMMON NAME: Dinoprop (ISO, BSI).
CODE NUMBERS: CAS 7257-41-2; SHA 319300.

Chemistry

COMPOSITION: 4,6-Dinitro-2-cymen-3-ol, or 2-isopropyl-3-methyl-4,6-dinitrophenol (IUPAC).



Action/Use

ACTION: Herbicide, insecticide.

Dinosam — see DNAP.

Dinosame — see DNAP.

Dinoseb

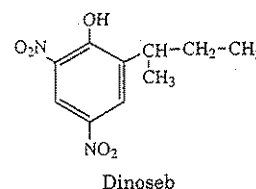
Identification

COMMON NAMES: DNBP (JMAF); dinoseb (BSI, ISO-E, WSSA), dinosebe (ISO-F).
EXP. CODE NUMBER: DN-289 (Dow/Elanco).
CODE NUMBERS: CAS 88-85-7; SHA 037505.

DISCONTINUED NAMES: Basanite* (BASF Wyandotte); Dinitro*, Premerge*, Premerge* Plus (+ naptalam), Vertac* Dinitro Weed Killer, Vertac* General Weed Killer, Vertac* Selective Weed Killer (Cedar Chemical Corp.); Dynamite* (Drexel); Elgetol* 318, Kiloseb*, Nitropone* C, Sinox General* (FMC Corp.); Hel-Fire* (Helena Chemical Co.); Caldon*, Gebutox*, Subitex* (Hoechst AG); Chemox* and Chemsect* (Tifa Ltd.); Enide Dinitro* (+ diphenamid) (TUCCO); Dynoram* (+ chloramben) (Union Carbide Corp.); Dyanap* and Klean Krop* (+ naptalam) (Uniroyal Chemical Co., Inc.); Unicrop* DNBP (Universal Crop Protection Ltd.).

Chemistry

COMPOSITION: 2-(sec-butyl)-4,6-dinitrophenol.
FAMILY: Dinitrophenol.
PROPERTIES: Dark brown solid or viscous liquid, melting point 36-40°C.



Action/Use

ACTION: Herbicide, desiccant, dormant fruit spray.
FORMULATIONS: Aqueous solution, emulsifiable concentrate, oil solution.

Registration Notes

U.S.: All uses cancelled.

Environmental Guidelines

HAZARDS: Fish: Highly toxic. Bird: Highly toxic. Bee: Toxic.
SOIL PARTICLE ADSORPTION: Leach potential.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.
TOXICITY CLASS: I.
TOXICITY: (Rat): Oral LD₅₀ 40-60 mg/kg.
HANDLING AND STORAGE CAUTIONS: Store in well ventilated areas, clearly marked, and away from foodstuffs, sources of heat.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

PROTECTIVE CLOTHING: Safety goggles, face shield, plastic gloves, hat, rubber boots, apron.

Dinoseb Acetate — see Aretit*.

Dinoseb Methacrylate — see Morocide*.

Dinosebe — see Dinoseb

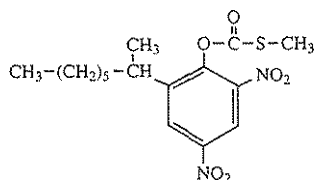
Dinosulfon

Identification

COMMON NAME: Dinosulfon (ISO).

Chemistry

COMPOSITIONS: S-Methyl O-(2-(1-methylheptyl)-4,6-dinitrophenyl) thiocarbonate, or S-methyl 2-(1-methylheptyl)-4,6-dinitrophenyl thiocarbonate. Very soluble in acetone. Xylene <10%.



Dinosulfon

Dinoterb Acetate

Identification

COMMON NAMES: Dinoterb acetate (BSI, ISO-E); dinoterbe acetate (ISO-F).

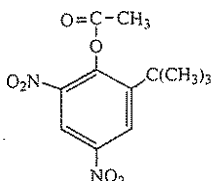
EXP. CODE NUMBER: MC 1108 (Murphy Chemical Ltd.).

CODE NUMBERS: CAS 3204-27-1; SHA 228400.

Chemistry

COMPOSITION: 2-tert-butyl-4,6-dinitrophenyl acetate (IUPAC).

PROPERTIES: Pale yellow crystals. Melting point 133-134.5°C. Hydrolyzed by alkalis to parent phenol dinoterb. Very soluble in acetone. Xylene: <10%.



Dinoterb Acetate

Action/Use

ACTION: Herbicide, nematicide, red spider ovicide.

Registration Notes

U.S.: EUP.

Environmental Guidelines

SOLUBILITY: Almost insoluble in water.

Safety Guidelines

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 62 mg/kg. Dermal LD₅₀ >2000 mg/kg.

Dinoterb Salts

BP: Rhone-Poulenc Agrochimie S.A. (Herbogil*)

Identification

COMMON NAMES: Dinoterb (BSI, ISO-E); dinoterbe (ISO-F).

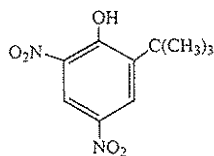
CODE NUMBERS: CAS 1420-07-1; SHA 228400.

OTHER NAME: DNTBP.

Chemistry

COMPOSITION: 2-tert-butyl-4,6-dinitrophenol (IUPAC).

PROPERTIES: Yellow solid. Melting point 125.5-126.5°C. Soluble in most organic solvents. Soluble in ethyl acetate, cyclohexanone, dimethyl sulfoxide.



Dinoterb

Action/Use

ACTION: Selective herbicide.

USE: Selective BLW control postemergence in cereals, alfalfa, maize (against triazine-resistant broadleaf weeds). Preemergence on peas, beans.

FORMULATIONS: Soluble concentrate (Herbogil*).

COMBINATIONS: DM 68* (+ MCPP), Tolkan S* (+ isoproturon) (Rhone-Poulenc Agrochimie S.A.).

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: Almost insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 62 mg/kg. (Mouse): 25 mg/kg.

Dinoterbe — see Dinoterb.

Dinoterbe Acetate — see Dinoterb Acetate.

Dinoterbon

Identification

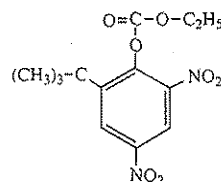
COMMON NAME: Dinoterbon (ISO).

CODE NUMBERS: CAS 6073-72-9; SHA 228500; OMS 1057 (WHO).

Chemistry

COMPOSITION: 2-tert-butyl-4,6-dinitrophenyl ethyl carbonate.

PROPERTIES: Related to dinoterb acetate. Pale yellow crystals. Melting point 133-134.5°C. Hydrolyzed by alkalis to parent phenol dinoterb. Very soluble in acetone. Xylene <10%.



Dinoterbon

Action/Use

ACTION: Acaricide, fungicide.

Environmental Guidelines

SOLUBILITY: Almost insoluble in water.

Dinoxol* — see 2,4-D.

Diocetyl Phthalate

(Discontinued 1972 by FMC Corp.)

Identification

CODE NUMBER: CAS 117-84-0.

OTHER NAME: DOP.

Action/Use

ACTION: Acaricide.

Di-on* — see Diuron.

Diethyl

Identification

COMMON NAME: Pyrimitate (ISO, BSI, BAN); pyrimithate (former common name).

EXP. CODE NUMBER: I.C.I. 29661.

Chemistry

COMPOSITION: O,O-Diethyl O-2-dimethylamino-6-(methyl pyrimidin-4-yl) phosphorothioate.

Action/Use

ACTION: Insecticide, acaricide.

Dioxabenzofos — see Salithion*.

Dioxacarb — see Elocron*.

Dioxacarbe — see Elocron*.

Dioxathion

Identification

COMMON NAMES: Dioxathion (BSI, ANSI, CSA, ESA, ISO).

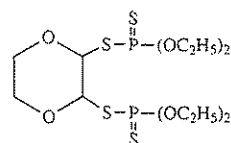
EXP. CODE NUMBER: Hercules AC 528.

OTHER CODE NUMBER: CAS 78-34-2.

DISCONTINUED NAMES: Delnav*, Deltic*, Navadel* (all NOR-AM Chemical Co.); Ruphos* (Hercules Inc.).

Chemistry

COMPOSITION: S,S'-(1,4-dioxane-2,3-diyl) O,O,O',O'-tetraethyl bis(phosphorodithioate) (IUPAC).



Dioxathion

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Insecticide, acaricide.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat, male): Oral LD₅₀ 45 mg/kg. Dermal 235 mg/kg.

Dipan* — see Diphenatrilite.

DiPel* — see *Bacillus thuringiensis* var. *kurstaki*.

Diphacin* — see Anticoagulant-Rodenticide; Diphacinone.

Diphacinone

BP: HACCO, Inc. (Diphacin*, Promar*, Ramik*)
Motomco Ltd. (Tomcat*)

Identification

COMMON NAMES: Diphacinone (ISO, ANSI, BSD); diphacin (Turkey); diphenadione (BAN).

CODE NUMBERS: CAS 82-66-6; SHA 067701.

ADDITIONAL TRADE NAMES: Kill-Ko Rat Killer*, Rat & Mouse Blues II (both Rigo Co.).

DISCONTINUED NAMES: P.C.Q.*; Rodent Cake* (Bell Labs); Contrax-D*, Parakakes* (Motomco Ltd.)

Chemistry

COMPOSITION: 2-(diphenylacetyl)-1,3-Indandione (IUPAC).

PROPERTIES: Tech, odorless, pale yellow powder. Melting point 293°F.

Action/Use

ACTION: Anti-coagulant rodenticide bait.

USE: For rats, mice, moles, and other rodents.

FORMULATIONS: Baits, pellets, concentrates.

Environmental Guidelines

SOLUBILITY: 17 ppm in water.

Safety Guidelines

SIGNAL WORD: DANGER (Tech); WARNING (Conc); CAUTION (Bait).

TOXICITY CLASS: I (Tech); II (Conc.); III (Bait).

TOXICITY: (Rat): Oral LD₅₀ 7.0 mg/kg.

HANDLING AND STORAGE CAUTIONS: Shelf-life of 3 yr. for Tomcat*. Keep dry.

Emergency Guidelines

ANTIDOTE: Vitamin K₁ (I.V./oral) combined with blood transfusions, as in cases of hemorrhage caused by overdoses of bishydroxycoumarin (Dicumarol*).

Diphenadione — see Diphacinone.

Diphenamid

Identification

COMMON NAME: Diphenamid (ISO-E, ANSI, BSI, CSA, JMAF, WSSA).

CODE NUMBERS: CAS 957-51-7; SHA 036601.

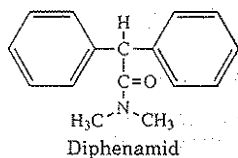
DISCONTINUED NAMES: Rideon* (Chemol Trading Ltd. Co.);

Trefmid* (+ trifluralin) (Elanco Products Co.); Dymid* (Eli Lilly & Co.);

Enide* (NOR-AM Chemical Co.); Enide Dinitro* (+ dinoseb) (TUCCO).

Chemistry

COMPOSITION: N,N-Dimethyl-2,2-diphenylacetamide (CAS 8CI).



Action/Use

ACTION: Selective preemergence herbicide.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bird: Very low toxicity. Bee: Very slightly toxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 1000 mg/kg.

Diphenatrilite

Identification

CODE NUMBERS: CAS 86-29-3; SHA 037901.

ADDITIONAL TRADE NAME: Dipan*.

Chemistry

COMPOSITION: Diphenylacetoneitrile.

Action/Use

ACTION: Preemergence herbicide.

USE: Seedling grasses in turf.

Diphenex* Herbicide (chlormethoxynil) — Discontinued 1990 by Ishihara Sangyo Kaisha, Ltd.

Diphenyl

Identification

COMMON NAME: Biphenyl (ISO, BSI).

CODE NUMBERS: CAS 92-52-4; SHA 017002.

Chemistry

COMPOSITION: Biphenyl.

Action/Use

ACTION: Fungicide.

USE: To impregnate citrus fruit wraps against rot fungi.

Registration Notes

OUTSIDE U.S.: In Japan, only fungicide applied to retard spoilage of citrus accepted as a chemical residue.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3280 mg/kg.

Diphenylamine — see Coraza*.

Dipher* — see Zineb.

Dipropalin

Identification

CODE NUMBERS: CAS 1918-08-7; SHA 391400.

Chemistry

COMPOSITION: N,N-Di-n-propyl-2,6-dinitro-4-methylaniline.

PROPERTIES: Chemically related to trifluralin, without fluorine.

Action/Use

ACTION: Herbicide.

USE: Preemergence control of seedling grasses in turf.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3600 mg/kg.

Dipropetryn — see Sancap*.

Dipropetryne — see Sancap*.

Dipterex* — see Trichlorfon.

Dipterex* MR — see Oxydemeton-methyl; Trichlorfon.

Diptyl* — see Banvel*; MCPA; MCPP.

Diquat Dibromide

BP: ZENECA Agrochemicals (Reglone*, Reglox*)
ZENECA Professional Products (Reward*)

Identification

COMMON NAMES: Diquat dibromide (ISO, BSI, ANSI, WSSA, JMAF); deiquat (Germany); reglon (USSR).

EXP. CODE NUMBER: GCC-711 (Hysan Products Co.)

CODE NUMBERS: CAS 2764-72-9 (diquat); CAS 85-00-7 (diquat dibromide); CAS 6385-62-2 (diquat dibromide monohydrate); SHA 032201.

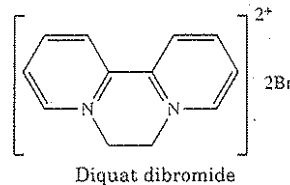
ADDITIONAL TRADE NAMES: Diquat Herbicide* (ZENECA Ag Products); Aquacide* (ZENECA Agrochemicals); Weedtrine*-D (Applied Biochemists).

DISCONTINUED NAMES: Actor*, Weedol* (both with paraquat) (ICI Agrochemicals); Weedtrine-Plus* (Applied Biochemists); Herbaxon* (+ paraquat) (AQ Group).

Chemistry

COMPOSITION: Diquat: 1,1'-Ethylene-2,2'-bipyridylum ion. 6,7-dihydrodipyrido(1,2-a:2',1'-c)pyrazinediium ion (Chem Abs usage) formulated as the dibromide monohydrate salt.

PROPERTIES: Stable in neutral or acid solutions; decomposes in alkaline solutions. Slightly soluble in alcohols, hydroxylic solvents. Practically insoluble in nonpolar organic solvents.



Action/Use

ACTION: Contact herbicide, desiccant.

USE: Desiccation of potato vines, seed crops; control of sugarcane flowering. Aquatic, industrial weed control.

FORMULATIONS: Commercially as the dibromide, 2 lb./gal. (U.S.); 200 g/l (outside U.S.).

COMBINATIONS: Preglone*, Priglone* (both with paraquat), Path-clear* (+ paraquat + simazine) (ZENECA Agrochemicals).

Environmental Guidelines

SOLUBILITY: At 20°C in water 700 g/l. Strongly absorbed and inactivated by soil particles.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 215-235 mg/kg. (Rabbit): Dermal >400 mg/kg.

PROTECTIVE CLOTHING: Protective suit, chemical resistant gloves and footwear except for aquatic subsurface applications. Add chemical resistant apron and face shield or goggles when handling concentrate.

HANDLING AND STORAGE CAUTIONS: Splashes should be washed from eyes, skin immediately. Avoid breathing spray mist. Unformulated corrosive to metals; formulated contains corrosive inhibitors for use through spray machinery. Keep out of reach of children.

Weedtrine*-D: Product stable to heat beyond the range of ordinary ambient temperatures. Do not contaminate feed, foodstuffs, or drinking water. Do not store or transport near feed or food. Do not apply under conditions involving possible drift to food, forage, or other plantings that might be damaged or the crops thereof rendered unfit for sale, use, or consumption. Following application, do not use water for irrigating, livestock watering or domestic use for 14 days after treatment.

Emergency GuidelinesFIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, take person and container to nearest medical facility.

EMERGENCY TELEPHONE: 800-759-2500 (ZENECA Professional Products); 0622-812511 (ZENECA Agrochemicals).

Diquat Herbicide* — see Diquat Dibromide.

Dir* — see Diuron.

Dirac Express* — see Iprodione; Thiram.

Diram***Chemistry**

COMPOSITION: Ammonium dimethyldithiocarbamate.

Action/Use

ACTION: Fungicide.

Directed Application

Precise application to a specific area or plant organ such as to a row or bed, or to the lower leaves and stems of plants.

Directed Sprays

Directed sprays are herbicidal sprays applied to particular weeds or weedy areas or to the soil preemergent to weeds, thus avoiding contact with the crop.

Direx* — see Diuron.

Direz* Fungicide (anilazine) — Discontinued by Bayer AG.

Dirimai* — see Sulfan*.

Disan* Herbicide (bensulide) — Discontinued by Stauffer Chemical Co.

Discon-Z* — see Zineb.

Discus* Insecticide (isofenphos) — Discontinued 1994 by Olympic Horticultural Products.

Disinfectant

A substance which kills or inactivates disease-producing microorganisms (bacteria, viruses, etc.) in animals, seeds, or other plant parts. Also commonly referred to chemicals used to clean or surface sterilize inanimate objects.

Disinfestant

A substance which destroys infesting organisms such as insects, mites, rats, weeds, and other organisms multicellular in nature. A term corresponding to, but distinct from, disinfectant.

See Infest.**Dislat***

F: Comercial Tecnica Aralf S.A.

Chemistry

COMPOSITION: Dodecylbenzene sulfonate, sodium carboxymethyl cellulose, colorants.

FAMILY: Surfactant tensoactive.

PROPERTIES: Natural color.

Action/Use

ACTION: Cleaner/washer.

USE: Aids in washing process of fruits and vegetables. Nontoxic product. Does not affect maturation process.

Environmental Guidelines

SOLUBILITY: 100% soluble in water. See label for rates and restrictions.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

PROTECTIVE CLOTHING: Synthetic rubber gloves for concentrate.

HANDLING AND STORAGE CAUTIONS: Keep container sealed. Do not contaminate other products.

Emergency GuidelinesFIRST AID: Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water.

EMERGENCY TELEPHONE: 506-32-7954 (Comercial Tecnica).

Disodium Methanearsonate — see DSMA.

Disodium Octaborate — see Polybor-Chlorate*; Sodium Chlorate.

Disparlure

BP: Agri-Pharm International Inc.

Identification

CODE NUMBERS: CAS 29804-22-6; SHA 114301.

Chemistry

COMPOSITION: (cis-7,8-Epoxy-2-methyloctadecane).

Action/Use

ACTION: Gypsy moth attractant.

USE: Traps male gypsy moths in scouting operations. Artificial pheromone developed after Gyplure, Gyptol found inactive.

Registration Notes

U.S.: Federal and State program use.

Dispersant

BP: BASF Corp. (Surfactants: Iconol*, Klearfac*, Plurafac*, Pluronic*, Vultamol*; Polyols: Pluracol*, Quadrol*)
 BASF India Ltd. (Tamol* FB P1)
 Hampshire Chemical Corp. (DAXAD* High Activity Dispersants)
 Henkel Corp. (Lomar*, Nopcosperse*)
 International Specialty Products (Agrimer*, Agrimer* VEMA H-240L, Agrimer* AL-10, Agrimer ST)
 LignoTech USA (Borresperse*, Diwatex*, Lignosol*, Maraspense*, Norlig*, Vanisperse*, Wanin*)
 Lobeco Products, Inc. (Galoryl* DM-74, Galoryl* DT-120, Galoryl* DT-505, Galoryl* PA-340)
 Rhone-Poulenc Surfactants & Specialties (AgrRHO* SA, Antarox*, Colloid*, Rhodacal*, Rhodafac*, Rhodapol*, Rhodasurf*, Soprophor*, Supragil*)
 Stepan Co. (Stepsperse*)
 R.T. Vanderbilt Co., Inc. (Darvan*)
 Westvaco Polychemicals (Kraftspense*, POLYFON*, Reax*)

A material that reduces the cohesiveness of like particles, either solid or liquid. Dispersing and suspending agents are added during the preparation of emulsifiable concentrates and wettable powders to facilitate dispersion and suspension of the ingredients. Careful selection is required for active ingredients. Foaming or other disadvantages may result from selection or use of excessive amounts.

See Deflocculator; Emulsifier; Foam Suppressant; Lignoculfonates.

Disposal

Process of discarding or throwing away unused spray material, surplus pesticides, and pesticide containers.

Disrupt* — see Hercon Disrupt*.

Dissolve* — see 2,4-D; Dichlorprop; Mecoprop.

Disulfoton

BP: Bayer AG (Disyston*)
 Hanwha Corp.
 Miles Inc. (Di-Syston*)
 Sandoz Agro Ltd. (Frumin AL*, Solvirex*)
 Sanex Inc. (Disultex*)

Identification

COMMON NAMES: Disulfoton (BSI, ISO, ESA); ethylthiodemeton (JMAF), M-74 (USSR).

EXP. CODE NUMBERS: S276, Bay 19639 (Bayer AG).

OTHER CODE NUMBERS: CAS 298-04-4; SHA 032501; ENT 23347;

EINECS 206-054-3.

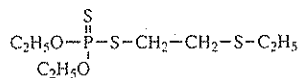
DISCONTINUED NAMES: Dithiodemeton*, Dithiosystox* (Bayer AG); Insyst-D*.

Chemistry

COMPOSITION: O,O-Diethyl S-[2-(ethylthio)ethyl] phosphorodithioate (CAS).

FAMILY: Organophosphorus pesticide.

PROPERTIES: Colorless liquid, specific gravity 1.144 at 20°/4°C. Boiling point 128°C at 1.3 hPa; vapor pressure 7.2 mPa at 20°C. Miscible in n-hexane, dichloromethane, 2-propanol, toluene. Stable in normal storage.



Disulfoton

Action/Use

ACTION: Systemic insecticide-acaricide.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

USE: Side dressing, broadcast, in the seed furrow or foliar spray to control aphids, thrips, mealybugs and other sucking insects and spider mites in cereal, cotton, tobacco, potatoes, and other vegetables. Seed treatment for sucking insects.

FORMULATIONS: Dry seed dressing, emulsifiable concentrate, granules.

COMBINATIONS: Baysyston* and Repulse* (+ triadimenol), Disyston* N (+ fenamiphos), Disyston Suncide* (+ propoxur) (Bayer AG); Mocap* Plus 4-2 EC (+ ethoprop) (Rhône-Poulenc Ag Co.); Ekanon* and Knave* (+ quinalphos) (Sandoz Agro Ltd.).

Registration Notes

U.S.: Some or all applications of Di-Syston* may be classified as RUP.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 3mg/L (96 h) (rainbow trout). Bee: Moderately toxic depending on mode of application. Bird: LD₅₀ 39 mg/kg (bobwhite quail).

SOLUBILITY: Soluble in water to 12 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 2-12 mg/kg b.w.; Dermal LD₅₀ 3.6-15.9 mg/kg b.w.

HANDLING AND STORAGE CAUTIONS: See label. Store in cool, dry place and in such a manner as to prevent cross contamination with other pesticides. Store in original container, preferably in a locked area, away from children, food, feed.

Emergency Guidelines

FLASHPOINT: >200°F (TCC).

FIRE EXTINGUISHING MEDIA: Dry powder, water spray, foam, CO₂.

ANTIDOTE: Atropine sulfate in large therapeutic doses. Repeat as necessary to point of tolerance. 2-PAM is antidotal; may be used in conjunction with atropine.

FIRST AID: Get immediate medical aid. Eyes, hold lids open, flush with a steady, gentle stream of water for at least 15 minutes. Skin, wash immediately with soap and warm water.

EMERGENCY TELEPHONE: 816-242-2582 (Miles Inc.).

Disul-Na* — see Sesone.

Disultex* — see Disulfoton.

Di-Syston* — see Disulfoton.

Disyston* — see Disulfoton.

Disyston* N — see Disulfoton; Nemacur*.

Disyston S*

(Discontinued by Bayer AG)

Identification

COMMON NAME: Oxydisulfoton (BSI, ISO).

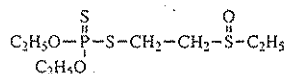
EXP. CODE NUMBER: Bay 23323.

OTHER CODE NUMBERS: CAS 2497-07-6; SHA 032501.

OTHER NAME: Disyston sulphoxide.

Chemistry

COMPOSITION: O,O-Diethyl S-2-ethylsulfinyethyl phosphorodithioate.



Oxydisulfoton

Action/Use

ACTION: Systemic insecticide-acaricide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 3.5 mg/kg. Dermal 92-235 mg/kg.

Disyston Sulphoxide — see Disyston S*.

Di-Tac* — see DSMA.

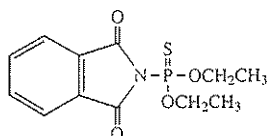
Ditalimfos

(Discontinued by Dow Chemical Co.)

Identification

COMMON NAMES: Ditalimfos (ISO-E, BSI, ANSI); ditalimfos (ISO-F).

CODE NUMBERS: CAS 5131-24-8; SHA 106301.



Ditalimfos

DISCONTINUED NAMES: Dowco* 199, Laptran*, Plondrel*.

Chemistry

COMPOSITION: O,O-diethyl phthalimidophosphonothioate.

Action/Use

ACTION: Contact fungicide with eradicator, protectant activity.

Safety Guidelines

SIGNAL WORD: Varies with country regulations: DANGER (France); WARNING (Holland); CAUTION (Germany).

TOXICITY CLASS: I (France), II (Holland), III (Germany).

TOXICITY: (Rat): Oral 5660 mg/kg (male); 4930 mg/kg (female). (Rabbit): Dermal 1000 mg/kg. (Guinea pig, male) 5660 mg/kg.

Disyston Suncide* — see Disulfoton; Propoxur.

Ditalimfos — see Ditalimfos.

Dithane* — see Dithiocarbamates; Mancozeb.

Dithane* D-14 Fungicide (nabam) — Discontinued 1987 by Rohm and Haas.

Dithane* Z-78 Fungicide (zineb) — Discontinued by Rohm and Haas.

Ditek* Fungicide (thiophanate-methyl) — Discontinued by Sandoz Crop Protection.

Dithianon

BP: American Cyanamid Co. (Delan*)

Identification

COMMON NAME: Dithianon (ISO, BSI, CSA, JMAF).

CODE NUMBERS: CAS 3347-22-6; SHA 099201.

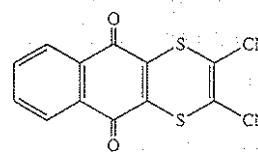
ADDITIONAL TRADE NAME: Delan-Col*.

DISCONTINUED NAME: Thynon* (Shell Agrar GmbH & Co. KG).

Chemistry

COMPOSITION: 5,10-Dihydro-5,10-dioxonaphtho[2,3-b]-1,4-dithi-in-2,3-dicarbonitrile (IUPAC).

PROPERTIES: Tech, light brown color; melting point 230°C. Solubility varies in organic solvents.



Dithianon

Action/Use

ACTION: Protective fungicide.

USE: Broad spectrum fungicide controlling scab, downy mildew, rust and leaf spot diseases in pome fruit, stone fruit, small fruit, wine growing, ornamentals, citrus, coffee, and vegetables. For use in Integrated Pest Management (IPM) programs.

FORMULATIONS: Aqueous dispersions, wettable powder, flowable.

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ ca. 0.07 (rainbow trout); ca. 4-5 (goldfish); ca. 0.04 mg/l (catfish). Bee: Nontoxic.

SOLUBILITY: At room temperature, approx. 0.05 ppm in water.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 638 mg/kg.

Dithio — see Bladafum*.

Dithiocarbamates

BP: BASF AG (Polyram* Combi, Polyram* DF)

Desarrollo Quimico Industrial, S.A. (Dequiman*,

Dequiman MZ*, Zineb, Ziram)

Du Pont Agricultural Products (Manzate*)

ELF Atochem Agri B.V. (Penncozeb*, Trifuncit*, Trimangol*,

Tritoflorol*, Vondozeb Plus*)

ELF Atochem Agri S.A. (Granéor*, Manéor*, Pennfluid*,

Trimano*)

ELF Atochem, North America (Penncozeb*)

Rohm and Haas Co. (Dithane*, Fore*)

UCB Chemicals (Agrochemicals Headquarters)

(Thianosan*, Thionic*)

UCB Chemicals Corp. (Carbamate WDG*, Ferbam*, Metam-

Sodium, Thianosan*, Thionic*, Thiram, Ucetam*, Ziram)

Identification

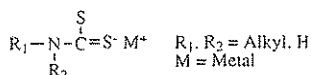
DISCONTINUED NAMES: Maneb Spritzpulver*, Polyram* M (BASF AG).

Chemistry

COMPOSITION: Included in this group of fungicides are the metallic dimethyldithiocarbamates (such as ferric, manganous, zinc) and ethylene bisdithiocarbamate salts (including disodium, diammonium, potassium ammonium, zinc, manganese), based on dithiocarbamic acid.

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.



Salts of Dithiocarbamic Acid

Action/Use

ACTION: Contact fungicide.
USE: For scabs, fruit rot, other diseases in fruit, vines, hops, vegetables, potatoes and ornamentals. For blue mold in tobacco.
COMBINATIONS: Grain Guard* (+ zinc) (Trace Chemicals, Inc.).

Registration Notes

U.S.: Some or all applications may be classified as RUP.

Safety Guidelines

SPILL CONTROL/CLEANUP: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

See Ferbam; Mancozeb; Maneb; Metam-Sodium; Metiram; Sodium dimethyl dithiocarbamate; Thiram; Zineb; Ziram.

Dithiodemeton* insecticide (disulfoton) — Discontinued by Bayer AG.

Dithiomethon — see Thiometon.

Dithiométon — see Thiometon.

Dithion* — see Dition*.

Dithione — see Bladafum*.

Dithiopyr — see Dimension* Turf Herbicide.

Dithiosystox* insecticide (disulfoton) — Discontinued by Bayer AG.

Ditiamino* Fungicide (zineb) — Discontinued by Rumianca S.p.A.

Dition*

(Discontinued by Agrimont S.p.A.)

Identification

CODE NUMBER: CAS 572-48-5.

ADDITIONAL TRADE NAMES: Chromaphton*, Coumitboate*, Dithion* (Agrimont S.p.A.).

Chemistry

COMPOSITION: O,O-diethyl O-(7,8,9,10-tetrahydro-6-oxo-6H-benzo[c]chromen-3-yl) phosphorothioate.

Action/Use

ACTION: Insecticide, acaricide.

Ditox-800* — see Diuron.

Ditranyl — see DCNA.

Di-Trapex* — Discontinued by Schering AG.

Ditrifon* insecticide (trichlorfon) — Discontinued 1989 by Chemol Trading Ltd. Co.

Diumate* — see Diuron.

Diurex* — see Diuron.

Diuro* — see Amitrole; Diuron.

Diuron

- BP: Bayer AG (Diuron Bayer*)
- Biesterfeld U.S., Inc.
- Chemol Trading Ltd. Co.
- Crystal Chemical Inter-America (Crisuron*, Crystal Diuron*)
- Defensa Indústria de Defensivos Agrícolas S.A.
- Drexel Chemical Co. (Diumate*)
- Du Pont Agricultural Products (Karmex*)
- Fersol Indústria E Comércio Ltda.
- Gilmore, Inc.
- Griffin Corp. (Direx*)
- HELM AG
- Herbitécnica Defensivos Agrícolas Ltda.
- Kuo Ching Chemical Co., Ltd.
- Makhteshim-Agan (Di-on*, Diurex*)
- Nitrokémia Ltd. (Lucentit*)
- Pyosa, S.A. de C.V. (Ditox-800*)
- Rhone-Poulenc Ag Co. (Seduron*)
- Sanachem (Pty) Ltd. (Sanuron*)
- Universal Crop Protection Ltd. (Unidron*)

Identification

COMMON NAMES: Diuron (ANSI, BSI, CSA, ISO, WSSA); DCMU (JMAF); dichlorfenidim (USSR).

CODE NUMBERS: CAS 330-54-1; SHA 035505.

ADDITIONAL TRADE NAMES: Cekkiuron* (Cequisa); Dir* (Chimac-Agriphar S.A.); Dailon*, Farmco* Diuron (C.I.K. Australia); Toter-

bane 50F* (Diachem S.P.A.); Herburon* (Herbitécnica Defensivos Agrícolas Ltda.); Vonduron*.

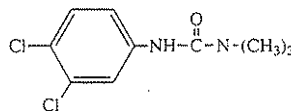
DISCONTINUED NAMES: Topsite* (+ imazapyr) (American Cyanamid); Monex* 3 (+ MSMA) (Ansul Co.); Ustilan* D (+ ethidimuron) (Bayer AG); Urox D* (Hopkins Agricultural Chemical Co.); Dynex* (Inter Ag Corp.); Uradex* (+ bromacil) (Makhteshim-Agan); Ureabor* 8D (+ sodium metaborate tetrahydrate) (Occidental Chemical); Chlorea* (+ sodium chlorate + sodium metaborate), Diater*, Herbiol* (+ amitrole), Sup'r Flo Diuron* (Rhone-Poulenc Ag Co.).

Chemistry

COMPOSITION: N-(3,4-dichlorophenyl)-N,N-dimethylurea.

FAMILY: Substituted urea.

PROPERTIES: White powder. Melting point 157°C. Vapor pressure 2.3 × 10⁻⁶ (20°C).



Diuron

Action/Use

ACTION: Herbicide.

USE: Effective against emerging and young broadleaf and grass weeds as well as mosses; suitable for both selective and total weed control. For use on alfalfa, asparagus, cotton, citrus, fruit orchards, sugarcane, wheat and vineyards.

FORMULATIONS: Flowable, granule, wettable powder.

COMBINATIONS: Ginstar* (+ thidiazuron) (AgrEvo USA Co.); Dakar* (+ bromacil + terbutryn) (Aragonesas Agro, S.A.); Ustinex* (in various combinations) (Bayer AG); Kill-Net* (+ amino-triazole) (Chimac-Agriphar S.A.); Krovar* (+ bromacil) (Du Pont); Acert* (+ trifluralin), Ametron* and Bimetron* (+ ametryn), Fortex* (+ MSMA), Tropuron* (+ glyphosate) (all Herbitécnica Defensivos Agrícolas Ltda.); Diuro* (+ amitrole) (Makhteshim-Agan); Dialam*, Krater*, Tartan* (+ asulam) (Rhone-Poulenc Ag Co.); Dexuron*, Gramuron*, Paracol*, Totacol* (+ paraquat) (ZENECA Agrochemicals); Vonduci* (+ chlorpropham); Diuron Fersol*; Diumate*.

Registration Notes

OUTSIDE U.S.: Crisuron*.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 3.5 mg/l (96 h) (rainbow trout). Bee: Nontoxic.

Bird: LD₅₀ >5000 mg/kg (mallard).

SOLUBILITY: 0.025 g/l in water at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION (Tech).

TOXICITY CLASS: III (Tech).

TOXICITY: Tech. (Rat): Oral LD₅₀ >5000 mg/kg. Dermal >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Causes eye irritation. Avoid nose, skin contact or breathing dust, spray mist. Wash contaminated clothing with soap, hot water before re-use. Avoid freezing liquid suspensions. Dry formulations stable under normal storage.

Emergency Guidelines

FLASHPOINT: Nonflammable.

FIRST AID: Get medical aid. **Eyes:** flush with water for 15 minutes.

Skin, wash with soap and water. **Ingestion,** get medical attention.

EMERGENCY TELEPHONE: 302-892-3000 (AgrEvo USA Co.); 800-441-3637 (Du Pont).

Diuron Bayer* — see Diuron.

Diuron Fersol* — see Diuron.

Dividend* — see Difenoconazole.

Divipan* — see DDVP.

Diwatex* — see Dispersant; Lignosulfonates.

Dixon* insecticide (phosphamidon) — Discontinued 1987 by Quimica Estrella.

Dizan — see Isoproturon.

Dizinon* — see Diazinon.

Djiin* — see Fenoxaprop-P-ethyl; Isoproturon.

Dlimonene — see Access Penetrator*; Kammo*.

DLP-87 — see Vacor*.

DM 68* — see Dinoterb Salts; MCPP.

DMA — see DSMA.

DMA 100 — see DSMA.

DMA-4* Herbicide (2,4-D) — Discontinued by Dow Chemical Co.

DMC — see Qikron*.

DMCP — see Fujithion*.

D-MCPP — see Bifenox; Ioxynil; Isoproturon.

DMP — see Dimethyl Phthalate.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

DMPA — see Zytron*.
 DMSO — see Dimethyl sulfoxide.
 DMTP — see Methidathion.
 DMTT — see Dazomet.

DN-111*

(Discontinued by Dow Chemical Co.)

Identification

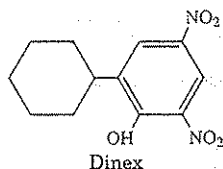
COMMON NAMES: DN (JMAF); dinex-diclexine (ISO, BSI); pédinex (ISO-F).

CODE NUMBER: CAS 317-83-9.

OTHER NAME: DNOCHP.

Chemistry

COMPOSITION: 2-Cyclohexyl-4,6-dinitrophenol dicyclohexyl-amine.



Action/Use

ACTION: Insecticide, acaricide.

DN-289* — see Dinoseb.

DNAP

Identification

COMMON NAME: Dinosam (ISO-E, BSI); dinosame (ISO-F).

CODE NUMBERS: CAS 4097-36-3; SHA 037504.

ADDITIONAL TRADE NAMES: Chemox General*; Sinox General*.

Chemistry

COMPOSITION: 4,6-Dinitro-o-sec-amyphenol or 2-(1-methylbutyl)-4,6-dinitrophenol.

Action/Use

ACTION: Herbicide, acaricide.

USE: Preharvest sprays.

DNBP — see Dinoseb.

DNC — see DNOC.

DNOC

BP: ELF Atochem Agri B.V. (Trifocide*, Trifrina*)
 A.H. Marks & Co., Ltd.

Identification

COMMON NAME: DNOC (ISO, WSSA, BSI, JMAF).

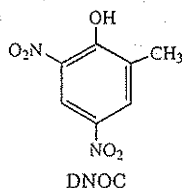
TRIVIAL NAME: DNC.

CODE NUMBERS: CAS 534-52-1; SHA 037507; ENT-154.

DISCONTINUED NAME: Chemssect* DNOC (Tifta Ltd.); Elgetol 30*, Nitrador*, Selinon*, Sinox* (all FMC Corp.).

Chemistry

COMPOSITION: 4,6-Dinitro-o-cresol, or 2-methyl-4,6-dinitrophenol.
 PROPERTIES: Yellow solid, melting point 86°C. Soluble in most organic solvents.



Action/Use

ACTION: Insecticide, fungicide, herbicide, defoliant.

USE: Only as dormant spray for insect eggs, apple scab control. The triethanolamine salt has promise as a complete dormant apple spray for light infestations of mite and aphid eggs as well as other pests. The sodium salt has been used as a weed killer and on apple, peach trees to thin fruit.

FORMULATIONS: Ammonium salt, flakes, flowable, wettable powder.

Registration Notes

U.S.: Banned.

OUTSIDE U.S.: Ammonium salt (Trifocide* liquid) produced in The Netherlands.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 6-13 mg/l (carp). Bee: Toxic.

SOLUBILITY: In water 0.013% at 15°C.

Safety Guidelines

SIGNAL WORD: DANGER. Very phytotoxic.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 20-50 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in cool, well-aired area away foodstuffs.

DNOCHP — see DN-111*.

DNTBP — see Dinoterb Salts.

Doble* — see Bentazone; Blazer*.

Docusate Sodium — see NONIT*.

Docklene* — see Banvel*; MCPA; Mecoprop.

Dodecylphenol — see Coupling Agent.

Dodemorfe Acetate — see Dodemorph Acetate.

Dodemorph — Discontinued by BASF AG.

Dodemorph Acetate

BP: BASF AG (BASF-Mehltaumittel*, Meltatox*)

Identification

COMMON NAMES: Dodemorph acetate (ISO-E, BSI); dodémorphe acetate (ISO-F).

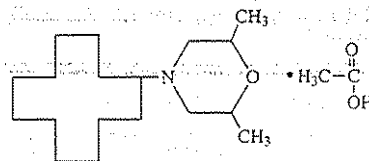
CODE NUMBERS: CAS 31717-87-0; SHA 213600; EINECS 250-778-2.

DISCONTINUED NAMES: Dodemorph (for parent compound). Badilin-Rosentfluid* (+ dodine) (BASF AG); Milban* (Grace-Sierra Crop Protection Co.).

Chemistry

COMPOSITION: 4-cyclododecyl-2,6-dimethylmorpholinium acetate.

PROPERTIES: Tech, viscous, yellow, acetic acid-like odor. Solubility: At 20° in g a.i./100g solvent: ether ca. 74.3; chloroform ca. 100; cyclohexan ca. 84.6; benzene ca. 100.



Dodemorph Acetate

Action/Use

ACTION: Foliar eradicant mildew fungicide.

USE: For powdery mildew in ornamental plants, roses commercially grown in greenhouses.

FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ ca. 40 mg/l (guppy). EC: Bee: Nontoxic.

DEGRADATION AND METABOLISM: Slow degradation.

SOIL PARTICLE ADSORPTION: High adsorption affinity.

SOLUBILITY: At 20° in g a.i./100g solvent: Water ca. 0.01.

Safety Guidelines

SIGNAL WORD: DANGER (eye) (Milban*); WARNING.

TOXICITY CLASS: I (Milban*); II.

TOXICITY: Tech: (Rat): Oral LD₅₀ 3944 mg/kg (male); 2465 (female).

Meltatox*: (Rat): Oral LD₅₀ 5301 mg/kg (male); 3720 (female); Dermal LD₅₀ >4000 mg/kg.

PROTECTIVE CLOTHING: Wear goggles, face shield, rubber gloves, full protective clothing when handling undiluted product.

HANDLING AND STORAGE CAUTIONS: Causes eye damage, skin irritation. Avoid inhaling vapors, spray mist. Use with adequate ventilation. Do not use or store near heat, open flame.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: 32°C (Meltatox*).

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. Treat symptomatically. Eyes, skin, wash immediately with plenty of water; remove contaminated clothing. Ingestion, do NOT induce vomiting unless advised by a physician.

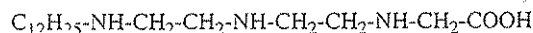
Dodicin

Identification

COMMON NAMES: Dodicin (ISO, BSI).

Chemistry

COMPOSITION: N-(2-(2-(Dodecylamino)ethyl)amino) ethyl glycine.



Dodicin

Action/Use

ACTION: Herbicide.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Dodina* — see Dodine.

Dodine

BP: Agrokémia Sellye Corp./Int. Com. Div. Starchem Co. Ltd. (Tech.)
 American Cyanamid Co. (Venturol*)
 Biochem S.R.L. (Dodina*)
 Chemol Trading Ltd. Co. (Tech.)
 General Quimica, S.A. (Sulgen*)
 Helm AG
 ISAGRO (Carpene*)
 Rhone-Poulenc Ag Co. (Melprex*)

Identification

COMMON NAMES: Dodine (ISO, ANSI, BSI), dodine acetate (BSI), doguadine (France), tsitrex (USSR).

EXP. CODE NUMBER: AC 5223.

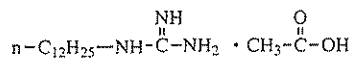
OTHER CODE NUMBERS: CAS 2439-10-3; SHA 044301.

DISCONTINUED NAMES: Efuzin* (Agrokémia Sellye Ltd./Int. Com. Div. Starchem Co. Ltd.); Cyprex* (American Cyanamid); Badilin-Rosenfluid* (+ dodemorph acetate), Badilin-Blumenspray* (+ fenitrothion + tetradifon), Meltatox Combi* (+ nitrothal-isopropyl) (BASF AG); Vondodine* (Pennwalt Holland B.V.); Tebulan* (+ fenarimol), Apadodine*, Syllit* (Rhone-Poulenc Ag Co.).

Chemistry

COMPOSITION: 1-Dodecylguanidine acetate.

PROPERTIES: White crystalline. Not compatible with lime or chlorobenzilate. Soluble in methanol, ethanol. Practically insoluble in most organic solvents.



Dodine

Action/Use

ACTION: Fungicide.

USE: For scab on apples and pecans. Leafspot on cherries. Foliar diseases of strawberries. Bacterial leafspot on peaches. Leaf blight of sycamores, black walnuts.

FORMULATIONS: Soluble concentrate, wettable powder.

Registration Notes

U.S.: Western states only: peach leaf curl, blossom brown rot on peaches and cherries, scab on pears.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic if no insecticidal additives.

SOLUBILITY: In distilled water 0.07%.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 1000 mg/kg. Dermal >6000 mg/kg. (Rabbit): Dermal >1500 mg/kg (single 24-hr. contact).

PROTECTIVE CLOTHING: Goggles, face shield, rubber gloves when handling.

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin contact. Do not breathe dust. Transfer or mix with adequate ventilation. Wash thoroughly after use. Do not contaminate food, feed products. Keep container closed when not in use. Store Carpine* in sealed original containers, in well-aired, fresh, dry, shaded areas. Avoid sources of heat, free flames, or spark-generating equipment. Biological activity of product remains practically unvaried for 3 years under environmental conditions, under proper storage.

SPILL CONTROL/CLEANUP: Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Dodine Acetate — see Dodine.

Doguadine — see Dodine.

Dojyopicrin* — see Chloropicrin.

Dokirin* — see Copper 8-Quinolinate.

Dol* Insecticide (BHC) — Discontinued by Nihon Nohyaku Co., Ltd.

Dolmix* Insecticide (BHC + MTMC) — Discontinued by Nihon Nohyaku Co., Ltd.

Dolochlor* — see Chloropicrin.

Domain* FL — see Thiophanate-Methyl.

Domark* Fungicide — see Tetraconazole.

Doom* (Outside U.S.) — see DDVP

Doom* (U.S.) — see Milky Disease Spores.

DOP — see Diocetyl Phthalate.

Dorado* — see Pyrifenoxy.

Dormancy

State of inhibited germination of seeds, or growth of plant organs. A state of suspended development or animation (as in wintering animals in hibernation).

Dormant Oils — see Petroleum Oils.

Dormant Spray

A spray in late winter when plants, trees, are in a dormant condition (prior to the emergence of leaves). Temperature should be as high as 40° to 45°F for application.

Dormex*

BP: SKW Trostberg AG (Dormex*)

Identification

COMMON NAME: Hydrogen cyanamide.

CODE NUMBERS: CAS 420-04-2

Chemistry

PROPERTIES: Blue, odorless liquid. Melting point -15°C. Boiling point approx. 100°C.

Action/Use

ACTION: Plant growth regulator.

USE: Desert grown grapes in specific counties of Arizona and California.

FORMULATION: Aqueous.

Registration Notes

U.S.: RUP in Arizona and California.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 180 mg/l (96 h) (rainbow trout).

SOLUBILITY: Miscible in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 300 mg/kg. (Rabbit): Dermal LD₅₀ 1700 mg/kg. Skin, eye irritant.

PROTECTIVE CLOTHING: Respirator with combination filter, tightly fitting safety goggles, rubber gloves and complete chemical protective suit.

HANDLING AND STORAGE CAUTIONS: Store in original containers away from direct sunlight at temperatures below 20°C. Violent, exothermic reaction with acids, bases and temperatures above 40°C.

SPILL CONTROL/CLEANUP: Dam up. Pump off in suitable containers and dispose of. Do not let product enter drains. Use personal protective equipment.

PRODUCT/WASTE DISPOSAL: Dispose of on site or at an approved waste disposal facility.

Emergency Guidelines

COMBUSTION PRODUCTS: Dangerous fumes in case of fire: ammonia, nitrogen oxides, carbon oxides, hydrogen cyanide.

FIRE EXTINGUISHING MEDIA: Carbon dioxide (CO₂), dry powder, dry sand or water spray.

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. **Eyes**, rinse thoroughly with plenty of water for at least 15 minutes. **Skin**, remove contaminated clothing and wash with plenty of water. **Inhalation**, remove to fresh air. Administer oxygen or artificial respiration if needed. **Ingestion**, rinse mouth and drink 1 to 2 glasses of water. Do not induce vomiting.

EMERGENCY TELEPHONE: 49-8621-86-0 (SKW Trostberg AG).

Dormone* — see 2,4-D.

Dosaflo* — see Metoxuron.

Dosage

A dose is a measured quantity, as of medicine, taken at one time or in one period of time. Dosage, therefore, is the amount of medicine in a dose. Used in connection with pesticides it refers in general to rate of application.

See Rate of Application.

Dosagran* (metoxuron) — Discontinued by Sandoz Ltd.

Dosamix* — see Metoxuron.

Dosanex* — see Metoxuron.

Dosater* — see Metoxuron.

Dotan* — see Chlormephos.

Double R* — see Imazalil.

Double Strength* Herbicide (silvex) — Discontinued 1984 by Union Carbide Corp.

Double-M* Insecticide (methoxychlor) — Discontinued by Hopkins Agricultural Chemical Co.

Double-Noctin* (Discontinued 1991 by Gustafson Inc.)

Chemistry

COMPOSITION: Captan + nitrogen-fixing bacteria.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 9000 mg/kg.

Double-Noctin II*

(Discontinued 1991 by Gustafson Inc.)

Identification

DISCONTINUED NAME: Double-Noctin L*.

Chemistry

COMPOSITION: Thiram + nitrogen-fixing bacteria.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Doublet* — see Bromoxynil; Ioxynil; Isoproturon.

Dow Sodium TCA* — Discontinued by Dow Chemical Co.

Dowco* 179 Insecticide (chlorpyrifos) — Discontinued by Dow Chemical Co.

Dowco 213* Acaricide (cyhexatin) — Discontinued by Dow Chemical Co.

Dowco 290* Herbicide (clopyralid) — Discontinued by Dow Chemical Co.

Dowco 453 ME* — see Verdict*.

Dowfume* — Discontinued by Dow Chemical Co.

Dowicide* 1

(Discontinued by Dow Chemical)

Identification

COMMON NAME: 2-Phenylphenol (BSI, ISO, IUPAC).

CODE NUMBERS: CAS 90-43-7; SHA 064103.

Chemistry

COMPOSITION: Orthophenylphenol.

PROPERTIES: Soluble in most organic solvents.

Action/Use

ACTION: Fungicide.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Slight in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2700 mg/kg. Eye and respiratory irritant.

Dowicide* A

(Discontinued by Dow Chemical)

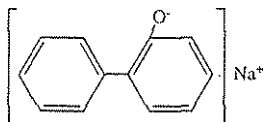
Identification

CODE NUMBERS: CAS 132-27-4; SHA 064104.

DISCONTINUED NAME: Topane*.

Chemistry

COMPOSITION: Sodium o-phenylphenate (tetrahydrate).



Sodium ortho phenylphenate

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Dowicide G-ST* (sodium pentachlorophenate) — Discontinued by Dow Chemical Co.

Dowlap* (trichloronitrophenol) — Discontinued by Dow Chemical Co.

Dowpon* M Herbicide (dalapon) — Discontinued by Inter-Ag Corp.

Dowspray 9* Insecticide (styrene dibromide) — Discontinued by Dow Chemical Co.

Dozer*

(Discontinued 1989 by HACO, Inc.)

Identification

COMMON NAMES: Fenuron-TCA (WSSA); fenuron trichloroacetate.

CODE NUMBERS: CAS 4482-55-7; SHA 035507.

ADDITIONAL TRADE NAME: Urab*.

Chemistry

COMPOSITION: 1,1-dimethyl-3-phenylurea trichloroacetate.

Action/Use

ACTION: Nonselective herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 4000-5700 mg/kg. Petroleum solvent in liquid formulation is greater hazard to humans.

2,4-DP — see Dichlorprop.

DP-35 — see Propanil.

DPA — see Coraza*; Propanil.

DPC — see Dinocap.

DPC* — see 2,4-D.

DPX 1410 — see Oxamyl.

DPX 3217 — see Cymoxanil.

DPX 3674 — see Hexazinone.

DPX 4189 — see Chlorsulfuron.

DPX 5648 — see Sulfometuron-methyl.

DPX 43898 — see Fortress*.

DPX F5384 — see Londax*.

DPX F6025 — see Chlorimuron-ethyl.

DPX H6573 — see Flusilazol.

DPX L5300 — see Express*.

DPX M6316 — see Pinnacle*.

DPX T5648 — see Sulfometuron-methyl.

DPX T6376 — see Metsulfuron-methyl.

DPX Y6202 — see Quizalofop-ethyl; Targa*.

Dragnet* FT — see Permethrin.

Drago* — see Cypermethrin.

Dragon* — see Permethrin.

Drat* Rodenticide (chlorophacinone) — Discontinued 1993 by Rhone-Poulenc Ag Co.

Drawin 755* — see Butocarboxim.

Drawinol* — see Dinobuton.

Drawizon* Insecticide/Nematicide (diazinon) — Discontinued by Wacker-Chemie GmbH.

Draza* — see Methiocarb.

Drazoxolon

Identification

COMMON NAME: Drazoxolon (ISO, BSI).

EXP. CODE NUMBER: PP 781.

OTHER CODE NUMBERS: CAS 5707-69-7; SHA 207400.

DISCONTINUED NAMES: Ganocide*, Mil-Col*, SAIsan* (all ICI Agrochemicals).

Chemistry

PROPERTIES: Yellow crystals, faint odor, melting point 167°C.

Action/Use

ACTION: Fungicide.

USE: Seed treatment for peas, beans.

FORMULATIONS: Suspension concentrate.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bird: Oral LD₅₀ ca. 100 mg/kg (hen).

DRB — see Nirit*.

DRC 1339

Identification

CODE NUMBERS: CAS 7745-89-3; SHA 009901.

Chemistry

COMPOSITION: 3-Chloro-p-toluidine hydrochloride.

Action/Use

ACTION: Bird repellent.

USE: Under study for starling, blackbird control.

Drepanon*

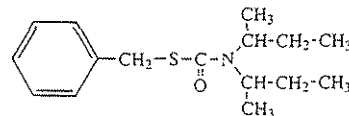
BP: ISAGRO (Drepanon*)

Identification

COMMON NAME: Tiocarbazil (ISO, BSI).

EXP. CODE NUMBER: M 3432 (Montedison).

OTHER CODE NUMBERS: CAS 36756-79-3; SHA 110701.



Active Ingredient of Drepanon*

Chemistry

COMPOSITION: S-Benzyl N,N-di-sec-butylthiolcarbamate.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

PROPERTIES: Colorless liquid, aromatic odor. Vapor pressure 5×10 mm/Hg at 25°C. Miscible over a wide range with polar, apolar solvents at room temperature.

Action/Use

ACTION: Highly selective herbicide.

USE: In flooded rice paddies for barnyardgrasses (*Echinochloa* spp.) by pre, postemergence treatment, or as seed dressing.

FORMULATIONS: Emulsifiable concentrate, granules.

Environmental Guidelines

SOLUBILITY: In water 2.5 ppm at 30°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral $LD_{50} > 10,000$ mg/kg. Dermal > 4000 mg/kg. (Chicken): Oral $LD_{50} > 10,000$ mg/kg.

PROTECTIVE CLOTHING: Protective equipment, clothing.

HANDLING AND STORAGE CAUTIONS: Store in sealed original containers, in well-aired, fresh, dry storehouses at $< 25-30^\circ\text{C}$. Stack containers for air flow at bottom, inside of piles, away from heat, free flames or spark-generating equipment. Store away from inhabited buildings, animal shelters, food stores. Secure from unauthorized persons, children, domestic animals. Biological activity of product remains practically unvaried for 2 years under environmental conditions, if stored as directed.

Emergency Guidelines

FLASHPOINT: Approx. 160°C .

Drexar* 530 — see MSMA.

Drexel* Atrazine — see Atrazine.

Drexel* Captan — see Captan.

Drexel* DSMA — see DSMA.

Drexel* Methoxychlor — see Methoxychlor.

Drexel Plant Bed Gas* Fumigant (methyl bromide + chloropicrin) — Discontinued by Drexel Chemical Co.

Drexel* Sulfur — see Sulfur.

Drianone*

Chemistry

COMPOSITION: Ammonium fluosilicate + pyrethrins + piperonyl butoxide + silica gel + oil.

Action/Use

ACTION: Insecticide.

Dribble* — see Dimefuron*.

Dri-Die*

BP: Roussel Uclaf Corp

Identification

CODE NUMBERS: CAS 7631-86-9; SHA 072602.

Chemistry

COMPOSITION: Silica aerogel/ammonium fluosilicate to 3% fluorine content.

PROPERTIES: Grindability, dusting properties. Balling pH 7; oil adsorption, 40-70%; usual screen analysis, 325; bulk density, 5-15 lbs./cu ft.

Action/Use

ACTION: Conditioning agent, insecticide.

USE: Conditioning agent in production of dry concentrates. For structural pests (roaches, silverfish, ants, fleas).

Drifene* Insecticide (dieldrin + parathion) — Discontinued by Pechiney Progil.

Drifene* A.P. Insecticide (endosulfan + parathion) — Discontinued by Pechiney Progil.

Drifgon*

(Discontinued 1994 by SANAG)

Chemistry

COMPOSITION: Octyl phenoxy ethanol + ethylene oxide + polyacrylamide polymer + polysaccharide polymer.

Action/Use

ACTION: Drift retardant additive.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

Drift

Drift is the movement of a portion of the airborne particles of a dust or spray away from an intended point of application. Dusting is done frequently in early morning when the air is quieter than later in the day. Windy days are poor for spraying. Sensitive crops at a great distance may be injured by drift of herbicides.

Drift Control Agents

BP: Custom Chemicides (Driftgard*)

Rhone-Poulenc (AgRH0* DR)

The principles used in achieving spray drift control are elimination of

droplets smaller than 150 microns and formation of a consistent and cohesive spray pattern.

Driftgard*

BP: Custom Chemicides (Driftgard*)

Chemistry

COMPOSITION: Anionic polyacrylamide.

Action/Use

ACTION: Drift control agent.

FORMULATION: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Drinox* — see Aldrin.

Drinox H-34* — see Heptachlor.

Drione*

BP: Roussel Uclaf Corp.

Chemistry

COMPOSITION: Amorphous silica gel + pyrethrins synergized with piperonyl butoxide in petroleum distillate.

Action/Use

ACTION: Desiccant insecticide dust.

USE: Indoor use for stored product insects. Apply as a crack, crevice treatment or surface application in protected locations such as wall voids. Residual up to 6 months for crawling insects.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral $LD_{50} > 5.0$ mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid dust inhalation.

Keep out of lakes, streams, ponds.

Drop Leaf* — see Sodium Chlorate.

Dropp*

BP: AgrEvo USA Co.

Hoechst Schering AgrEvo GmbH

Identification

COMMON NAME: Thidiazuron (ANSI, BSI, ISO).

EXP. CODE NUMBER: SN 49537 (Schering AG).

OTHER CODE NUMBERS: CAS 51707-55-2; SHA 120301.

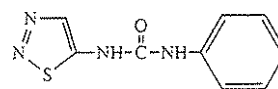
DISCONTINUED NAME: Defolit* (Schering AG).

Chemistry

COMPOSITION: N-phenyl-N'-1,2,3-thiadiazol-5-ylurea (CAS).

FAMILY: Substituted urea.

PROPERTIES: Colorless crystals. Melting point 213°C with decomposition. In DMSO, dimethylformamide > 50 g/100 ml. Less soluble in other organic solvents.



Thidiazuron

Action/Use

ACTION: Plant growth regulator, defoliant.

USE: Cotton defoliant.

FORMULATIONS: Wettable powder.

COMBINATIONS: Ginstar* (+ diuron) (AgrEvo USA Co.).

Environmental Guidelines

SOLUBILITY: In water 20 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral $LD_{50} > 4000$ mg/kg. Intraperitoneal 4200 mg/kg. (Rabbit): Dermal > 1000 mg/kg.

PROTECTIVE CLOTHING: Face mask or goggles, dust respirator, rubber gloves.

HANDLING AND STORAGE CAUTIONS: Use with adequate ventilation. Avoid dust inhalation.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water, foam, dry powder. CO_2 .

FIRST AID: **Eyes,** flush with plenty of water for 15 minutes. **Skin,** remove contaminated clothing, wash skin with soap and water. **Ingestion:**

Call physician or poison control center immediately. Induce vomiting.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC). 302-892-3000 (AgrEvo USA Co.).

Drosan* (drosolure) — Discontinued by Tamogan Ltd.

Drug & Poison Information Center — see National Pesticide Telecommunications Network; Poison Control Centers.

DRW 1139 — see Goltix*.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Dry Concentrate

A dry, relatively free-flowing powder containing the maximum possible amount of active ingredient (a.i.). A wetting agent may be included so that the mixture is ready to be dispersed in water for spray application in which case it is termed a dry wettable. Without a wetting agent, but suitable for further dilution to form a dust, it is called a dust base.

DS 5328

(Discontinued by Diamond Shamrock)

Chemistry

COMPOSITION: cis-2,5-Dimethyl-1-pyrrolidincarboxanilide.

Action/Use

ACTION: Herbicide.

DS-15647 Insecticide (thiofanox) — Discontinued by Fermenta Plant Protection.

DSE — see Nabam.

DSMA

BP: Drexel Chemical Co. (Drexel* DSMA)

ISK Biosciences Corp. (Ansar* 8100, DSMA Liquid)

Luxembourg Industries (Pamol) Ltd. (DSMA 63P*, DSMA 81P*)

Identification

COMMON NAME: DSMA (WSSA, JMAF).

CODE NUMBERS: CAS 144-21-8; SHA 13802.

ADDITIONAL TRADE NAMES: Arrhenal*, Arsynyl*, Di-Tac*, DMA, DMA 100, Methar* 30 (W.A. Cleary Chemical Corp.); Namate* (Crystal Chemical Inter-America); Sodar*.

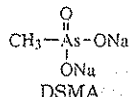
DISCONTINUED NAMES: Dinat* (Cumberland Intl. Corp.); Chipco Crab Kleen* (+ bromoxynil), Weed Broom* (+ bromacil + 2,4-D) (Rhone-Poulenc Ag Co.); Crab-E-Rad*, Dal-E-Rad* 100, Weed-E-Rad*-360 (Vineland Chemical).

Chemistry

COMPOSITION: Disodium methanearsonate (CAS 8CI).

FAMILY: Organic arsenical.

PROPERTIES: (DSMA 81P* and Ansar* 8100): White crystalline solid; melting point 300°C. Hexahydrate is the stable form in moist air. Solubility: 26 g/100 ml in methanol; 0.0025 g/100 ml in hexane.

**Action/Use**

ACTION: Selective postemergence herbicide.

USE: For noncrop areas, lawns, ornamental turf. Directed spray in cotton.

FORMULATIONS: Liquid, water soluble powder, soluble powder solution + added surfactant, slurry.

Registration Notes

U.S.: Drexel* DSMA for bearing, nonbearing citrus except in Florida.

Environmental Guidelines

SOLUBILITY: 34.1 g/100 ml at 25°C in water. Log K_{ow} is <1.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD_{50} 1935 mg/kg. (Rabbit): Dermal LD_{50} >2000 mg/kg. Slight eye, skin irritant.

DSMA liquid (Rat): Inhalation LC_{50} (4 hr. nominal) >22.1 mg/l.

PROTECTIVE CLOTHING: Goggles or face shield, rubber or neoprene gloves, rubber apron.

HANDLING AND STORAGE CAUTIONS: Avoid skin contact or breathing spray mist. Do not store near feed, food. Keep children, domestic animals off treated areas until material washes into soil.

Emergency Guidelines

FLASHPOINT: Nonflammable.

FIRE EXTINGUISHING MEDIA: Dry chemical, CO_2 .

ANTIDOTE: BAL (Dimercaprol).

FIRST AID: Get medical aid. **Eyes**, flush with water for 15 minutes. **Skin**, remove contaminated clothing, wash skin with water. **Inhalation**, get medical aid. **Ingestion**, induce vomiting, drink lots of water; follow with a saline cathartic. NOTE: Some physicians may discourage use of saline emesis.

DSMA 63P* — see DSMA.

DSMA 81P* — see DSMA.

DU 112307 — see Diflubenuron.

Du Nema***Chemistry**

COMPOSITION: 4-Chloropyridine-N-oxide.

Action/Use

ACTION: Nematicide.

USE: For turf.

Du Pont 328 — see Milneb.

Dual* — see Metolachlor.

Dualweed* (barban) — Discontinued by Schering AG.

DuBay* 115 HH — see Ethylmercury Iodide.

Dublex* — see 2,4-DB.

Dumate*

(Discontinued by Midox Ltd.)

Chemistry

COMPOSITION: Zinc-manganese dithiocarbamate.

Action/Use

ACTION: Fungicide.

Duogran* — see Bromoxynil; Pyridate.

Duo-Kill* Insecticide (DDVP) — Discontinued by Hopkins Agricultural Chemical Co.

Duomeen*

BP: Akzo Nobel Chemicals Inc. (Duomeen*)

Identification

CODE NUMBERS: CAS 61791-64-8; SHA 067302.

Chemistry

COMPOSITION: Diamines.

Action/Use

USE: Herbicide preparation.

Duosan*

BP: Grace Sierra Crop Protection Co.

Chemistry

COMPOSITION: Dimethyl 4, 4,0-phenylenebis (3-thioallophanate) 15%; zinc, manganese ethylenebisdithiocarbamate 60%, inert ingredients 25%.

Action/Use

ACTION: Foliar fungicide.

USE: Combines contact and systemic action to reduce resistant disease buildup, effective in controlling brown patch, dollar spot, leaf spots, Fusarium patch, anthracnose, red thread, and rust on turf; anthracnose, blackspot, flower blight, leaf blight, stem and twig blight, downy mildew, powdery mildew, scab, and rust on horticultural and nursery crops.

FORMULATION: 75% wettable powder.

Registration Notes

U.S.: Not for edible crops.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD_{50} 10,200 mg/kg. (Rabbit): Dermal LD_{50} 8000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Product causes eye and skin irritation; toxic to fish. Store in a dry place (temperature not to exceed 122°F (50°C) in a well closed container). Stable, as packaged, for a minimum of two years.

Duo-Tox* E.C. — see Toxaphene.

Duplosan* DP — see 2,4-D; Dichlorprop-P.

Duplosan* DP/D — see 2,4-D; Dichlorprop-P.

Duplosan* DP-M — see Dichlorprop-P; MCPA.

Duplosan* KV

BP: BASF AG (Duplosan* KV, Methoxone*)

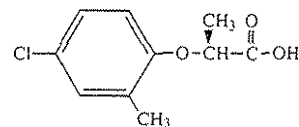
Identification

COMMON NAME: Mecoprop-P (BSI, CSA, ISO, WSSA).

CODE NUMBERS: CAS 16484-77-8; EINECS 240-539-0.

Chemistry

COMPOSITION: (+)-(R)-2-(4-chloro-2-methylphenoxy)propionic acid. PROPERTIES: Solid, slightly yellow. Melting point 83-88°C; bulk density ca. 500-700 g/l. Non-corrosive. Solubility: Tech at 20°C: >100g/100g in acetone, ethanol.



Mecoprop-P

Action/Use

ACTION: Systemic hormone-type herbicide.

USE: For broadleaf weeds such as Galium aparine (cleavers), Stellaria (chickweed), Veronica (speed well) in wheat, barley, oats, and grassland.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

FORMULATIONS: Aqueous solution as amine salt, emulsifiable concentrate (ester form).

COMBINATIONS: Basagran* KV-P (+ bentazone), Duplosan* KV-Combi (+ 2,4-D), Duplosan* M/KV (+ MCPA), Duplosan* Super (+ dichlorprop-P + MCPA), Estrad* M (+ fluoroglycofen-ethyl) (all BASF AG).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >150 <222 mg/l (trout). Bee: Nontoxic. Bird: LD₅₀ >500 <1000 mg/kg (quail).

SOLUBILITY: Tech in water 1.16 g/l at 20°C.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 1050 mg/kg. Dermal >4000 mg/kg.

PROTECTIVE CLOTHING: Goggles, long-sleeved shirt and pants.

HANDLING AND STORAGE CAUTIONS: Do not eat, drink while using. Avoid skin contact. Keep out of reach of children.

SPILL CONTROL/CLEANUP: Liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. Eyes, skin, flush with plenty of water. Ingestion, do NOT induce vomiting unless advised by a physician, treat symptomatically.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC).

Duplosan* KV-Combi — see 2,4-D; Duplosan* KV.

Duplosan* M/KV — see Duplosan* KV; MCPA.

Duplosan* Super — see Dichlorprop-P; Duplosan* KV; MCPA.

Dupono!

(Discontinued by Du Pont Agricultural Products.)

Chemistry

COMPOSITION: Series of long-chain alcohol sulfates.

Action/Use

ACTION: Surface active agents.

Duracide* 15 — see Piperonyl Butoxide; Tetramethrin.

DuraGuard* — see PT* 1325 DuraGuard*.

Duraphos* — see Mevinphos.

Duraset* Plant Growth Regulator (N-meta-Tolylphthalamic acid) — Discontinued 1970 by Uniroyal Chemical Co., Inc.

Duratox* Insecticide (demeton-S-methyl) — Discontinued by Shell Chemicals UK.

Duravos* Insecticide/Fumigant (DDVP) — Discontinued by Fermenta Animal Health Co.

Dursban* — see Chlorpyrifos.

Du-Sprex* Herbicide (dichlobenil) — Discontinued by Duphar B.V.

Dust (s)

BP: Celite Corp./World Minerals, Inc. (Celite*, Kenite*, Micro-Cel*)

Floridin Co. (Diluex*)

J.M. Huber Corp., Calcium Carbonate Div. (Hubercarb*)

Southeastern Clay Co. (Type-41 Clay*)

R.T. Vanderbilt Co., Inc. (Continental Clay*, Pyrax* ABB)

Pesticide dusts are most often made with talcs, pyrophyllite, clays, calcium carbonate, precipitated hydrated silicates and silicon dioxides, synthetic calcium silicate and diatomaceous earth as the diluents although finely ground plant material such as tobacco dust or walnut-shell flour is sometimes used. In some cases, a solution of the insecticide toxicant in a volatile organic solvent such as acetone or benzene is mixed with the dust diluent, the solvent allowed to evaporate, and the mixture then ground. A solution of the insecticide may be sprayed on the dust diluent during mixing and grinding or the toxicant dissolved in a nonvolatile solvent and mixed with the diluent. When this is done, care must be taken to avoid an excess of solvent that might impair dusting qualities of the finished material.

Many technical pesticides in solid form lend themselves to direct grinding with a sorptive clay carrier in adequate milling equipment. Field strength dusts may be produced by diluting or cutting down dust concentrates which contain from 10 to 50% a.i. (Dust Bases). Because of their good dusting properties, attapulgit, diatomite, talc, pyrophyllite, kaolins, and treated calcium carbonate are used as diluents to provide the volume per acre needed to facilitate metering of the dust through the duster mechanism. Since many formulations contain more than one a.i., dry concentrates must have the proper qualities to

make a good dustable formulation with relatively little or no diluent. From a toxicity standpoint, it is desirable to have a very small particle size, since immediate toxicity is generally inversely proportional to particle size. There are several important disadvantages to extremely small particle size: high wind losses, more or less rapid volatilization and the prohibitive cost of extremely fine grinding. Also, to obtain better toxicant exposure of technical concentrates absorbed on a carrier, it is desirable to have the extender or diluent in as large a particle size as possible and still give good dusting characteristics. In a 5% dust effective toxicant exposure is obtained with the extender averaging 10 times the size of the toxicant particles. At present, particle size specifications are usually 10 to 30 microns for ground dusts and 20 to 40 microns for aircraft units. For use in fertilizer mixtures, granulated powders of 20 to 80 mesh are prepared by impregnation of Fuller's earth and bentonite fractions with the desired toxicant. Some toxicants, Tepp* for example, are formulated directly to a 1 to 3% dilute dust by spraying them directly into the diluent while it is agitated in a mixer. This technique is used for preparing dry concentrates and dilute dusts of liquid or liquefiable toxicants such as chlordane, parathion or toxaphene. Dry materials as carriers and diluents for manufacture of dry preparations.

See Carrier, Diluent.

Dust Base (s)

When producing field strength insecticide dusts, in most cases, an intermediate or master-batch state is produced with additional dilution completed at a later stage. These master batches are known as dust bases. Solid diluents are usually termed carriers when used in the intermediate stage. In final reduction they are known as diluents. Production of the master batches requires more elaborate grinding and impregnating equipment than is needed for the blending of finished materials.

See Carriers.

Dust M* — see Tetrachlorvinphos.

Duster (s) — see Hand Duster; Knapsack Duster; Power Duster; Rotary-type Hand Duster.

Dusting Sulfur* — see Sulfur.

Dustret A*

F: AGSCO, Inc.

Chemistry

COMPOSITION: Maneb + streptomycin sulfate.

Action/Use

ACTION: Fungicide; antibiotic.

USE: Potato seed piece treatment.

FORMULATIONS: Dry.

Environmental Guidelines

HAZARDS: Fish: Toxic.

Safety Guidelines

PROTECTIVE CLOTHING: Respirator, gloves, safety glasses, long sleeve shirt, long pants.

HANDLING AND STORAGE CAUTIONS: Keep dry; store in well ventilated area away from excessive heat or ignition sources. Avoid contact with oxidizing materials, acid.

Emergency Guidelines

FLASHPOINT: N/Ap.

FIRST AID: Eyes, flush with water. Skin, wash with soap and water. Inhalation, remove to fresh air. Ingestion, dilute by giving 2 glasses of water.

Dutch Treat* Defoliant (cacodylic acid) — Discontinued by Vine-land Chemical.

Du-Ter* Fungicide (triphenyltin hydroxide) — Discontinued 1993 by Griffin Corp.

Duter* Fungicide (triphenyltin hydroxide) — Discontinued 1989 by Duphar B.V.

Dwell* Fungicide (etridiazole) — Discontinued by Uniroyal Chemical Co., Inc.

Dyanap* Herbicide (dinoseb + naptalam) — Discontinued 1987 by Uniroyal Chemical Co., Inc.

Dybar* Herbicide (fenuron) — Discontinued by Du Pont Agricultural Products.

Dycarb* — see Bendiocarb.

Dyclomec* — see Dichlobenil.

Dyfonate*

BP: ZENECA Ag Products (Capfos*, Cudgel*, Dyfonate*, Tycap*)

Identification

COMMON NAME: Fonofos (ISO, BSI, ESA).

EXP. CODE NUMBER: N-2790 (ZENECA Ag Products).

OTHER CODE NUMBERS: CAS 944-22-9; SHA 041701.

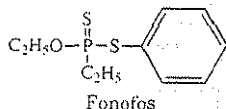
Chemistry

COMPOSITION: O-Ethyl S-phenyl ethylphosphonodithioate (IUPAC).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Soil insecticide.
USE: Controls corn borers and rootworms, cutworms, symphylans (garden centipedes), wireworms, other soil, foliar pests.
FORMULATIONS: Emulsifiable concentrate, granules.
COMBINATIONS: Edge* (+ napropamide) (ZENECA Ag Products).



Registration Notes

U.S.: Some (4EC) or all applications may be classified as RUP.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.05 mg/l (96 h) (rainbow trout). Bee: Toxic.
SOLUBILITY: In water 13 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: DANGER (Dyfonate* 4EC, Dyfonate* II 20G);
WARNING (Dyfonate* II 10G, Dyfonate* II 15G).
TOXICITY CLASS: I (Dyfonate* 4EC, Dyfonate* II 20G); II (Dyfonate* II 10G, Dyfonate* II 15G).

TOXICITY: Tech (Rat): Oral LD₅₀ 8-17.5 mg/kg. (Rabbit): Dermal approx. 25 mg/kg.

Cholinesterase inhibitor. Granulars much less hazardous than emulsions. TLV, 0.1 mg/m³.

Emergency Guidelines

FLASHPOINT: >200°F, 93°C (Tag OC).

ANTIDOTE: Atropine, protopam chloride. NEVER use morphine.

FIRST AID: Cholinesterase inhibitor. Get medical aid. Eyes, skin, flush immediately with plenty of water. Wash nails, skin and hair with soap and water. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water.

Dygun*

Chemistry

COMPOSITION: Toxaphene + methyl parathion.

Action/Use

ACTION: Insecticide.

USE: For rice (Philippines).

FORMULATIONS: Emulsifiable concentrate.

Dylox* — see Trichlorfon.

Dymec* — see 2.4-D.

Dymet

(Discontinued by Sierra Crop Protection Co.)

Chemistry

COMPOSITION: Methoxychlor + diazinon. 2,2-bis(p-methoxyphenyl)-1,1,1-trichloroethane + O,O-diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate.

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2000 mg/kg. (Rabbit): Dermal 8000 mg/kg. Moderate eye, skin irritation.

Emergency Guidelines

ANTIDOTE: Use atropine for organophosphate treatment.

Dymid* — Discontinued by Eli Lilly & Co.

Dymron

BP: SDS Biotech K.K. (Showrone*)

Identification

COMMON NAMES: Dymron (JMAF); daimuron (ISO draft, BSI).

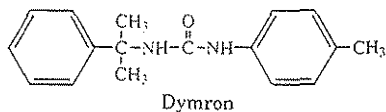
CODE NUMBER: CAS 42609-52-9.

DISCONTINUED NAMES: Sohyaron* (+ oxadiazon) (SDS Biotech K.K.).

Chemistry

COMPOSITION: 1-(α,α-Dimethylbenzyl)-3-p-tolyl urea (IUPAC).

PROPERTIES: Odorless, colorless needle crystals. Melting point 203.0°C. Soluble in alcohols, ether, ketones.



Action/Use

ACTION: Selective herbicide.

USE: For rice paddies. Preemergence for cyperaceous weeds; at or shortly after sowing, transplanting. Not phytotoxic to rice.

FORMULATIONS: Granule, wettable powder.

COMBINATIONS: Showrone M* (+ CNP).

Registration Notes

OUTSIDE U.S.: Registered in Japan, Korea and Taiwan.

Environmental Guidelines

SOLUBILITY: 1.2 ppm in water at 20°C.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >4000 mg/kg. (Mouse): Oral LD₅₀ >6500 mg/kg.

HANDLING AND STORAGE CAUTIONS: Stable against heat, light.

Dymuron — see Hinochloa*.

Dynamite* — see Fenpyroximate.

Dynamyte* Herbicide (dinoseb) — Discontinued 1989 by Drexel Chemical Co.

Dyne-amic*

BP: Helena Chemical Co.

Chemistry

Proprietary blend of polyalkyleneoxide modified polydimethylsiloxane, nonionic emulsifiers, and methylated vegetable oils.

Action/Use

ACTION: A crop oil concentrate with the wetting ability of a nonionic surfactant.

USE: Coverage and penetration in application of pesticide sprays.

See Penetrant.

Dynex* Herbicide (diuron) — Discontinued by Inter Ag Chemical Corp.

Dynit* Emulsifier (alkoxylated fatty alcohol) — Discontinued 1994 by BASF AG.

Dynone* Fungicide (prothiocarb) — Discontinued by Schering AG.

Dynoram* Herbicide (chloramben + dinoseb) — Discontinued by Union Carbide Corp.

Dypar* — see Methyl Parathion.

Dyrene*

BP: Bayer AG (Dyrene*)

Identification

COMMON NAMES: Anilazine (BSI, ISO); triazine (JMAF).

CODE NUMBERS: CAS 101-05-3; SHA 080811; EINECS 202-910-5.

DISCONTINUED NAMES: Direz*, Kemate* (Bayer AG); Triasyn*.

Chemistry

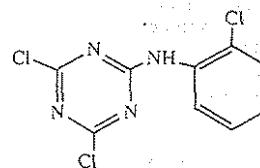
COMPOSITION: 4,6-Dichloro-N-(2-chlorophenyl)-1,3,5-triazin-2-amine (IUPAC).

FAMILY: Triazine.

PROPERTIES: Colorless to tan crystalline solid. Melting point 159°C.

Vapor pressure 820 nPa at 20°C. Stable under normal use conditions.

Compatible with most insecticides, fungicides, except oils, alkaline materials. Moderately soluble in organic solvents.



Anilazine

Action/Use

ACTION: Non-systemic foliar fungicide with protective action.

USE: Mainly for Septoria in wheat (glume blotch and on leaves). Also for early and late blights of potatoes and tomatoes; leaf spot diseases on vegetables, ornamentals, berry fruit, coffee, tobacco and other crops; and turf diseases.

FORMULATIONS: Suspension concentrate, wettable powder.

Registration Notes

U.S.: All uses voluntarily cancelled by Miles Inc.

Environmental Guidelines

HAZARDS: Tech: Fish: LC₅₀ 0.15 mg/l (96 h) (rainbow trout). Bird: LD₅₀ >2000 mg/kg b.w. (virg. quail). Bee: Nontoxic.

SOLUBILITY: Insoluble in water. Subject to hydrolysis.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ >4000 mg/kg. Dermal >5000 mg/kg.

PROTECTIVE CLOTHING: Goggles, face shield or safety glasses. Protective clothing during application or when contacting treated foliage.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry place in original container out of reach of children, preferably in a locked storage area.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** hold lids open, flush with steady, gentle stream of water for at least 15 minutes. **Skin,** wash immediately with soap and water. **Inhalation,** remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth.

EMERGENCY TELEPHONE: 49-2173-38-3030 (Bayer AG).

Dyzol* — see Diazinon.

D.z.n — see Diazinon.

E7 Z9-12 Ac — see RAK* 2.

E-48 — see Karphos*.

E-600 — see Paraoxon.

E-601 — see Methyl Parathion.

E-605 — see Parathion.

E-838 — see Potasan*.

E-1059 — see Systox*.

E 1752 — see Fenthion.

Eagle* Fungicide — see Systhane*.

Eagle* Herbicide — see Amidosulfuron.

Early Postemergence

Applied after emergence during the cotyledonary growth phase of crop or weed seedlings.

Earthcide* — see PCNB.

Eastman* DMP Plasticizer — see Dimethyl Phthalate.

Easy Off-D* Defoliant (merphos) — Discontinued by Rhone-Poulenc Ag Co.

Easy Spot*

F: Cornbelt Chemical Co.

Chemistry

COMPOSITION: Sodium lauryl ether sulfate + other principal functioning agents.

Action/Use

ACTION: Foam marking agent.

FORMULATIONS: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

STORAGE AND HANDLING CAUTIONS: Eye irritant. Avoid skin contact. Do not freeze. Store at >40°F.

EBDCs — see Dithiocarbamates.

E-B-Farnesene — see Panic*.

E.C. — see Emulsifiable Concentrate.

Ecdysone — see Molting Hormone.

Echloomezol — see Etridiazole.

Echloomezole — see Etridiazole.

Echo* — see Chlorothalonil.

Echo* 500 — see Chlorothalonil.

Echo* 90DF — see Chlorothalonil.

Eclahra* — see Fosthiazate.

Eclesis* — see Fosthiazate.

Eclipse* — see Fenoxycarb.

Ecology

Defined by Webster as: "A branch of science concerned with interrelationship of organisms and their environments; the totality or pattern of relations between organisms and their environment."

Ecombi* — see Oxydemeton-methyl; Parathion.

Economic Poison (Pesticides)

As defined under the Federal Insecticide, Fungicide, and Rodenticide Act, economic poison "means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, nematodes, fungi, or weeds, or any other forms of life declared to be pests; and any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant." As so defined economic poisons are now known generally as pesticides.

Ecopro* — see Temephos.

Ectiban* Insecticide (permethrin) — Discontinued 1985 by ICI Americas.

Ectodex* — see Amitraz.

Ectoral* — see Ronnel.

Ectrin* — see Fenvalerate.

EDB — see Ethylene Dibromide.

EDB 85 (ethylene dibromide) — Discontinued by Michigan Chemical.

E-D-Bee* (ethylene dibromide) — Discontinued.

EDC — see Ethylene Dichloride.

EDDP — see Edifenphos.

Edge*

BP: Custom Chemicides

Chemistry

COMPOSITION: Alkyl sulfonates + alcohols.

Action/Use

ACTION: Foam marker.

USE: Visible foam to mark fields.

FORMULATION: Liquid concentrate.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Edifenphos

BP: Bayer AG (Hinosan*)

Hanwha Corp.

Nihon Bayer Agrochem K.K. (Hinosan*)

Identification

COMMON NAME: Edifenphos (ISO, BSI); EDDP (JMAF).

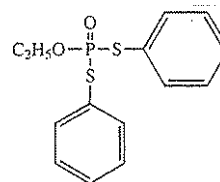
EXP. CODE NUMBERS: Bay 78418, SRA 7847.

OTHER CODE NUMBERS: CAS 17109-49-8; SHA 434300; EINECS 241-178-1.

Chemistry

COMPOSITION: O-ethyl S,S-diphenyl phosphorodithioate (IUPAC and CAS).

PROPERTIES: Yellow-light brown clear liquid. Specific gravity approx. 1.23. Vapor pressure 13 mPa at 20°C. Soluble in organic solvents.



Edifenphos

Action/Use

ACTION: Fungicide.

USE: For blast disease, ear blight, and stemrot in rice.

FORMULATIONS: Emulsifiable concentrate, dustable powder.

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Canada: Not marketed. Japan: May be used in combination with fthalide, penoxcuren, and various insecticides and fungicides.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96 h) 0.49 mg/l (bluegill); LC₅₀ (96 h) 0.43 mg/l (rainbow trout). Bird: Dietary: LC₅₀ >1819 mg/kg (bobwhite quail). Bee: LD₅₀ (24 h) >20 µg/bee.

SOLUBILITY: Insoluble in water.

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: Tech: (Rat): Oral LD₅₀ approx. 100 - 250 mg/kg b.w.; Dermal 700 - 800 mg/kg b.w.

Emergency Guidelines

ANTIDOTE: Atropine, PAM.

EDTA — see Cheelox* Sequestrants.

Eerex* — see Bromacil; Urox*.

Effix* — see Suffix BW*.

Efosite-AI* Fungicide (fosetyl-aluminum) — Discontinued by Rhone-Poulenc Agrochimie S.A.

Efuzin* Fungicide (dodine) — Discontinued 1994 by AgroKemia Sellye Ltd./Int. Com. Div. Starchem Co. Ltd.

EGT — see Glytac*.

EI 4124 — see Di-Captan*.

EINECS

European Inventory of Existing Commercial Chemical Substances. EINECS code numbers are included in some Pesticide Dictionary listings.

Ekalux* — see Quinalphos.

Ekamet*

BP: Sandoz Agro Ltd. (Ekamet*, Satisfar*)

Identification

COMMON NAME: Etrimfos (ISO, ANSI, BSI, ESA).

EXP. CODE NUMBER: SAN 197 I (Sandoz Agro Ltd.).

OTHER CODE NUMBERS: CAS 38260-54-7; SHA 427500; OMS 1806 (WHO).

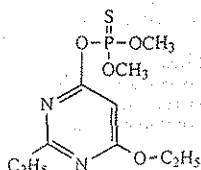
Chemistry

COMPOSITION: O-(6-ethoxy-2-ethyl-4-pyrimidinyl) O,O-dimethyl phosphorothioate.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

FAMILY: Organophosphorus, pyrimidine.

PROPERTIES: Colorless oil. Vapor pressure 8.6 mPa (20°C), d_{20}^{20} , 1.195 n_D^{20} , 1.5068. Soluble in organic solvents. Stable in nonpolar solvents.



Etrinfos

Action/Use

ACTION: Broad-spectrum nonsystemic contact, stomach insecticide. **USE:** Ekamet* for crop protection uses. Satisfar* for stored crop (barley, beans, corn, sorghum, groundnuts, oil seeds, peas, soybeans, wheat, etc.) uses. For Coleoptera, Diptera, Lepidoptera, and to a variable extent, Hemiptera, mainly on temperate and subtropical fruits (including grapes), alfalfa, corn, olives, rice, tobacco, and vegetables. All-purpose insecticide for house gardens and handling equipment. Controls scales in fruit trees, citrus and olives, grape berry moths in grapes, European corn borer, Colorado potato beetle, lepidopterous pests of tobacco, prebloom and early postbloom pest complexes on fruit trees: rice stemborers, beetles, midges and bugs, and alfalfa weevils. Granular for Pyralidae in paddy rice. Moderate residual activity in the field lasting 7-14 days.

FORMULATIONS: Dust, emulsifiable concentrates, granular, ULV.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 13.3 mg/l (96 h) (carp); 5.5 mg/l (96 h) (guppy); 24 µl (96 h) (rainbow trout). Bee: Toxic by contact.

DEGRADATION (SOIL): DT₅₀ 3-10 days (o.c. 2.8%, pH: 6.8).

SOIL PARTICLE ADSORPTION: Hydrostability: In aqueous buffered solution at 25 ppm a.i. (25°C) the half-life periods are 16 and 14 days at pH 6 and 9, respectively.

DEGRADATION AND METABOLISM: DT₅₀ 3-10 days (o.c. 2.8%, pH: 6.8).

SOLUBILITY: In water at 40 ppm (23-24°C).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: A.I. (Rat): Oral LD₅₀ 1800 mg/kg (male). Dermal >2000 mg/kg. (Rabbit): Dermal LD₅₀ >500 mg/kg (male). In 26-week feeding tests on dogs, the "no-effect" level was about 12 ppm of the diet; in 3-month tests on rats it was 9 ppm. In 2-year feeding trials the NOEL for rats was 6 mg/kg diet and for dogs 10 mg/kg diet.

HANDLING AND STORAGE CAUTIONS: Store in original container, in locked area away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Atropine with PAM or obidoxime chloride.

FIRST AID: Get medical aid.

Ekanon* — see Disulfoton; Quinalphos.

Ekatin* — see Thiometon.

Ekatin* M — Discontinued by Sandoz Ltd.

Ekatox* — see Methyl Parathion.

Eksmin* — see Permethrin.

Ektafos* — see Dicrotophos.

EL-107 — see Gallery*.

EL-110 (benefin) — Discontinued by Elanco Products.

EL-119 (oryzalin) — Discontinued by Elanco Products.

EL-161 — see Sonalan*.

EL-179 (isopropalin) — Discontinued by Elanco Products.

EL-222 — see Rubigan*.

EL-228 — see Trimidal*.

EL-273 (triarimol) — Discontinued by Elanco Products.

EL-291 (tricyclazole) — Discontinued by Elanco Products.

EL-531 — see A-Rest*.

EL-614 (bromethalin) — Discontinued.

EL-12008

Chemistry

COMPOSITION: O,O-Diethyl S-(isopropylthiomethyl) phosphorodithioate.

EL-47470

Chemistry

COMPOSITION: 2-(Diethoxyphosphinylimino)-4-methyl-1,3-dithiolane.

Elancolan* Herbicide (trifluralin) — Discontinued by Elanco Products.

Elastrel* — see DDVP.

Elcar*

(Discontinued 1985 by Zoecon Corp.)

Identification

COMMON NAME: Heliothis Nuclear Polyhedrosis Virus.

DISCONTINUED NAME: Biotrol* VHZ (Zoecon Corp.).

Chemistry

COMPOSITION: Nuclear Polyhedrosis virus of Heliothis zea.

Action/Use

ACTION: Selective microbial insecticide.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bird: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Relatively nonhazardous for other invertebrates, animals including human and other mammals, fish and wildlife. See Virus.

Elcide* — see Thimerosal*.

Electrostatic Charge

The electric charge generated in walking over a rug or by which a silk thread adheres to the hand. Dust particles bear charges produced by friction with the dusting equipment or even between particles themselves. These charges have much to do with attraction to plant surfaces.

Elgetol* 30 (DNOC) — Discontinued 1993 by FMC Corp.

Elgetol* 318 Herbicide (dinoseb) — Discontinued by FMC Corp.

Elite* — see Tebuconazole.

Elimpro* Fungicide (thiabendazole) — Discontinued by Hopkins Agricultural Chemical Co.

Elcron*

(Discontinued by Ciba-Geigy Ltd.)

Identification

COMMON NAMES: Dioxacarb (ISO-E, BSI, ANSI, ESA, JMAF); dioxacarbe (ISO-F).

EXP. CODE NUMBER: C 8353 (Ciba-Geigy).

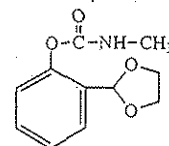
OTHER CODE NUMBERS: CAS 6988-21-2; SHA 392100; OMS 1102 (WHO); ENT 27389.

DISCONTINUED NAME: Famid* (Ciba-Geigy Ltd.).

Chemistry

COMPOSITION: 2-(1,3-Dioxolan-2-yl)phenyl methylcarbamate.

PROPERTIES: White crystals. Readily soluble in various organic solvents. Melting point 114-115°C.



Dioxacarb

Action/Use

ACTION: Contact, stomach insecticide.

FORMULATIONS: Flowable, wettable powder.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bee: Toxic.

SOLUBILITY: In water 6000 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 60-80 mg/kg. Dermal 3000 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine alone. Do NOT combine with oxime preparations.

Elosal* — see Sulfur.

Eisan* — see Phenthoate.

Elvaron* — see Euparen*.

EM 923 — see Genite*.

Emathlite* Carrier (Fuller's Earth) — Discontinued by Mid-Florida Mining Co.

Embark* — see Mefluidide.

Embark* Lite — see Mefluidide.

Emblem* Herbicide (benefin) — Discontinued by Mallinckrodt, Inc.

Emblem* — see Bromoxynil.

Embutone* — see 2,4-DB.

Embutox Plus* — see 2,4-DB.

EMC — see Ethylmercury Chloride.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Emerald Green — see Paris Green.

Emerest*

BP: Henkel Corp.

Action/Use

ACTION: Emulsifier; solvent.

Emergence

Emergence, in connection with herbicide usage, refers to the time when the first leaves of a plant appear above the soil surface. The expression "at emergence" refers to treatment applied during the visible emerging phase of the specified crop or weed.

Emergency Information

A toll-free Emergency Drug and Poison Information number for your state is available from your local information operator.

Emersed Plant

A rooted or anchored aquatic plant adapted to grow with most of its leaf-stem tissue above the water surface and not lowering or rising with the water level.

Emetic

An agent which causes vomiting. Some physicians do NOT recommend use of saline solutions as an emetic. Check the label and seek emergency treatment.

Emid

Chemistry

COMPOSITION: 2,4-Dichlorophenoxyacetamide.

Action/Use

ACTION: Herbicide.

Eminent* Fungicide — see Tetraconazole.

Eminent Star* — see Chlorothalonil; Tetraconazole.

Emisan* 6 — see MEMC.

Emmatoes* — see Malathion.

Emmatoes Extra* — see Malathion.

Emmi*

(Discontinued by Velsicol Chemical Corp.)

Identification

CODE NUMBERS: CAS 2597-93-5; SHA 045301.

Chemistry

COMPOSITION: N-Ethylmercuri-1,2,3,6-tetrahydro-3,6-endomethano-3,4,5,6,7,7-hexachlorophthalimide.

Action/Use

ACTION: Fungicide.

Empal* — see MCPA.

Empire* — see Chlorpyrifos.

Empirical Formula — see Formula.

Emisorb*

BP: Henkel Corp.

Action/Use

ACTION: Emulsifier

EMTS — see Ethylmercury p-Toluene Sulfonanilide.

Emul 168

F: Wilbur-Ellis Co.

Chemistry

COMPOSITION: Alkylaryl phosphoric acid ester as the active constituents.

Action/Use

ACTION: Emulsifier and compatibility agent.

USE: To help prevent inverts as well as reclaiming inverted mixes.

FORMULATIONS: Flammable liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

See Emulsifier.

Emulsamine* BK — see 2,4-D; 2,4,5-T.

Emulsamine* E-3 — see 2,4-D.

Emulsamine* 2,4,5-T — see 2,4,5-T.

Emulsifiable Concentrate

Produced by dissolving the toxicant and an emulsifying agent in an organic solvent. A solvent substantially insoluble in water is usually selected since water-miscible solvents have not in general proved feasible. Strength usually stated in pounds of toxicant per gallon of concentrate.

Emulsifier

Surface-active substance which stabilizes (reduces the tendency to separate) a suspension of droplets of one liquid in another liquid which otherwise would not mix with the first one.

Emulsifiable Oil — see Refined Petroleum Distillate.

Emulsion

A dispersion of fine particles of oily material in water (OW type). Or less commonly, in pesticide usage, a dispersion of water droplets in oil (WO type). The one liquid does not dissolve in the other although when a suitable emulsifier is added a stable mixture can be made.

Enable* — see Indar*.

Encapsulated Pesticides

Pesticides enclosed in tiny capsules (or beads) of thin polyvinyl or other plastic material to control release of the chemical and extend the period of diffusion, thus providing increased safety to applicators as well as to the environment.

Endangered Species

Animals, birds, fish, plants or other living organisms threatened with extinction by man-made or natural changes in their environment.

Requirements for declaring a species endangered are contained in the Endangered Species Act.

Endocel* — see Endosulfan.

Endocide* — see Endosulfan.

Endocide* Insecticide (endothion) — Discontinued 1979 by Rhone-Poulenc Ag Co.

Endogerme CP* — see Chlorpropham.

Endosan* Insecticide (endosulfan) — Discontinued by Hoechst AG.

Endosol* — see Endosulfan.

Endosul* — see Endosulfan.

Endosulfan

BP: AgrEvo USA Co. (Phaser*)

Bharat Pulverising Mills Ltd. (Hexasulfan*)

Biesterfeld U.S., Inc.

Defensa Indústria de Defensivos Agrícolas S.A.

Excel Industries Ltd. (Endocel*)

Gilmore, Inc.

Hanwha Corp.

Hindustan Insecticides Ltd. (Hildan*)

Hoechst Schering AgrEvo GmbH (Thiodan*)

Hubei Sanonda Co., Ltd.

Krishi Rasayan (Rasayansulfan*)

Makhteshim-Agan (Thionex*)

Identification

COMMON NAMES: Endosulfan (ANSI, BSI, CSA, ESA, ISO); benzoepin (JMAF); thiodan (USSR).

EXP. CODE NUMBERS: FMC 5462 (FMC Corp.); Hoe 002671 (Hoechst AG); NIA 5462.

OTHER CODE NUMBERS: CAS 115-29-7; SHA 079401.

ADDITIONAL TRADE NAMES: Ex-borer* (Agsin Pte. Ltd.); Endosol* (All India Medical Corp.); Chimac Endo*, Spodos*, Sulfanex* (Chimac-Agriphar S.A.); Thionate* (Crystal Chemical Inter-America); Devisulfan* (Devidayal (Sales) Pvt. Ltd.); Sutene 35 EC* (Diachem S.P.A.); GoldenLeaf* Tobacco Spray (FMC Corp.); Endosun* EC (Gupta Chemicals Pvt. Ltd.); Malix* (Hoechst Schering AgrEvo GmbH); Insectophene*; Khatau Endo* (Khatau Junker Ltd.); Pausulfa* (Paushak Ltd.); Vegfru Thiotox* (Pesticides India); Endocide* (Platte Chemical Co.); Endosul* (Sulphur Mills Ltd.); Beosit*, Chlorthiepin*, Crisulfan*, Cyclofan*, Devisulphan*, Thimul*, Thiofor*.

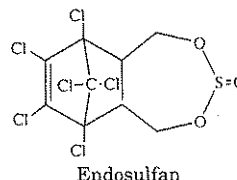
DISCONTINUED NAMES: Endosan*, Kop Thiodan* (Hoechst AG); Thiosulfan* (Hooker Chemical); Tiovel* (Velsicol Chemical Corp.).

Chemistry

COMPOSITION: 6,7,8,9,10,10-Hexachloro-1,5,5a,6,9,9a-hexahydro-6,9-methano-2,4,3-benzodioxathiepin 3-oxide (IUPAC).

FAMILY: Sulfurous acid ester of a chlorinated cyclic diol (WHO).

PROPERTIES: Tech (mixture of two isomers); melting points 109.2°C, 213.3°C. Density approx. 1.8 at 20°C. Readily soluble in most organic solvents.



Action/Use

ACTION: Insecticide, acaricide.

USE: For aphids, thrips, beetles, foliar feeding larvae, tarsonemid mites, borers, cutworms, bollworms, bugs, whiteflies, and leafhoppers on citrus, deciduous, small fruits, coffee, tea, fiber crops, forage crops, forest, grains (cereals and rice), nuts, oil crops, ornamentals, tobacco, vegetables. Controls tsetse fly.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

FORMULATIONS: Dust, emulsifiable concentrate, granule, ULV, wettable powder.

COMBINATIONS: Metofan*, Metofan Forte* (+ methomyl) (Aragonesas Agro, S.A.); Cyperfan* (+ cypermethrin), Demecor* (+ dimethoate) (Chimac-Agrifhar S.A.); Endocide Plus* (+ parathion) (Platte Chemical); Serk* (+ thiometon) (Sandoz Agro Ltd.).

Environmental Guidelines

HAZARDS: Fish: Toxic. Bird: Toxic. Bee: Moderately toxic (direct application). Relatively nontoxic to beneficials (parasitic wasps, lady bird beetles and beneficial mites).

SOLUBILITY: Tech insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (tech.); POISON (most formulations).

TOXICITY CLASS: I (tech.).

TOXICITY: Tech (Rat): Oral LD₅₀ 160 mg/kg (male), 22.7 mg/kg (female). Dermal >500 mg/kg. (Rabbit): Dermal 359 mg/kg.

PROTECTIVE CLOTHING: Applicators must wear long-sleeved shirt, trousers, unlined waterproof neoprene or rubber gloves, shoes or boots, hat, and a MSHA/NIOSH approved mask or respirator.

HANDLING AND STORAGE CAUTIONS: Do not breathe dust, spray mist. Avoid eye, skin, clothing contact. Wash hands immediately after handling. Do not store in or around home. Do not store near heat, open flame or hot surfaces.

Emergency Guidelines

ANTIDOTE: Endosulfan is a central nervous system stimulant; no specific antidote available. Diazepam IV for convulsions; barbiturates (phenobarbital) are also anticonvulsants. Epinephrine (adrenaline) derivatives are contraindicated.

FIRST AID: Ingestion, gastric lavage, with care to prevent aspiration with subsequent development of pneumonia or pulmonary edema due to organic solvent contained in this product.

EMERGENCY TELEPHONE: 800-228-5635, Ext. 132 (Hoechst-Roussel).

Endosun* EC — see Endosulfan.

Endothal — see Endothall.

Endothal* — see Endothall.

Endothal Turf Herbicide* — see Endothall.

Endothal Weed Killer* — Discontinued by Pennwalt.

Endothall

BP: Elf Atochem Agri S.A. (Accelerate*, Aquathol*, Hydrothol*)
 ELF Atochem North America, Inc. (Accelerate*, Aquathol*, Aquathol* K, Des-I-Cate*, Endothal*, Hydrothol* 191, Hydrothol* Turf Herbicide, Herbicide 273*)

Identification

COMMON NAME: Endothall (ANSI, WSSA, CSA); endothal (ISO, BSI).
CODE NUMBERS: CAS 129-67-9; SHA 038901.

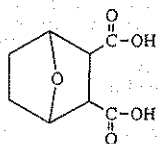
ADDITIONAL TRADE NAMES: ETH*.

DISCONTINUED NAMES: Tribetol* (+ propham) (Atochem Agri B.V); Hydout* (Pennwalt); Niagrathal* (FMC Corp.).

Chemistry

COMPOSITION: 7-Oxabicyclo[2,2,1]heptane-2,3-dicarboxylic acid (IUPAC) used as sodium, potassium, or amine salts.

PROPERTIES: Melting point 144°C. Soluble in methanol.



Endothall

Action/Use

ACTION: Pre, postemergence herbicide, defoliant, desiccant, aquatic algicide, growth regulator.

USE: For sugar beets, turf; hops sucker suppression; alfalfa, clover desiccant; cotton harvest aid (Accelerate*); potato vine killers. Aquatic herbicide, algicide (Aquathol*, Hydrothal*).

FORMULATIONS: Granular.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic.

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 51 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact or drift to other plants as injury may result. As an aquatic herbicide, certain water use restrictions apply. Keep from freezing.

Emergency Guidelines

EMERGENCY TELEPHONE: 409-779-0060.

Endothion

Identification

COMMON NAME: Endothion (ISO, BSI, ESA, ex-ANSI).

EXP. CODE NUMBERS: AC-18737 (American Cyanamid); NIA 5767 (FMC Corp.).

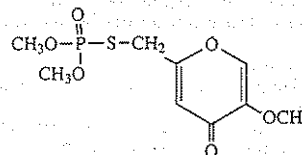
OTHER CODE NUMBERS: CAS 2778-04-3; SHA 422100; ENT 24653.

ADDITIONAL TRADE NAMES: Exothion*, Phosphopyron*

DISCONTINUED NAME: Endocide* (Rhône-Poulenc Ag Co.).

Chemistry

COMPOSITION: S-5-methoxy-4-oxo-4H-pyran-2-ylmethyl O,O-dimethyl phosphorothioate (IUPAC).



Endothion

Action/Use

ACTION: Systemic insecticide, acaricide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 30-50 mg/kg.

Endoxan

Identification

OTHER NAME: Cyclophosphamide.

Chemistry

COMPOSITION: 2-(bis(2-chloroethyl)amino) tetrahydro-2H-1,3,2-oxazophosphorine-2-oxide.

Endrex* Insecticide (endrin) — Discontinued by Shell International Chemical Co. Ltd.

Endrin

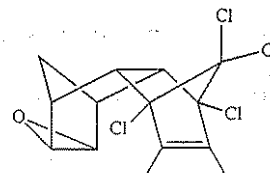
Identification

COMMON NAMES: Endrin (ISO-E, BSI, ESA, JMAF); endrine (ISO-F); nendrin (India, So. Africa).

CODE NUMBERS: CAS 72-20-8; SHA 041601; OMS 197 (WHO); ENT 17251; EINECS 200-775-7.

ADDITIONAL TRADE NAME: Hexadrin*.

DISCONTINUED NAME: Endrex* (Shell International Chemical Co. Ltd.).



Endrin

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 7-15 mg/kg. Dermal 15 mg/kg (female).

Emergency Guidelines

ANTIDOTE: Central nervous system depressant and hepatotoxin; no antidote. Diazepam, intravenous glucose, B vitamins, large amounts of activated charcoal, saline laxatives help to control convulsions, protect the liver, and limit GI absorption. Oxygen may be necessary.

Endrine — see Endrin.

Endura PB 80EC* — see Piperonyl butoxide.

Endyl* Insecticide/Acaricide (carbophenothion) — Discontinued by Planters Products.

Enhance* — see Captan; Carboxin.

Enhance Plus* — see Carboxin; Lindane; Maneb.

Enide* Herbicide (diphenamid) — Discontinued 1988 by NOR-AM.

Enide Dinitro* Herbicide (dinoseb + diphenamid) — Discontinued 1977 by TUCO.

Enilconazole — see Imazatil.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Enovit Methyl

PESTICIDE DICTIONARY

Enovit Methyl* — see Thiophanate-Methyl.

Enquik*

BP: Unocal Petroleum Products & Chemicals Div.

Identification

COMMON NAME: Sulfcarbamide.

CODE NUMBERS: CAS 21351-39-3; SHA 612-4; EINECS 224-343-6.

Chemistry

COMPOSITION: Monocarbamide dihydrogensulfate.

PROPERTIES: Odorless pink viscous liquid. Vapor pressure negligible up to decomposition temperature 110°C.

Action/Use

ACTION: Herbicide; desiccant.

USE: Herbicide in onions, leeks, shallots, garlic, peanuts, alfalfa, deciduous fruits, nuts and vineyards, wheat, tomatoes, pepper, eggplant, strawberry row middles, red raspberries, grape vine sucker control, cranberries, grass seed. Desiccant for dry beans, peas, lentils, peppermint, potato vines.

FORMULATIONS: Liquid.

COMBINATIONS: Do not mix with nitrogen fertilizers. See label.

Registration Notes

U.S.: Limited to Alabama, Georgia, Idaho, Michigan, Oregon, and Washington. Aerial application prohibited.

Environmental Guidelines

HAZARDS: (49% a.i.): Bird: Dietary: >5620 ppm (bobwhite, mallard).

Safety Guidelines

TOXICITY: (Rat): Oral LD₅₀ 1200 mg/kg (male); 350 mg/kg (female). (Rabbit): Dermal (48 h) >2 g/kg.

PROTECTIVE CLOTHING: Face shield or goggles, synthetic rubber or non-nylon plastic apron, gloves, pants, boots.

HANDLING AND STORAGE CAUTIONS: Wash after contact with skin; shower after work. Do not wear contaminated clothing. Corrosive to some metals such as: mild steel, aluminum and pot metals. Do not heat above 80°C. Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting. Rinse mouth with water and dilute by drinking one glass milk or water.

Enstar* II

BP: Sandoz Agro, Inc. (Enstar* II, Enstar* 5E)

Identification

COMMON NAME: S-kimoprene (ISO, ANSI, BSI, ESA).

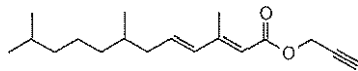
EXP. CODE NUMBER: ZR-777 (Zoecon).

OTHER CODE NUMBERS: Tech: CAS 42588-37-4; SHA 107501. Enstar* II: 65733-20-2.

Chemistry

COMPOSITION: 2-propynyl (E,E)-3,7,11-trimethyl-2,4-dodecadiene-ate (CAS).

PROPERTIES: Amber liquid, faint fruity odor. Boiling point 138°C (280°F). Vapor pressure less than 1 mm Hg (20°C).



Kinoprene

Action/Use

ACTION: Insect growth regulator.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: WARNING (form.).

TOXICITY CLASS: II (form.).

TOXICITY: Tech (Rat): Oral LD₅₀ 4900 mg/kg (male); 5000 mg/kg (female). Inhalation LC₅₀ >200 mg/l. (Rabbit): Dermal LD₅₀ 9000 mg/kg; no dermal or eye irritation.

Enstar* 5E — see Enstar* II.

ENT 20852 — see Butonate.

ENT 21170 — see Dimethrin.

Entex* — see Fenthion.

Entex*

BP: Custom Chemicides

Action/Use

ACTION: Feeding stimulant.

USE: For use with contact and stomach poison insecticides to increase pest control.

FORMULATIONS: Wettable powder.

Entry* — see Bentazone.

Invert* 171 — see 2,4-D; Dichlorprop.

Environmental Protection Agency — see EPA.

Enzone*

BP: Unocal Petroleum Products & Chemicals Div.

Identification

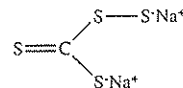
EXP. CODE NUMBER: GY-81.

CODE NUMBERS: CAS 7345-69-9; EINECS 230-865-1.

Chemistry

COMPOSITION: Sodium tetrathiocarbonate.

PROPERTIES: Hygroscopic orange crystalline solid with a characteristic odor resembling rotten eggs.



Sodium tetrathiocarbonate

Action/Use

ACTION: Fungicide, insecticide, nematocide, soil fumigant.

USE: Water-soluble contact fumigant for the management of grape phylloxera, plant parasitic nematodes, and various soil-borne pathogens causing root rot diseases.

FORMULATIONS: 32% aqueous solution.

Registration Notes

U.S.: Citrus and grapes in Arizona, Oregon, Washington, and pending in California.

OUTSIDE U.S.: Numerous crops in France and Spain.

Environmental Guidelines

HAZARDS: Fish: Moderately to slightly toxic. Bee: Relatively non-toxic. Bird: Slightly toxic to practically non-toxic.

DEGRADATION AND METABOLISM: Rapidly degrades in the soil, releasing carbon disulfide gas which in turn is rapidly dissipated, hence minimizing the potential for groundwater contamination. Routes of dissipation include evaporation and biological oxidation. The latter produces carbonate and sulfate, both of which are plant nutrients. Dissipation by the combined mechanisms is complete within four to seven days in most agricultural soils.

SOLUBILITY: Very soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (32% solution)

TOXICITY CLASS: I (32% solution).

TOXICITY: (Rat): Oral LD₅₀ (24 hr) 631 mg/kg; Inhalation LC₅₀ (4 hr) 4.04 g/m³ (32% solution). (Rabbit): Dermal LD₅₀ >2 g/kg; severe dermal irritation; moderate eye irritation (32% solution). (Guinea pigs): Negative dermal sensitization (32% solution).

PROTECTIVE CLOTHING: Coveralls over long sleeved shirt and long pants, chemical-resistant footwear plus socks, waterproof gloves, protective eyewear, respirator equipped with either an organic-vapor-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G). When handlers use closed systems in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4)], the handler PPE requirements may be reduced or modified as specified in the WPS.

HANDLING AND STORAGE CAUTIONS: Causes severe burn. Harmful if inhaled. May be fatal if swallowed. Causes eye irritation. Contact with acids can release poisonous hydrogen sulfide and carbon disulfide gases. Vapor may ignite. Keep away from all sources of ignition. Keep container tightly closed. Use with adequate ventilation. Do not breathe vapor or mist. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Wash thoroughly after handling. Wear appropriate personal protective equipment. Do not use or store this product below 0°C because it will crystallize (to re-solutionize, do not heat above 65°C). A tank that has contained this material should be cleaned, degassed, and checked before it is entered. Equipment should be thoroughly flushed before repairs or disassembly. Do not store or transport in equipment with aluminum, brass, tin, or zinc alloys. Do not use polyurethane.

SPILL CONTROL/CLEANUP: Liquid will not burn but vapor may ignite. Keep all sources of ignition away from spill/release. Use non-sparking tools and explosion-proof equipment. Stay upwind and away from spill/release. Isolate danger area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

al. Use water sparingly to reduce disposal requirements. Spilled material may be absorbed into an appropriate absorbent material. Notify appropriate federal, state, and local authorities. Immediate cleanup of any spill is recommended.

PRODUCT/WASTE DISPOSAL: Material may be disposed of as a hazardous waste (characteristic reactivity; contains sulfides which, when exposed to pH conditions between 2.0 and 12.5, can generate toxic gases, vapors, or fumes). However, a procedure is available for oxidizing the product to a solution of sodium sulfate and sodium carbonate. State and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

Emergency Guidelines

FLASHPOINT: 100.6°C (PMCC)

COMBUSTION PRODUCTS: Oxides of carbon and sulfur.

FIRE EXTINGUISHING MEDIA: Use that which is appropriate for the surrounding fire.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water for at least 15 minutes. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. If victim is not breathing, immediately begin artificial respiration. **Ingestion,** If victim is conscious and alert, immediately give 1-2 cups water. Induce vomiting, preferably by giving a syrup of ipecac or by gently placing two fingers in the back of the throat. If victim is unconscious, do not give anything by mouth. **Note to physician:** This product will decompose rapidly in the stomach and release hydrogen sulfide and carbon disulfide. The material should be rapidly removed from the stomach by emesis or gastric lavage. Signs of systemic toxicity (headache, dizziness, nausea, and vomiting), if present, may be due to hydrogen sulfide and carbon disulfide, and should be managed accordingly.

EP-316 — see Carbamult*.

EP-332 — see Carzol*.

EP-333 — see Chlordimeform.

EP-452 — see Phenmedipham.

EP-475 — see Desmedipham.

EPA

The Environmental Protection Agency (EPA) is responsible for controlling the various aspects of environmental pollution (air, water and earth). Included are pesticide regulations such as residue tolerances, product approval, re-entry standards, protective clothing.

EPA Establishment Number

A number assigned to each pesticide production plant by EPA. The number indicated the plant at which a pesticide product was manufactured and must appear on all labels of that product.

EPA Registration Number

A number assigned to a pesticide product by EPA when the product is registered by the manufacturer or his designated agent. The number must appear on all labels for a particular product.

Epai* Fungicide (fosetyl-aluminum) — Discontinued by Rhone-Poulenc Agrochimie S.A.

EPBP — see S-Seven*.

Ephirsulphonate — see Ovex.

Epibloc*

Discontinued by Gilmore, Inc.)

Identification

CODE NUMBERS: CAS 96-24-2; SHA 117101.

OTHER NAMES: Alpha-chlorohydrin, α -Monochlorohydrin, 3-chloro-1, 2-propanediol.

Chemistry

COMPOSITION: 3-chloro-1,2-propanediol.

Action/Use

ACTION: Rodenticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Epix* 500

(Discontinued 1989 by Gustafson, Inc.)

Identification

COMMON NAME: Furmecyclox (ISO, BSI).

EXP. CODE NUMBER: BAS 389F.

OTHER CODE NUMBERS: CAS 60568-05-0; SHA 122601.

Chemistry

COMPOSITION: N-Cyclohexyl-N-Methoxy-2,5-Dimethyl-3-Furan-carboxamide (CAS).

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

Epichlorohydrin

Identification

CODE NUMBERS: CAS 106-89-8; SHA 097201.

Chemistry

COMPOSITION: 1-Chloro-2,3-epoxypropane.

Action/Use

ACTION: Insect fumigant.

Epidemic

Widespread outbreak of a disease, or a large number of cases of a disease in a single community or relatively small area.

Epidemiology

The study of diseases as they affect population, including the distribution of disease or other health-related states and events in human populations, the factors (e.g., age, sex, occupation, economic status) that influence this distribution, and the application of this study to control health problems.

Epifume* — see Aluminum Phosphide.

EPN

BP: Hanwha Corp.

Nissan Chemical Industries, Ltd.

Identification

COMMON NAME: EPN (ESA, JMAF).

CODE NUMBERS: CAS 2104-64-5; SHA 041801; EINECS 218-276-8.

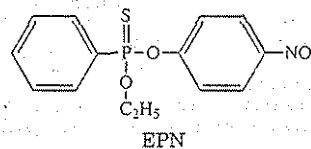
DISCONTINUED NAME: Veto* (+ methyl parathion) (Drexel Chemical Co.).

Chemistry

COMPOSITION: O-Ethyl O-4-nitrophenyl phenylphosphonothioate.

FAMILY: Organophosphate.

PROPERTIES: Yellow crystals. Melting point 36°C. Much less volatile than parathion. Soluble in many organic solvents.



EPN

Action/Use

ACTION: Acaricide, insecticide.

USE: For European corn borer, rice stem borer, bollworm, tobacco budworm, boll weevil and others.

FORMULATIONS: Emulsifiable concentrates, granules, wettable powders.

COMBINATIONS: With methyl parathion.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 80 ug/l (96 h) (rainbow trout); 190 ug/l (bluegill).

Bird: Dietary: LC₅₀ 168 ppm (mallard); 349 ppm (bobwhite).

SOLUBILITY: Very low in water.

Safety Guidelines

SIGNAL WORD: DANGER (tech., EC); WARNING (granules).

TOXICITY CLASS: I (tech., EC); II (granules).

TOXICITY: (Rat): Oral LD₅₀ 26 mg/kg. (Mouse) 43 mg/kg. (Rabbit):

Dermal LD₅₀ 420 mg/kg.

PROTECTIVE CLOTHING: Rubber gloves, protective clothing, goggles, respirators.

HANDLING AND STORAGE CAUTIONS: Poisonous if inhaled; ingestion may be fatal. Rapidly absorbed through skin. Repeated exposure may, without symptoms, be increasingly hazardous. Avoid eye, skin, clothing contact, vapor inhalation. Use with adequate ventilation. Keep away from heat and open flame. Keep container closed. Store at 65-100°F.

Emergency Guidelines

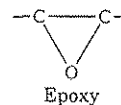
ANTIDOTE: Atropine with 2-PAM as a supplement. Do NOT use morphine.

FIRST AID: Get immediate medical aid.

Epoxiconazole — see Opus*.

Epoxy

A group having the structure:



Eptam* — see EPTC.

Eptapur*

(Discontinued by BASF AG)

Identification

COMMON NAME: Buturon (BSI, ISO, WSSA).

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

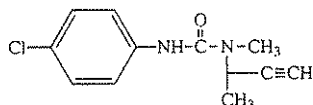
Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

CODE NUMBERS: CAS 3766-60-7; SHA 207600.

DISCONTINUED NAMES: Arisan*, Basfitox* (+ isonuron), Butyron* (all BASF AG).

Chemistry

COMPOSITION: 3-(4-chlorophenyl)-1-methyl-1-(1-methylprop-2-ynyl)-urea (IUPAC).



Buturon

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 5500 mg/kg.

EPTC

BP: Chemol Trading Ltd. Co. (Alirox*, Witox*)
 Defensa Indústria de Defensivos Agrícolas S.A.
 Nitrokémia Ltd. (Niptán)
 OXON Italia S.p.A. (Maizox*)
 Sanachem (Pty) Ltd. (Farmarox*)
 ZENECA Ag Products (Eptam*)

Identification

COMMON NAME: EPTC (BSI, ISO, JMAF, WSSA).

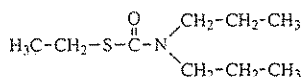
CODE NUMBERS: CAS 759-94-4; SHA 041401.

DISCONTINUED NAME: EPTC Maicero* (Química Estrella - ACA S.A.); Knoxweed* (+ 2,4-D) (Stauffer Chemical Co.).

Chemistry

COMPOSITION: S-Ethyl dipropylthiocarbamate (IUPAC).

PROPERTIES: Pale-dark yellow liquid, aromatic odor characteristic to thiocarbamates. Boiling point 127°C at 27 mbar. Vapor pressure: 4.7 mbar at 25°. Density: 0.9546 at 30°C. Stable under normal storage conditions. Hydrolyzed by warm strong acids. Miscible with common organic solvents.



EPTC

Action/Use

ACTION: Selective herbicide.

USE: For annual grassy weeds, perennial weeds, some broadleaf weeds in beans, forage legumes, potatoes; corn, sweet potatoes in some areas. See label.

FORMULATIONS: Emulsifiable concentrate, granules.

COMBINATIONS: Anelirox* (+ butylate) (Chemol Trading Ltd. Co.).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 19 mg/l (96 h) (rainbow trout). Bee: Nontoxic if used as directed.

SOLUBILITY: At 25°C in water 0.0375%.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 1630 mg/kg. 7E: (Rat): Oral LD₅₀ 1825-1500 mg/kg.

PROTECTIVE CLOTHING: Chemical tight goggles or full faceshield; impervious gloves and adequate clothing to prevent skin contact.

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin contact.

Emergency Guidelines

FLASHPOINT: >200°F, 93.3°C (PMCC).

ANTIDOTE: Atropine if cholinesterase inhibition is suspected.

FIRST AID: Call a poison center or physician immediately. Physicians' note: EPTC is a cholinesterase inhibitor. Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, rinse thoroughly with water. Discard contaminated clothing. **Inhalation**, remove to fresh air. **Ingestion**, drink one or two glasses of water and induce vomiting.

EPTC Maicero* (EPTC) — Discontinued by Química Estrella.

Equino-Aid* — see Trichlorfon.

Equitdazin* — see Carbendazim.

Equity* — see Chlorpyrifos.

Eradex*

(Discontinued 1978 by Bayer AG)

Identification

COMMON NAME: Thioquinox (ISO, BSI, ESA).

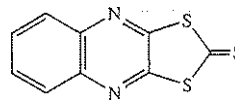
EXP. CODE NUMBERS: Bay 30686, SS 1451.

OTHER CODE NUMBERS: CAS 93-75-4; SHA 084401; ENT 25579.

DISCONTINUED NAME: Chinotionat, Eraditon*, Erazidon* (Bayer AG).

Chemistry

COMPOSITION: 1,3-dithiolo[4,5-6]quinoxaline-2-thione (IUPAC).



Thioquinox

Action/Use

ACTION: Acaricide, fungicide.

COMBINATIONS: Hicombi* (+ triadimefon) (Bayer AG).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3400 mg/kg.

Eradex* insecticide — see Chlorpyrifos.

Eradicane*

BP: ZENECA Ag Products (Eradicane*, Eradicane Extra*)

Identification

CODE NUMBERS: CAS 759-94-4.

Chemistry

COMPOSITION: EPTC + inert herbicide safener.

Action/Use

ACTION: Herbicide.

USE: For many annual grasses, broadleaf weeds (barnyardgrass, crabgrass, fall panicum, foxtails, johnsongrass, nutsedge, quackgrass, wild oats, wild proso millet, woolly cupgrass, etc.).

FORMULATIONS: Emulsifiable concentrate.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Eradicane* 6.7E (Rat): Oral LD₅₀ 2000-2870 mg/kg.

Eradicane Extra* 6E: (Rat): Oral LD₅₀ 800-1330 mg/kg.

PROTECTIVE CLOTHING: Chemical tight goggles or full faceshield and impervious gloves.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry well-ventilated area out of reach of children. Do not store near food, feedstuff, seeds or fertilizers.

Emergency Guidelines

FLASHPOINT: 186°F, 85.6°C (Tag CU).

ANTIDOTE: Atropine. 2-PAM, Protopam is NOT recommended.

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation**, remove to fresh air. **Ingestion**, drink one or two glasses of water but do NOT induce vomiting.

Eradicane Extra* — see Eradicane*.

Eradicant Fungicide

A fungicide used to destroy (burn out) fungi which have already developed and produced a diseased condition.

See Protective Fungicide.

Eradication

The complete elimination of either weeds, insects, disease organism or other pests from an area.

Eraditon* Fungicide (thioquinox) — Discontinued by Bayer AG.

Erazidon* Fungicide (thioquinox) — Discontinued by Bayer AG.

Erbon

Identification

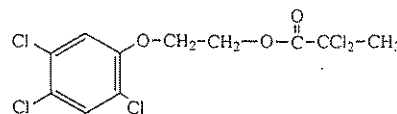
COMMON NAME: Erbon (except UK, New Zealand).

CODE NUMBERS: CAS 136-25-4; SHA 028701.

DISCONTINUED NAMES: Baron*, Novege* (Dow Chemical Co.).

Chemistry

COMPOSITION: 2-(2,4,5-Trichlorophenoxy)ethyl 2,2 dichloro-propionate.



Erbon

Action/Use

ACTION: Nonselective herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

TOXICITY CLASS: III.
 TOXICITY: (Rat): Oral LD₅₀ 1000-2000 mg/kg.
Erbotan*

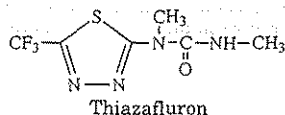
BP: Ciba-Geigy Ltd.

Identification

COMMON NAMES: Thiazafurion (ISO, BSI); thiazafurion (CSA).
 EXP. CODE NUMBER: GS 29696 (Ciba-Geigy).
 OTHER CODE NUMBER: CAS 25366-23-8.

Chemistry

COMPOSITION: N,N'-dimethyl-N-[5-(trifluoromethyl)-1,3,4-thiadiazol-2-yl]urea (CAS).



Action/Use

ACTION: Herbicide.

Registration Notes

US: Not marketed.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

Ergostim*

BP: ISAGRO (Ergostim*)

Chemistry

COMPOSITION: L-cysteine derivatives + folic acid in stabilized buffered solution.

PROPERTIES: Yellowish liquid, practically odorless. Vapor pressure at 20°C, 15 mm/Hg. Solubility at 25°C (of AATC) in methanol 20%; acetone 2.5%.

Action/Use

ACTION: Plant growth regulator.

USE: Seed dressing, foliar application at various plant stage growth. Low dosage rates.

FORMULATIONS: Soluble concentrate.

Environmental Guidelines

SOLUBILITY: At 25°C (of AATC) in water 9%.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >20,624 mg/kg. Dermal >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Biological activity practically unvaried for 2 years provided stored in original, undamaged, sealed containers, in well-aired, fresh, dry area.

Ericine* — see Ethephon.

Erranca* — see Glyphosate.

Ertimix* WP (mancozeb + cyoxonil + folpet) — Discontinued 1989 by Ercros Fitoquimica.

Erunit* — see Acetochlor; Atrazine.

ESA

Designates the Entomological Society of America.

See Common Name.

Esbiol* — see S-bioallethrin.

Esbiothrin* — see Allethrin, d-trans.

Escort* — see Metsulfuron methyl.

Esdepalléthrine — see S-bioallethrin.

Esfenvalerate — see Asana* XL; Sumi-alpha*.

Esgram* Herbicide (paraquat) — Discontinued by F.E. Zuellig.

Esprocarb — see Fujigrass*; Londax*.

Ester

A compound formed by the union of an organic acid and an organic base (an alcohol). An example is 2,4-D and isoctyl alcohol to form the isoctyl ester of 2,4-D.

Esterdefore* — see 2,4-D.

Esteron* Herbicide (2,4-D) — Discontinued by Dow Chemical Co.

Esteron* 99C — see 2,4-D.

Esterone* Herbicide (2,4,5-T) — Discontinued by Rhone-Poulenc Ag Co.

Estone* — see 2,4-D.

Estonmite* — see Ovx.

Estox* — see Metasystox-S*.

Estrad* Duplo — see Compete*; Dichlorprop-P.

Estrad* M — see Compete*; Duplosan* KV.

Etacelasil — see Alsol*.

Etaconazole

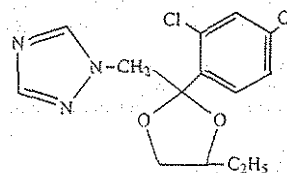
Identification

COMMON NAME: Etaconazole (ISO, BSI).

EXP. CODE NUMBER: CGA 64251 (Ciba-Geigy).

OTHER CODE NUMBER: CAS 60207-93-4.

DISCONTINUED NAMES: Benit*, Sonax* (both Ciba-Geigy Ltd.); Vanguard*.



Action/Use

ACTION: Systemic fungicide.

Registration Notes

Discontinued worldwide.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 1343 mg/kg. Dermal >3100 mg/kg.

Etalene* — see Fenitrothion.

Etan 3G* — see Lindane.

Etanzol* — see Etridiazole.

Etazine*

(Discontinued by Ciba-Geigy Ltd.)

Identification

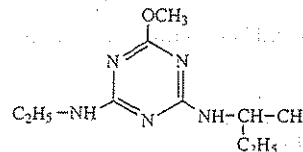
COMMON NAME: Secbuneton (ANSI, BSI, ISO, WSSA).

EXP. CODE NUMBER: GS-14254.

CODE NUMBERS: CAS 26259-45-0; SHA 331300.

Chemistry

COMPOSITION: 2-sec-butylamino-4-ethylamino-6-methoxy-1,3,5-triazine.



Action/Use

ACTION: Selective herbicide.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 1000 ± 100 mg/kg.

ETCMTD — see Etridiazole.

ETH* — see Endothal.

Ethalfuralin — see Sonalan*.

Ethanox* — see Ethion.

Ethazol — see Etridiazole.

Ethazole — see Etridiazole.

Ethephon

BP: CFPI (Arvest*, Etheverse*)

CHEMIE AG Bitterfeld-Wolfen (Camposan*, Flordimex*, Flordimex* T-Extra)

Forward International Ltd.

Rallis India Ltd. (Ethotaf*)

Rhone-Poulenc Ag Co. (Cerone*, Ethrel*, Prep*)

Identification

COMMON NAME: Ethephon (ANSI).

CODE NUMBERS: CAS 16672-87-0; SHA 099801; EINECS 240-718-3.

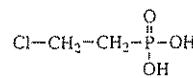
ADDITIONAL TRADE NAMES: Xtragro* (Agsin Pte. Ltd.); Ericine* (Chimac-Agriphar S.A.); Rephon* (Rotam Group).

DISCONTINUED NAMES: Cepha*, Gafgro* (GAF Chemicals); Chipco* Florel* Pro (Rhone-Poulenc Ag Co.).

Chemistry

COMPOSITION: (2-chloroethyl)phosphonic acid (CAS).

PROPERTIES: Soluble in short-chain alcohols, glycols; sparingly soluble in nonpolar organic solvents; insoluble in kerosene and diesel oil.



Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Plant growth regulator, as ethylene generator.
USE: Varies with plant species, chemical concentration, and time of application. For apples, barley, blackberries, bromeliads, cantaloupes, cherries, coffee, cotton, cucumbers, grapes, guava, Macadamia nuts, ornamentals, peppers, pineapples, rye, squash, sugarcane, tobacco, tomatoes, walnuts, wheat, etc.

FORMULATIONS: Aqueous solutions, liquid concentrate.

COMBINATIONS: Terpal* (+ mepiquat-chloride), Terpal* C (+ chlormequat-chloride), Terpal* M (+ chlormequat-chloride + mepiquat-chloride) (BASF AG).

Registration Notes

OUTSIDE U.S.: For flax, maize, oranges, peaches, rubber, rye, sugarcane.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 170 mg/l (rainbow trout); 180 mg/l (bluegill). Bird: LC₅₀ 804 mg/kg (quail); 3750 ppm (duck).

SOLUBILITY: Arvest*, Etheverse*: Soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (Cerone*, Prep*); WARNING (Ethrel*); CAUTION (Florel*).

TOXICITY CLASS: I (Cerone*, Prep*); II (Ethrel*); III (Florel*).

TOXICITY: (Rat): Oral LD₅₀ 4229 mg/kg.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Etheverse* — see Ethephon.

Ethide*

(Discontinued by Commercial Solvents Corp.)

Identification

COMMON NAME: Dichloronitroethane.

CODE NUMBERS: CAS 594-72-9; SHA 029701.

Chemistry

COMPOSITION: 1,1-Dichloro-1-nitroethane (IUPAC).

Action/Use

ACTION: Fumigant.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 410 mg/kg.

Ethidimuron — see Ustilan*.

Ethimeton — see Disulfoton.

Ethiofencarb — see Croneton*.

Ethiol* Insecticide (ethion) — Discontinued 1994 by Rhone-Poulenc Ag Co.

Ethiolate

(Discontinued by Gulf Oil Chemical)

Identification

COMMON NAME: Ethiolate (ISO, ANSI, WSSA, BSI).

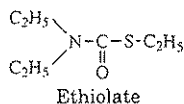
EXP. CODE NUMBERS: S 6176, S 15076 (Gulf Oil Chemical).

OTHER CODE NUMBERS: CAS 2941-55-1; SHA 103701.

DISCONTINUED NAME: Prefox* (+ cyprazine) (Gulf Oil Chemical Co.).

Chemistry

COMPOSITION: S-Ethyl diethylthiocarbamate (IUPAC).

**Action/Use**

ACTION: Herbicide.

Ethion

BP: All India Medical Corp. (Ethanox*)

Cheminova Agro A/S

FMC Corp. (Ethion EC)

Gilmore, Inc.

Khatau Junker Ltd.

Krishi Rasayan

Pesticides India (Vegfru Fosmite*)

Rallis India Ltd. (Tafethion*)

Rhone-Poulenc Ag Co. (Rhodocide*)

Voltas Ltd., Chemicals & Agro Products (Volthion* EC)

Identification

COMMON NAMES: Ethion (ISO, BSI, CSA, ESA, JMAF), diethion (France, So. Africa).

EXP. CODE NUMBERS: NIA 1240 (FMC Corp.).

OTHER CODE NUMBERS: CAS 563-12-2; SHA 058401.

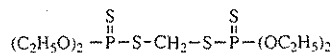
ADDITIONAL TRADE NAME: Acithion* (Agro Chemicals Industries Ltd.); Khatau Ethion* (Khatau Junker Ltd.); Ethiosul* (Sulphur Mills Ltd.).

DISCONTINUED NAME: Nialate* (FMC Corp.); Ethiol*, Hylemox*, Rhodiocide* (Rhone-Poulenc Ag Co.); RP-Thion* (Voltas Ltd. Chemicals & Agro Products).

Chemistry

COMPOSITION: O,O,O',O'-Tetraethyl S,S'-methylene bis(phosphorodithioate) (IUPAC).

PROPERTIES: Colorless to light brown or pale yellow; odorless; melting point -12° to -15°C; boiling point 164-165°C at 0.3mm Hg; density 1.215-1.230 at 20°C. Fully soluble in acetone, methyl alcohol, ethyl alcohol, xylene.



Ethion

Action/Use

ACTION: Insecticide-acaricide.

USE: Controls aphids, mites (including Eriophyd mites), scales, thrips, leafhoppers, maggots, foliar feeding larvae on variety of food, fiber, ornamental crops.

FORMULATIONS: Dust, emulsifiable concentrates, emulsifiable solution, granules, wettable powder.

COMBINATIONS: Scipio* (+ cypermethrin) (Rhone-Poulenc Ag Co.).

Registration Notes

U.S.: Ethion EC is only formulation marketed.

Environmental Guidelines

HAZARDS: (95% CI) Fish: LC₅₀ (96h) 500 ug/l (rainbow trout). Bird: LD₅₀ 128 mg/kg (bobwhite).

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Pure (Rat): Oral LD₅₀ 208 mg/kg. Tech (Rat): Oral LD₅₀ 21-191 mg/kg. Dermal 838 mg/kg. Inhalation LC₅₀ (4 h) 0.864 mg/l.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FLASHPOINT: 176°C (Pensky Martens closed tester).

COMBUSTION PRODUCTS: Thermal decomposition (e.g. fire) may produce diethylsulfide, sulfur dioxide, carbon monoxide, carbon dioxide, phosphorus pentoxide.

FIRE EXTINGUISHING MEDIA: Foam, carbon dioxide or dry chemicals.

ANTIDOTE: Atropine. For mild intoxication, 2-4 mg intravenously or intramuscularly. Repeat every 10 minutes until patient is fully atropinized. Observe patient for 24-48 hours, repeating atropine as necessary.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** unless a physician can be seen within one hour, drink one or two glasses of water and induce vomiting.

EMERGENCY TELEPHONE: 800-424-9300 (Chemtree). 716-735-3765 (FMC).

Ethiophencarbe — see Croneton.

Ethiosul* — see Ethion.

Ethiozin — see Tycor*.

Ethirimol

BP: ZENECA Agrochemicals

Identification

COMMON NAMES: Ethirimol (ISO-E, BSI); éthyrimol (ISO-F).

EXP. CODE NUMBERS: PP149, ETH 560 (ZENECA Agrochemicals).

OTHER CODE NUMBERS: CAS 23947-60-6; SHA 228900.

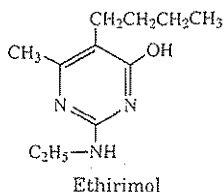
DISCONTINUED NAME: Milcap* (+ captan), Milcarb Super*, Milgo*, Milstem* Seed Dressing (ICI Agrochemicals).

Chemistry

COMPOSITION: 5-butyl-2-ethylamino-6-methylpyrimidin-4-ol (IUPAC).

PROPERTIES: White crystalline solid. Melting point 159-160°C. Vapor pressure 2 × 10⁻⁶ torr at 25°C. Stable to heat, acid, alkaline solutions. Slightly soluble in DAA, ethanol.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.



Action/Use

ACTION: Systemic fungicide.
USE: For powdery mildew of barley, other cereals.
FORMULATIONS: Aqueous suspensions.
COMBINATIONS: Ferrax* (+ flutriafol + thiabendazole ± imazalil) (ZENECA Agrochemicals).
Environmental Guidelines
HAZARDS: Fish: 45 mg/l (24 h) (rainbow trout). Bee: Nontoxic if used as directed. Bird: Oral LD₅₀ 4000 mg/kg (hen).
SOLUBILITY: Practically insoluble in water (250 mg/l water).

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: IV.
TOXICITY: (Rat): Oral LD₅₀ 6340 mg/kg.
PROTECTIVE CLOTHING: Gloves, face shield for concentrate.
HANDLING AND STORAGE CAUTIONS: When using do not eat, drink, or smoke. Wash concentrate from eyes, skin immediately. Do not breathe spray mist. Wash hands, exposed skin before meals, after work. Keep away from food, drink, animal feed. Keep out of reach of children. Keep in tightly closed original container in a secure area. Stable for at least 1 year under normal storage in unopened container. Wash out container thoroughly, dispose of safely.

Ethisol* Fungicide (ethylene thiuram sulfide) — Discontinued 1971 by Roberts Chemical Inc.

Ethoate-methyl — see Fitos B/77*.

Ethoate-méthyle — see Fitos B/77*.

Ethofat*

BP: Akzo Nobel Chemicals Inc. (Ethofat*)

Chemistry

COMPOSITION: Ethoxylated fatty acids. Ethylene oxide adducts of fatty acids from coconut oil, tallow, etc.

Action/Use

ACTION: Surface active agents.

USE: For pesticide formulations.

Ethofenprox — see Trebon*.

Ethofumesate

BP: AgrEvo USA Co. (Nortron*-SC, Progress*)
 Barclay Chemicals Mfg. Ltd. (Keeper*)
 Hoechst Schering AgrEvo GmbH (Nortron*, Tram*)
 Kemira Agro Oy (Kemiron*, Rubetram*)
 Pen-Tsao-Materia-Medica-Center GmbH

Identification

COMMON NAME: Ethofumesate (ISO, BSI, ANSI, WSSA).
EXP. CODE NUMBER: NC 8438 (Schering AG).
OTHER CODE NUMBERS: CAS 26225-79-6; SHA 110601; EINECS 247-525-3.
DISCONTINUED NAME: Pyrat* (+ chloridazon) (BASF AG).

Chemistry

COMPOSITION: (±)2-ethoxy-2,3-dihydro-3,3-dimethyl-5-benzofuranyl methanesulfonate (CAS).

PROPERTIES: White crystalline solid; melting point 70-72°C; vapor pressure 6.45 × 10⁻⁷ mm/Hg at 25°C. Solubility in ethanol 10%, in glycerol 25%, in acetone 40%, in chloroform 40%, in dioxan 40%, in hexane 0.4%, in benzene 40%.

Action/Use

ACTION: Selective herbicide.

USE: For control of annual broadleaf and grass weeds in sugar beets, grass seed crops, spinach grown for seed only, and turf.

FORMULATIONS: Emulsifiable concentrate, suspension concentrate.

COMBINATIONS: Magnum* (+ chloridazon) (BASF AG); Betanal*, Tandem*, Betanal Progress* (+ phenmedipham + desmedipham), Betanal Trio* (+ phenmedipham + metamitron) (Hoechst Schering AgrEvo GmbH); Kemifam* Duo (+ phenmedipham), Kemifam* Pro FL (+ phenmedipham + desmedipham) (Kemira Agro Oy); Spectron* (+ chloridazon); Tram* Combi (+ lenacil); Nortron* Leyclene (+ bromoxynil + ioxynil).

Registration Notes

OUTSIDE U.S.: For red table beets, tobacco, onions, peas, sunflowers and strawberries.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 15 mg/l (24 h) (guppy). Bee: Nontoxic.

SOLUBILITY: Solubility in water 50 ppm.

Safety Guidelines

SIGNAL WORD: DANGER, CAUTION (Nortron*-SC, Progress*).

TOXICITY CLASS: I, III (Nortron*-SC, Progress*).

TOXICITY: (Rat): Oral LD₅₀ 6400 mg/kg. Dermal >1440 mg/kg.

PROTECTIVE CLOTHING: Wear goggles or face shield when handling.

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed. Avoid contact with eyes, on skin or clothing. Do not store near foods, feeds, or fertilizers. Flowable formulation non-flammable and can be stored down to 15°F.

Emergency Guidelines

FLASHPOINT: Non-combustible.

EMERGENCY TELEPHONE: 302-892-3000 (AgrEvo USA Co.).

Ethohexadiol — see Ethyl Hexanediol.

Ethomeen*

BP: Akzo Nobel Chemicals Inc. (Ethomeen*)

Chemistry

COMPOSITION: Ethoxylated aliphatic amines. Ethylene oxide adducts of coco, soya, and tallow primary amines.

Action/Use

ACTION: Surface active series.

USE: Pesticide or herbicide formulations.

Ethoprop

BP: Hanwha Corp.

Rhone-Poulenc Ag Co. (Mocap*)

Identification

COMMON NAMES: Ethoprop (ANSI, ESA), ethoprophos (ISO, BSI).

EXP. CODE NUMBER: VC9-104 (Mobil).

OTHER CODE NUMBERS: CAS 13194-48-4; SHA 041101.

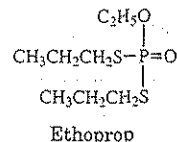
DISCONTINUED NAMES: Prophos* (Rhone-Poulenc Ag Co.); Jolt* (Velsicol Chemical Corp.).

Chemistry

COMPOSITION: O-Ethyl S,S-dipropyl phosphorodithioate (IUPAC and CAS).

FAMILY: Organophosphate.

PROPERTIES: Readily soluble in most organic solvents.



Action/Use

ACTION: Nematicide, soil insecticide.

USE: Action by contact; must be mixed with soil or carried by water into soil. May be used at planting with no waiting period. For bananas, beans (snap, lima), cabbage, corn, cucumber, flue-cured tobacco, peanuts, pineapple, plantains, soybeans, sugarcane, sweet potato, white potato, Bermuda, Zoysia, St. Augustine, centipede, Fescue, Kentucky Blue, perennial rye, Bahia grasses in commercial turf.

FORMULATIONS: Emulsifiable concentrate, granules.

COMBINATIONS: Mocap* Plus 4-2 EC (+ disulfoton) (Rhone-Poulenc Ag Co.).

Registration Notes

U.S.: Some or all applications may be classified as RUP.

Environmental Guidelines

HAZARDS: Tech: Fish: moderately-to-highly toxic (rainbow trout); highly toxic (bluegill). Bird: Highly toxic.

SOLUBILITY: Slight in water 750 ppm.

Safety Guidelines

SIGNAL WORD: DANGER (6EC, 15G, 20G); WARNING (10G).

TOXICITY CLASS: I (6EC, 15G, 20G); II (10G).

TOXICITY: (Rat): Oral LD₅₀ 61.5 mg/kg. (Rabbit): Dermal 2.4 mg/kg.

HANDLING AND STORAGE CAUTIONS: Do not contaminate water, food, feed, by storage or disposal.

Emergency Guidelines

ANTIDOTE: If cyanosis is absent, give 2-4 mg atropine intravenously (0.05 mg/kg for children). Repeat at 5-10 minute intervals until atropinization occurs (dry, flushed skin, tachycardia, pupillary dilatation), and maintain for 48 hours. If cyanotic, give initial atropine intramuscularly and start measures to improve ventilation. Start 2-PAM (Protopam, Ayerst) at the same time. Give 1-2 grams Protopam (20-40 mg/kg for children) in 100cc saline over 15-30 minutes. If pulmonary edema is present, give intravenously slowly as a 5% solution in water over a period of not less than 5 minutes. A second dose may be given after

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

one hour if muscle weakness persists. Additional doses may be given cautiously for persistent muscle weakness. May be given by intramuscular or subcutaneous routes if intravenous administration is not feasible. The use of theophylline, morphine, barbituates, phenothiazines, reserpine, and succinyl choline is contraindicated.
FIRST AID: Skin, wash with soap and water followed by wash with 95% ethyl alcohol. Keep under constant observation for 24-36 hours. Symptoms may persist for one month.

Ethoquad* C/12

BP: Akzo Nobel Chemicals Inc. (Ethoquad* C/12)

Chemistry

COMPOSITION: Ethoxylated quaternary ammonium compounds from coconut oil, tallow, etc.

Action/Use

ACTION: Surface active agents.

Ethotaf* — see Ethephon.

Ethoxyquin**Identification**

COMMON NAMES: Ethoxyquin (ISO-E, BSI), éthoxyquine (ISO-F).
CODE NUMBERS: CAS 91-53-2; SHA 055501.

ADDITIONAL TRADE NAMES: Deccoquin 305* (ELF Atochem North America, Inc.); Nix-Scald*.

DISCONTINUED NAME: Stop Scald* (Monsanto Agricultural Co.).

Chemistry

COMPOSITION: 6-ethoxy-1,2-dihydro-2,2,4-trimethylquinoline (CAS).

Action/Use

ACTION: Antioxidant preservative.

USE: Scald control on apples, pears.

FORMULATIONS: Emulsifiable concentrate.

COMBINATIONS: Do not combine with any other product unless safety has been established.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Store in cool area. Avoid freezing.

Emergency Guidelines

FLASHPOINT: >200°F.

Ethoxyquin — see Ethoxyquin.

Ethrel* — see Chipco* Florel* Pro; Ethephon.

Ethychozate — see Figaron*.

Ethyl Alcohol — see Alcohol; Ethanol.

Ethyl Formate

BP: Agri-Pharm International Inc.

Identification

CODE NUMBERS: CAS 109-94-4; SHA 043102.

Action/Use

ACTION: Fumigant.

USE: For food products. No residual odor; leaves no deposit on treated materials.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4000 mg/kg.

Ethyl Guthion* Insecticide (azinphos-ethyl) — Discontinued by Bayer AG.

Ethyl Hexanediol**Identification**

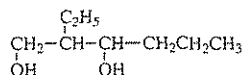
COMMON NAMES: Ethyl hexanediol, ethohexadiol.

CODE NUMBERS: CAS 94-96-2; SHA 041001.

DISCONTINUED NAME: Rutgers 612* (Union Carbide Corp.).

Chemistry

COMPOSITION: 2-Ethyl-1,3-hexanediol (CAS).



2-Ethyl-1,3-Hexanediol

Action/Use

ACTION: Insect repellent.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 6500 mg/kg.

Ethyl Parathion — see Parathion.

Ethyl Pyrophosphate — see TEPP.

Ethylan — see Perthane*.

Ethylbutyl Propanediol**Identification**

CODE NUMBERS: CAS 115-84-4; SHA 041003.

Chemistry

COMPOSITION: 2-Butyl-2-ethyl-1,3-propanediol.

Action/Use

ACTION: Insecticide.

Ethylene**Identification**

CODE NUMBERS: CAS 74-85-1; SHA 041901.

Action/Use

ACTION: Plant growth regulator.

USE: Initiates degreening, ripening of bananas, citrus fruits, honeydew melons, pears. Preharvest for pineapples to induce flowering.

FORMULATIONS: Compressed gas.

Ethylene Bisdithiocarbamates — see Dithiocarbamates.

Ethylene Chlorobromide

(Discontinued 1972 by FMC Corp.)

Identification

CODE NUMBERS: CAS 107-04-0; SHA 042001.

Chemistry

COMPOSITION: 1-Bromo-2-chloroethane.

Action/Use

ACTION: Nematicide (soil fumigant).

Safety Guidelines

TOXICITY: High mammalian toxicity. (Intense irritation of mucous membranes followed by nausea reduces hazard.)

Ethylene Dibromide

BP: United Phosphorus Ltd. (Dibrom*)

Identification

COMMON NAMES: Ethylene dibromide (ISO-E, BSI, ESA); EDB (JMAF); dibromure d'éthylène (ISO-F).

CODE NUMBERS: CAS 106-93-4; SHA 042002.

DISCONTINUED NAMES: Bromofume*, E-D-Bee*, EDB-85 (Michigan Chemical), KopFume*, Nephis*, Dowfume* (Dow Chemical Co.); Celmide* (Excel Industries Ltd.); Soilbrom* (Great Lakes Chemical).

Chemistry

COMPOSITION: 1,2-Dibromoethane (IUPAC and CAS).

PROPERTIES: Boiling point 131.7°C. Specific gravity 2.172 lb./gal. at 25/25°C; 18.07 lb./gal. at 25°C. Freezing point at 0°C = 9.3°C specific heat, B.T.U./lb./°F = 0.18. Latent heat of vaporization at boiling point: cal/g = 46.2, B.T.U./lb. = 83.2; viscosity, centistokes, 20°C = 38.1. Readily soluble in all common organic solvents; miscible with most.

Action/Use

ACTION: Fumigant, insecticide, nematicide.

FORMULATIONS: Wettable powder.

Registration Notes

U.S.: Not registered.

Environmental Guidelines

SOLUBILITY: 0.43 in g/100g water at 25°C = 0.43.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 146 mg/kg. Vapor 200 ppm. Animal mutagen, carcinogen.

HANDLING AND STORAGE CAUTIONS: Do not store or ship with food, feeds, clothing. Store in tightly closed container in a cool area away from dwellings. Prolonged contact causes skin irritation, blisters. Absorbed through skin. Avoid contact with eyes, skin, or clothing. Use only with adequate ventilation. Do not leave residual product in container; empty completely.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush with plenty of water for at least 15 minutes. Skin, immediately remove contaminated shoes, clothes; wash skin with soap, water. Do not reuse clothing or shoes until completely free of chemical odor. Inhalation, remove to fresh air. Ingestion, give 2 tablespoons of salt in glass of warm water to induce vomiting. Some physicians may discourage use of saline emesis.

Ethylene Dichloride**Identification**

COMMON NAMES: EDC (JMAF); ethylene dichloride (ISO-E, BSI, ESA); dichlorure d'éthylène (ISO-F)

CODE NUMBERS: CAS 107-06-2; SHA 042003.

Chemistry

COMPOSITION: 1,2-Dichloroethane (IUPAC and CAS).

PROPERTIES: Soluble in ethanol, xylene.

Action/Use

ACTION: Insect fumigant.

USE: For stored grain products.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

FORMULATIONS: Usually mixed in a 3:1 ratio with carbon tetrachloride (ED/CT) to avoid flammability.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 670-890 mg/kg. Vapor 1000 ppm. Less toxic than ethylene oxide.

HANDLING AND STORAGE CAUTIONS: To avoid disagreeable odor, taste, do not use on foods with high fat content. Do not ship or store with food, feeds, drugs, clothing.

Emergency Guidelines

FLASHPOINT: Somewhat flammable.

Ethylene Oxide**Identification**

COMMON NAME: Ethylene Oxide.

CODE NUMBERS: CAS 75-21-8; SHA 042301.

OTHER NAMES: ETO, oxirane.

Chemistry

COMPOSITION: 1,2-Epoxyethane.

PROPERTIES: Colorless liquefied gas.

Action/Use

ACTION: Fumigant, sterilant.

USE: Properly used, ethylene oxide and mixtures thereof will kill all life including insects, snails, molds, fungi, viruses, and other microorganisms.

COMBINATIONS: Mixed with either carbon dioxide or fluorocarbon 12 (dichlorodifluoromethane) to eliminate flammability.

Registration Notes

U.S.: RUP for black walnuts, copra, spices.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: DANGER (pure).

TOXICITY CLASS: I (pure).

TOXICITY: Toxic. TLV 1 ppm (OSHA). Continuous exposure causes loss of the sense of smell which may result in the inhalation of dangerous concentrations. Exposure to low concentrations may cause delayed symptoms.

HANDLING AND STORAGE CAUTIONS: Do not inhale.

Emergency Guidelines

FLASHPOINT: Pure ethylene oxide is extremely flammable.

FIRST AID: Inhalation, remove to fresh air. Get medical aid. Do NOT apply artificial respiration.

Ethylene Thiourea**Identification**

CODE NUMBER: CAS 96-45-7.

OTHER NAME: ETU.

Ethylene Thiuram Monosulfide — see Vegetta*.

Ethylene Thiuram Sulfide — see Ethisul*.

Ethylenediaminetetra acetic acid (EDTA) — see Cheelox* Sequestrants.

Ethylmercury Chloride**Identification**

CODE NUMBERS: CAS 109-62-8; SHA 041502.

ADDITIONAL TRADE NAME: Hexasan*.

DISCONTINUED NAMES: Ceresan* and Granosan* (both Du Pont Agricultural Products).

Action/Use

ACTION: Fungicide, seed treatment.

Ethylmercury Iodide**Identification**

OTHER NAME: DuBay 115HH*.

Action/Use

ACTION: Fungicide, seed treatment.

Ethylmercury Nitrile (Methylmercury Nitrile) — Discontinued.

Ethylmercury Phosphate**Identification**

CODE NUMBERS: CAS 2235-25-8; SHA 041505.

DISCONTINUED NAMES: Lignasan*, New Improved Ceresan*, New Improved Granosan* (all Du Pont Agricultural Products).

Action/Use

ACTION: Seed treatment.

Ethylmercury p-Toluene Sulfonamide**Identification**

OTHER NAME: EMTS.

DISCONTINUED NAMES: Ceresan* M, Ceresan* M-DB, Granosan* M (all Du Pont).

Action/Use

ACTION: Fungicide, seed disinfectant.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 100 mg/kg.

Ethylmercury Sulfate**Identification**

COMMON NAME: Ethylmercury sulfate.

DISCONTINUED NAME: New Mel* (Nihon Nohyaku Co., Ltd.).

Action/Use

ACTION: Seed treatment fungicide.

Ethylthiodemeton — see Disulfoton.

Ethirimol — see Ethirimol.

Etilon* — see Parathion.

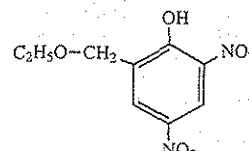
Etinofen**Identification**

COMMON NAMES: Etinofen (ISO-E, BSI), étinofene (ISO-F).

CODE NUMBER: CAS 2544-94-7.

Chemistry

COMPOSITION: 2-[Ethoxymethyl]-4,6-dinitrophenol (CAS).



Etinofen

Action/Use

ACTION: Herbicide.

ETO — see Ethylene Oxide.

Etoc*

BP: Sumitomo Chemical Co., Ltd.

Identification

COMMON NAME: Prallethrin (BSI).

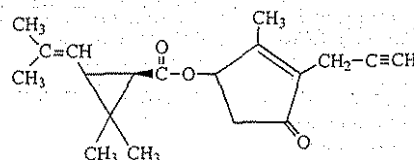
EXP. CODE NUMBER: S-4068SF.

OTHER CODE NUMBERS: CAS 23031-36-9; OMS 3033 (WHO).

Chemistry

COMPOSITION: (S)-2-Methyl-4-oxo-3-(2-propenyl)-2-cyclopentenyl (1R)-cis,trans-chrysanthemate.

PROPERTIES: Yellow-yellow brown liquid. Vapor pressure 3.5×10^{-3} mmHg at 20°C. Miscible with most organic solvents at 20-25°C.



Prallethrin

Action/Use

ACTION: Insecticide.

USE: Flying and crawling insect control for household, industrial locations and outdoor use.

FORMULATIONS: Aerosol, emulsifiable concentrate, mosquito coil/mat, oil liquid.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 640 mg/kg (male). Dermal >5,000 mg/kg.

PROTECTIVE CLOTHING: Gloves, goggles or full face shield when handling.

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin, mouth contact. Store in original containers away from feed, foodstuffs.

Etufenprox — see Trebon*.

Etoxinol***Identification**

EXP. CODE NUMBER: G-23645.

Chemistry

COMPOSITION: Ethoxymethylbis (p-chlorophenyl) carbinol.

Etridiazole

BP: Grace-Sierra Crop Protection Co. (Koban*, Truban*)

Uniroyal Chemical Co., Inc. (Aaterra*, Pansoil*, Terrazole*)

Identification

COMMON NAMES: Etridiazole (ISO, BSI); echlomezol (JMAF).

TRIVIAL NAMES: ETCMTD, ethazol, ethazole.

EXP. CODE NUMBERS: MF-344 (Mallinckrodt); OM-2424 (Olin Corp.).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

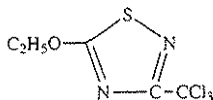
Etrimfos

PESTICIDE DICTIONARY

OTHER CODE NUMBERS: CAS 2593-15-9; SHA 084701.
DISCONTINUED NAMES: Terra-Coat L-205N* and Terraclor Super X20-5* (both with PCNB) (Gustafson Inc.); Phorate TSX* (+ phorate) (Platte Chemical); Dwell* (Uniroyal Chemical Co., Inc.).

Chemistry

COMPOSITION: 5-Ethoxy-3-trichloromethyl-1,2,4-thiadiazole (IUPAC).
PROPERTIES: Reddish brown liquid. Specific gravity 1.500 at 25°C. Soluble in ethanol, xylene.



Active Ingredient of Terrazole*

Action/Use

ACTION: Soil fungicide.

USE: Terrazole* for Pythium and Phytophthora on ornamentals and turf as a soil application. Terraclor Super X* in furrow soil treatment for cotton seedling disease complex (Fusarium, Rhizoctonia and Pythium). TSX 20-5* and Terra-Coat L-205N* as a broad spectrum seed treatment fungicide on beans, corn, cotton, peanuts, peas, safflower, sorghum, soybeans, sugar beets and wheat. Truban* for Pythium and Phytophthora.

FORMULATIONS: Dust, emulsifiable concentrate, granules, wettable powder.

COMBINATIONS: Banrot* (+ thiophanate methyl) (Grace-Sierra Crop Protection); 4-Way* (+ captan + PCNB + maneb) (Gustafson); Terraclor Super-X* (+ PCNB) (Uniroyal Chemical Co., Inc.).

Registration Notes

OUTSIDE U.S.: Echlomezole for use in Japan.

Environmental Guidelines

HAZARDS: (Tech) Fish: (24 hr.) LC₅₀ >4.0 mg/l (rainbow trout); >7.5 mg/l (bluegill). Bird: Slightly toxic.

SOLUBILITY: Water <100 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: DANGER (Truban* EC); WARNING (tech, WP); CAUTION (G).

TOXICITY CLASS: I (EC); II (tech, WP); III (G).

TOXICITY: (Rat): Oral LD₅₀ 1077 mg/kg. (Rabbit): Dermal 1366 mg/kg.

Koban* (Rat): Oral LD₅₀ 4000 mg/kg.

Truban* (Rat): Oral LD₅₀ 4700 mg/kg (WP); 3900 mg/kg (EC).

PROTECTIVE CLOTHING: Use eye protection, gloves, respirator, and long sleeved shirt and long pants during mixing and loading.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, or clothing. Avoid breathing dust or spray mist. Wash thoroughly with soap and water after use and before eating or smoking. Remove contaminated clothing and wash before reuse. With seed treatments, do not contaminate feed or foodstuffs.

Emergency Guidelines

FIRST AID: Skin, wash with soap and water. Eyes, flush with water.

Ingestion, get immediate medical aid. For 4-Way*, do NOT induce vomiting; drink large quantities of milk.

Etrimfos — see Ekamet*.

Etrimix* — see Mancozeb.

Etrofol*

(Discontinued 1986 by Bayer AG)

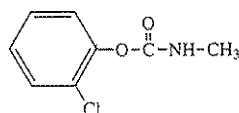
Identification

COMMON NAME: CPMC (JMAF).

DISCONTINUED NAME: Hopcide*.

Chemistry

COMPOSITION: 2-Chlorophenyl methylcarbamate (IUPAC).



CPMC

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 648 mg/kg. Dermal >500 mg/kg.

Etrofolan* — see MIPC.

Etrolene* — see Ronnel.

ETU — see Ethylene thiourea.

Eugenol

Identification

CODE NUMBERS: CAS 97-53-0; SHA 102701.

Chemistry

COMPOSITION: Derived essentially from clove oil.

Action/Use

ACTION: Insect attractant.

USE: With phenylethyl buytrate as an adult Japanese beetle lure.

Eulava SM* — see Magnesium Fluosilicate.

EUP

Environmental Use Permit refers to use permitted under controlled or premeditated experiments or trials only.

Euparen*

BP: Bayer AG (Elvaron*, Euparen*)

Identification

COMMON NAMES: Dichlofluamid (ISO-E, BSI); dichlorfluamid (JMAF); dichlofluamide (ISO-F).

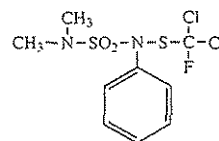
EXP. CODE NUMBERS: Bay 47531, KUE 13032c.

OTHER CODE NUMBERS: CAS 1085-98-9; SHA 128844; EINECS 214-118-7.

Chemistry

COMPOSITION: 1,1-dichloro-N-[(dimethylamino)sulfonyl]-1-fluoro-N-phenylmethanesulfenamide (CAS).

PROPERTIES: White crystalline powder. Melting point 106°C (not distillable). Vapor pressure 0.021 mPa at 20°C. Moderately soluble in organic solvents.



Dichlofluamid

Action/Use

ACTION: Basic action fungicide.

USE: Controls scab, brownrot, and storage diseases in apples and pears; Alternaria, downy mildews and other fungal diseases on pome and stone fruit, berries, vegetables, ornamentals and other crops; suppresses spider and rust mites on fruit, grapes and other crops with only slight effect on beneficial mites. Used in IPM programs.

FORMULATIONS: Dust, wettable powder, water dispersible granule.

COMBINATIONS: Bakreni Euparen* (+ copper oxychloride), Euparen* Ramato Micro CM (+ copper oxychloride + cymoxanil) (Bayer AG); and tebuconazole combinations.

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Not marketed in Canada.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.01 mg/l (96 h) (rainbow trout). Bird: LD₅₀ >5000 mg/kg b.w. (Japanese quail). Bee: Nontoxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Tech: (Rat): Oral LD₅₀ >5000 mg/kg b.w.; Dermal >5000 mg/kg b.w.

Euparen M*

BP: Bayer AG (Euparen M*)

Identification

COMMON NAMES: Tolyfluamid (ISO-E, BSI), tolyfluamide (ISO-F).

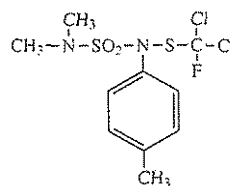
EXP. CODE NUMBERS: Bay 5712, Bay 49854, KUE 13183b.

OTHER CODE NUMBERS: CAS 731-27-1; SHA 309200.

Chemistry

COMPOSITION: 1,1-dichloro-N-[(dimethylamino)sulfonyl]-1-fluoro-N-(4-methylphenyl) methanesulfenamide.

PROPERTIES: Colorless crystals. Melting point 96°C. Vapor pressure 0.016 mPa at 20°C. Moderately insoluble in organic solvents.



Tolyfluamid

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Basic multi-acting fungicide with protective action.

USE: In rotation with specifically acting fungicides against *Uncinula*, *Botrytis*, *Plasmopara* on grapes; in vegetables against *Botrytis*, *Pero-nospora* and powdery mildew; in ornamentals against powdery mildew, rust and leafspot diseases. Recommended for IPM programs.

FORMULATIONS: Wettable powder, water dispersible granule.

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Not marketed in Canada.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.1 - 0.25 mg/l (96 h) (goldenorfe). Bee: Nontoxic. Bird: LD₅₀ >5000 mg/kg b.w. (Japanese quail).

SOLUBILITY: Insoluble in water.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Tech: (Rat): Oral LD₅₀ >5000 mg/kg b.w.; Dermal >5000 mg/kg b.w.

Euparen* Ramato Micro CM — see Copper Oxochloride; Cymoxanil; Euparen*.

European Pine Sawfly Nuclear Polyhedrosis Virus — see Preserve*.

Eurozim-50* — see Carbendazim.

Evemul* Surfactants — Discontinued 1992 by Chemol Trading Co. Ltd.

Evershield II* — see Captan; Malathion.

Evershield* T Seed Protectant (thiram) — Discontinued 1984 by Cargill Inc.

Evik* — see Ametryn.

Evimazid* Plant Growth Regulator (maleic hydrazide) — Discontinued 1992 by Chemol Trading Ltd. Co.

Evisect* — see Thiocyclam Hydrogen Oxalate.

Evisekt* — see Thiocyclam Hydrogen Oxalate.

Evital* — see Norflurazon.

Evrest* — see Calixin*; Fenpropimorph; Flusilazole.

Exa* Herbicide (methabenzthiazuron + triasulfuron) — Discontinued 1994 by Bayer AG.

Exact-Trol*

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: Polyamide copolymer (non-ionic).

Action/Use

ACTION: Adjuvant, drift retardant-deposition aid.

USE: Reduces drift and evaporation. Mixes easily with glyphosate products.

FORMULATIONS: Liquid concentrate.

Exathion* Insecticide (malathion) — Discontinued 1993 by Rhone-Poulenc Ag Co.

Ex-borer* — see Endosulfan.

Excel* — see Fenoxaprop-ethyl.

EXD — see Herbisan* 5.

Exem* Emulsifier — Discontinued 1988 by Makhteshim-Agan.

Exhait* 4-10 — see Transfilm*.

Exhait* 800 — see Sticker.

Exit*

BP: Miller Chemical & Fertilizer Corp. (Exit*)

Identification

CODE NUMBER: CAS 64742-95-6.

Chemistry

COMPOSITION: Poly(methylene-p-nonylphenoxy) poly(oxypropylene) propanol, modified resin, petroleum distillate.

PROPERTIES: Amber liquid, aromatic hydrocarbon odor.

Action/Use

ACTION: Herbicide penetrator, activator.

USE: In combination with non-selective herbicides for control of weeds on roadsides, ditchbanks, fence rows, fallow fields and other non-crop areas.

Environmental Guidelines

SOLUBILITY: In water emulsifies.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >5 g/kg. (Rabbit): Dermal LD₅₀ >3.16 g/kg.

PROTECTIVE CLOTHING: Chemical resistant apron, clean body-covering clothing, boots, hat, rubber chemical resistant gloves, chemical splash goggles, respirator.

Emergency Guidelines

FIRST AID: **Eyes,** flush immediately with plenty of water for 15 minutes, if irritation persists call a Physician. **Skin,** remove any contami-

nated clothing and wash thoroughly with soap and water. **Inhalation,** remove victim to fresh air, call a Physician. **Ingestion,** Do NOT induce vomiting, call a Physician.

Exotherm Thermil* — see Chlorothalonil.

Exothion* — see Endothion.

EXP 3864 — see Quizalofop-ethyl.

Expand* — see Sethoxydim.

Experimental Tolerance — see Temporary Tolerance.

Exporsan* — see Bensulide.

Express*

BP: Du Pont Agricultural Products (Express*)

Identification

COMMON NAME: Tribenuron-methyl (ISO draft, ANSI, BSD).

EXP. CODE NUMBER: DPX-L5300.

OTHER CODE NUMBER: CAS 101200-48-0.

DISCONTINUED NAME: Matrix*.

Chemistry

COMPOSITION: Methyl 2-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)methylamino]carbonyl]amino]sulfonyl]benzoate.

FAMILY: Sulfonylurea.

PROPERTIES: Light brown solid, Melting point 141°C. Solubility low in organic solvents

Action/Use

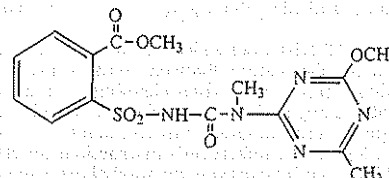
ACTION: Herbicide.

USE: Selective postemergence broadleaf weed control in wheat (including durum), barley.

FORMULATIONS: DF.

COMBINATIONS: Cheyenne* Herbicide [Twin Pack of Cheyenne*

FM (fenoxaprop-ethyl + MCPA) & X-TRA* (thifensulfuron methyl + tribenuron methyl)] (AgrEvo USA Co.); Harmony* Extra (+ thifensulfuron-methyl) (Du Pont).



Tribenuron-methyl

Registration Notes

U.S.: Received registration August 1989.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >1000 mg/l (96 h) (bluegill sunfish, rainbow trout). Bee: LD₅₀ >100 µg/bee (honeybee). Bird: (Dietary) LC₅₀ >5620 (mallard duck, bobwhite quail).

SOLUBILITY: In water 280 mg/l at 25°C pH6.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin, clothing contact. Wash contaminated clothing with soap, hot water before reuse. Store in original container only. Do not contaminate pesticides, fertilizer, food, feed by storage or disposal. Follow state, local regulations for disposal of product, container, wastes.

Emergency Guidelines

FIRST AID: **Eyes,** flush with plenty of water. **Skin,** wash with plenty of water. Get medical aid if irritation persists.

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Exit*

BP: Kalo, Inc.

Chemistry

COMPOSITION: Principal functioning agents: Alkylene ethersulfate, aromatic sulfonate, polyhydric alcohol, aliphatic solvents.

PROPERTIES: As corrosive as UAN solutions alone. Soluble in urea, ammonium nitrate solutions.

Action/Use

ACTION: Nitrogen additive.

USE: For corn, milo, small grain.

FORMULATIONS: Liquid.

Environmental Guidelines

SOLUBILITY: Complete in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

TOXICITY CLASS: IV.
TOXICITY: (Mouse): Oral LD₅₀ 10,000 mg/kg. (Rabbit): Dermal LD₅₀ 20,000 mg/kg.
HANDLING AND STORAGE CAUTIONS: Wash well after handling. Product may darken in color during storage.
Emergency Guidelines
FIRST AID: Eyes, immediately flush with water.
Extender — see Sticker.
Extoll* — see Bentazone; Bromoxynil.
Extrazine* Herbicide (atrazine + cyanazine) — Discontinued by Du Pont.

Extrazine* II
 BP: Du Pont Ag Products (Extrazine* II)
Chemistry
COMPOSITION: Cyanazine + atrazine (3:1).
PROPERTIES: Stable at normal temperatures and storage conditions.

Action/Use
ACTION: Selective herbicide.
USE: Controls many annual grasses and broadleaves in field corn, popcorn, sweetcorn. Early preplant (EPP), preemergence (PE), or preplant incorporate (PPI) spray on conventional or conservation (including no-till) tillage corn.
FORMULATIONS: 90DF, 4L.

Registration Notes
 U.S.: RUP.
Environmental Guidelines
SOIL PARTICLE ADSORPTION: Do not use on sands with <1% organic matter.
SOLUBILITY: Dispersible in water.

Safety Guidelines
SIGNAL WORD: WARNING.
TOXICITY CLASS: II.
TOXICITY: (Rat): Oral LD₅₀ 336 mg/kg. (Rabbit): Dermal LD₅₀ >2220 mg/kg.

PROTECTIVE CLOTHING: Long-sleeved shirt and long pants, water-proof gloves, chemical-resistant footwear plus socks, protective eye-wear, chemical-resistant apron when cleaning equipment, mixing or loading. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with Extrazine* II concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed. Avoid contact with skin or eyes. Store in cool, well ventilated area. Do not contaminate water, food or feed by storage or disposal.

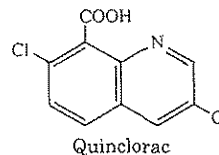
Emergency Guidelines
FIRST AID: Ingestion, drink 2 glasses of water and induce vomiting.
EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).
E-Z-OFF* — see Magnesium Chlorate.
E-Z-OFF D* Defoliant (butifos) — Discontinued.
Ezy Pickin Herbicide (cacodylic acid + sodium cacodylate)** — Discontinued by Drexel Chemical.

38-F*
 BP: SANAG (38-F*)
Chemistry
COMPOSITION: Fluid polymer dispersion of polyacrylamide 32% + 68% constituents ineffective as spray adjuvants.

Action/Use
ACTION: Drift retardant additive.
USE: Aerial, ground application to reduce drift caused by fines.
Safety Guidelines
SIGNAL WORD: WARNING.
TOXICITY CLASS: II.
TOXICITY: Eye and skin irritant. Nontoxic.
HANDLING AND STORAGE CAUTIONS: May cause irritation. May be harmful if absorbed through skin.

Emergency Guidelines
FIRST AID: Eyes, flush with plenty of water for at least 15 minutes. Skin, immediately remove contaminated shoes, clothes; wash skin with soap, water. Inhalation, remove to fresh air. Ingestion, seek medical attention.
3336-F* — see Thiophanate.
F-319 — see Tachigaren*.
F-461 — see Oxyarboxin.
Fac* — see Prothoate.
Fac Super* — see Oxev; Prothoate.
Facet*
 BP: BASF AG (Facet*)

Identification
COMMON NAME: Quinclorac (ISO draft, BSI).
EXP. CODE NUMBER: BAS 514H.
CODE NUMBER: CAS 84087-01-4.
Chemistry
COMPOSITION: 3,7-dichloro-8-quinolinecarboxylic acid.
PROPERTIES: Colorless crystalline, faint odor. Solubility: Tech: In cyclohexanone and xylene ca. 1 g/100 g.



Action/Use
ACTION: Selective pre and postemergence herbicide.
USE: In transplanted, seeded rice for control of Aeschynomene, Echinochloa, Ipomoea, Sesbania, etc. Postemergent in spring wheat for Setaria spp., and in turf for Digitaria sanguinalis, Trifolium, etc.
FORMULATIONS: Granular, suspension concentrate (250 g/l), wettable powder (50%).
COMBINATIONS: Basagran* Pl and Basagran* Pulta (+ bentazone), Facet-P* (+ propanil) (BASF AG).

Environmental Guidelines
HAZARDS: Fish: LC₅₀ >100 mg/l (96 h)(trout). Bee: Nontoxic. Bin. LD₅₀ >2000 mg/kg (quail).
SOLUBILITY: Tech: In water 6.2 mg/100 ml (20°C).

Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: Facet* (Rat): Oral LD₅₀ 4120 mg/kg. Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Goggles, long-sleeved shirt and pants and boots when handling undiluted and diluted product. Impermeable gloves and rubber apron when handling undiluted product.
HANDLING AND STORAGE CAUTIONS: Keep out of children's reach. Do not take internally. Avoid contact with eye, skin, clothing, foodstuffs. Skin contact may cause sensitization.
SPILL CONTROL/CLEANUP: Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with a sorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.
PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines
ANTIDOTE: Unknown.
FIRST AID: Get medical aid. Eyes, Skin, flush with plenty of water. Ingestion, do NOT induce vomiting unless advised by a physician.
EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC).

Facet*-P — see Facet; Propanil.
Fagal* Herbicide (mecoprop) — Discontinued 1994 by BASF AG.
Fair 30* Plant Growth Regulator (maleic hydrazide) — Discontinued by Fair Products, Inc.
Fair 85*

BP: Fair Products, Inc. (Fair 85*)
Identification
DISCONTINUED NAME: Sprout-Off*.
Chemistry
COMPOSITION: Fatty alcohols (C8 + C10 groups).
PROPERTIES: Emulsifies.

Action/Use
ACTION: Tobacco sucker control agent.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: IV.
TOXICITY: Nontoxic as defined by FHSLA.
HANDLING AND STORAGE CAUTIONS: Store at room temperature. Indefinite shelf life.
Fair Plus* — see Maleic Hydrazide.
Fair-Tac* — see n-Decanol.
Falgro* — see Gibberellic Acid.
Fall* — see Sodium Chlorate.
Fallowmaster*
 BP: Monsanto Co., The Agricultural Group (Fallowmaster*)

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: Dicamba + glyphosate.

Action/Use

ACTION: Herbicide.

USE: Emerged annual weeds in fallow and reduced tillage systems, prior to planting or emergence of barley, milo, oats, rye, and wheat.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 4000 mg/kg. Inhalation LC₅₀ 1.14 mg/l (4 h). Dermal LD₅₀ >5000 mg/kg. Corrosive to eye; nonirritating to skin.

PROTECTIVE CLOTHING: Long sleeved shirt, long pants, water-proof gloves, socks, shoes, and protective eyewear.

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed or inhaled. Causes eye burns; may cause allergic skin reaction. Keep out of reach of children. Wash thoroughly after use. Stable under normal storage conditions. Mix, store, apply only in stainless steel, aluminum, fiberglass, plastic, plastic lined containers to avoid forming highly combustible gas.

Emergency Guidelines

FIRST AID: Get immediate medical aid. Eyes, flush immediately with plenty of water for at least 15 minutes. Skin, wash with plenty of soap, water. Remove contaminated clothing and wash before reuse. Inhalation, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Ingestion will cause gastrointestinal tract irritation. Immediately dilute by swallowing water or milk.

EMERGENCY TELEPHONE: 314-694-4000 (Monsanto Co., The Agricultural Group).

Falodin* Herbicide (2,4-DEP) — Discontinued by Uniroyal Chemical Co., Inc.

Falone*

(Discontinued by Uniroyal Chemical Co., Inc.)

Identification

COMMON NAME: 2,4-DEP (WSSA).

CODE NUMBERS: CAS 94-84-8; SHA 031201.

DISCONTINUED NAME: Falodin* (Uniroyal Chemical Co., Inc.)

Chemistry

COMPOSITION: Tris (2,4-dichlorophenoxyethyl) phosphite + bis (2,4-dichlorophenoxyethyl) phosphite.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 850 ± 140 mg/kg. Subacute oral toxicity study (400 ppm/rat/dog/90 da.) showed no abnormalities.

Faltex* — see Folpet.

FAM* — see MNFA.

Famid* Insecticide (dioxacarb) — Discontinued by Ciba-Geigy, Ltd.

Faneron*

BP: Ciba-Geigy Ltd. (Faneron*)

Identification

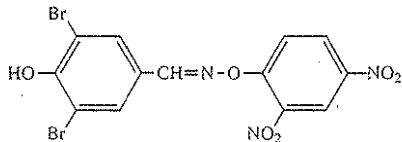
COMMON NAMES: Bromofenoxim (ISO-E, BSI, WSSA); bromophénoxime (ISO-F).

EXP. CODE NUMBER: C 9122 (Ciba-Geigy).

OTHER CODE NUMBER: CAS 13181-17-4.

Chemistry

COMPOSITION: 3,5-Dibromo-4-hydroxybenzaldehyde 2,4-dinitrophenyloxime (IUPAC).



Bromofenoxim

Action/Use

ACTION: Herbicide.

USE: For broadleaf weeds, including phenoxy-resistant weeds in cereals. Combinations for grasses.

FORMULATIONS: Suspension concentrate, wettable powder.

COMBINATIONS: With terbutylazine.

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.13-0.24 (96 h) (catfish, goldfish); 0.056-0.1

mg/l (rainbow trout). Bee: Wettable powder nontoxic. Suspension concentrate toxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1217 mg/kg. Dermal >3000 mg/kg.

Fanyl Colza* — see Prochloraz.

Fanyline*

Chemistry

COMPOSITION: Fluoroacetophenylhydrazide.

Action/Use

ACTION: Insecticide.

Far-Go*

BP: Monsanto Co., The Agricultural Group (Far-Go*)

Identification

COMMON NAMES: Triallate (ISO-F, WSSA); tri-allate (ISO-E, BSI).

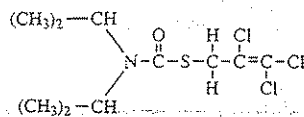
CODE NUMBERS: CAS 2303-17-5; SHA 078002.

ADDITIONAL TRADE NAME: Avadex* BW.

DISCONTINUED NAME: TRIGGER* (+ isoproturon) (May & Baker Ltd.).

Chemistry

COMPOSITION: S-2,3,3-trichloroallyl di-isopropyl(thiocarbamate) (IUPAC).



Triallate/tri-allate

Action/Use

ACTION: Preemergence selective herbicide.

USE: For wild oats in barley, green peas, field dried peas, lentils, wheat (durum, spring, winter).

FORMULATIONS: Emulsifiable concentrate, granular.

COMBINATIONS: Pyradex* T (+ chloridazon) (BASF Corp.); Buckle* (+ trifluralin) (Monsanto Co., The Agricultural Group).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 1.3 mg/l (96 h) (bluegill); 1.2 mg/l (rainbow trout).

Bird: (Dietary) >5620 ppm (quail).

SOLUBILITY: Tech 4 ppm in H₂O at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2193 mg/kg; (Rabbit) Dermal >5000 mg/kg.

PROTECTIVE CLOTHING: Long sleeved shirt, long pants, socks, shoes, chemical resistant gloves, and protective eyewear.

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin contact. Store in well-ventilated area, above freezing.

Emergency Guidelines

FLASHPOINT: 118°F.

FIRE EXTINGUISHING MEDIA: Water spray, foam, dry chemical, CO₂, or other Class B agent.

FIRST AID: Eyes, flush with plenty of water for 15 minutes. Skin, Wash with soap and water; remove contaminated clothing. Wash clothing before reuse. Ingestion, do NOT induce vomiting. If conscious, give large quantities of water. Never give anything by mouth to an unconscious person. Get immediate medical aid.

EMERGENCY TELEPHONE: 314-694-4000 (Monsanto Co. The Agricultural Group).

Farmachlor* — see Butachlor.

Farmarox* — see EPTC.

Farmatox* — see Fenpropathrin.

Farmco* Amizine-AA — see Atrazine.

Farmco* Amizine-AA Flowable* — see Amitrole; Atrazine.

Farmco* Atrazine — see Atrazine.

Farmco* Diuron — see Diuron.

Farmco* Fence Rider Herbicide (2,4,5-T) — Discontinued.

Farmco* One-Shot — see MCPA.

Farmco* Propanil — see Propanil.

Farmco* Sure-Shot — see Bromoxynil.

Farmco* Trifluralin — see Trifluralin.

Farmon Condox* Herbicide — Discontinued 1980 by Farm Protection Ltd.

Farnesol

Chemistry

COMPOSITION: 3,7,11-Trimethyl-1-2,6,10-dodecatrien-1-ol.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Insect hormone.

Fastac* — see Alpha-cypermethrin.**Faster*** — see Phosalone; Pirimor*.**Fatty Acids, Pesticidal**

BP: Mycogen Corp. (DeMoss* Moss/Algicide, M-Pede* Insecticide)

Identification

ADDITIONAL TRADE NAMES: Safer* Insecticide Concentrate, Safer* Moss & Algae Killer (Safer Inc.).

DISCONTINUED NAME: Sharpshooter* Fatty Acid (Mycogen Corp.).

Chemistry

COMPOSITION: Potassium salts of fatty acids.

Action/Use

ACTION: Insecticide/herbicide management.

USE: Kills aphids, spider mites, mealybugs and whitefly on garden vegetables, shrubs and trees (M-Pede* Insecticide). Some fatty acids may be applied to control moss in lawns and mosses, algae, lichens, and liverworts on roofs, walks, and fences, and in greenhouses (DeMoss* Moss/Algicide). Other fatty acids kill weeds in and around walks, driveways, flowerbeds, trees, shrubs (Sharpshooter* Herbicide).

FORMULATIONS: Liquid concentrate.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic. Bird: Nontoxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

HANDLING AND STORAGE CAUTIONS: See label. Avoid extreme temperatures.

FBC - 32197 — see Quizalofop-ethyl.

FBC CMPP* 2 — see Mecoprop.

FBHC* (BHC) — Discontinued by Hooker Chemical.

Fecundal* — see Imazalil.

Federal (U.S.) Legislation

The following partial history of pesticide legislation applies only to the United States. The Federal Insecticide Act of 1910, which went into effect January 1, 1911, covered only insecticides and fungicides. It was primarily an act to overcome adulteration and to regulate labelling.

The Pure Food Law of 1906 was amended in 1938 to cover pesticides, primarily such as lead arsenate and Paris green, in food. It provided tolerances for residues of arsenic and lead in foods. It also required the coloring of white insecticides such as sodium fluoride to prevent their use as flour or other cooking materials of similar appearance.

The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) of 1947 superseded the 1910 act and extended coverage to include herbicides and rodenticides. All covered materials were required to be registered before being marketed in interstate commerce. The law required useful labelling, with manufacturer's name and address, name and trademark of the product, net contents, and appropriate warning statements.

In 1954 the Food, Drug and Cosmetic Act (1938) was amended (Miller Amendment) to provide that any raw agricultural product may be condemned as adulterated if it contains any pesticide whose safety has not been cleared or is present in excessive amounts.

In 1958 the Food Additives Amendment was passed, which also controls pesticide residues in processed foods. It included the Delaney clause which states that any chemical found to be a carcinogen in laboratory animals may not appear in human food.

In 1959 the FIFRA was amended to include nematocides, plant growth regulators, defoliants, and desiccants as pesticides. Since that time, poisons and repellents used against all classes of animals (from invertebrates to mammals) have been brought under control.

In 1972 the FIFRA was further amended as the Federal Environmental Pesticide Control Act (FEPCA) making violations by growers, applicators or dealers subject to heavy fines and/or imprisonment. There are eight basic provisions: (1) Use of any pesticide inconsistent with the label is prohibited; (2) violations can result in heavy fines and/or imprisonment; (3) all pesticides will be classified into general use or restricted use categories; (4) restricted use pesticides must be applied by a certified applicator; (5) pesticide manufacturing plants must be registered and inspected by EPA; (6) states may register pesticides on a limited basis for local needs; (7) all pesticides must be registered by EPA; and (8) for a product to be registered the manufacturer is required to provide scientific evidence that the product, when used as directed (a) will effectively control the pests listed on the label, (b) not injure humans, crops, livestock, wildlife, or damage the environment, and (c) will not result in illegal residues in food or feed.

Congress amended FIFRA in 1988 to strengthen and accelerate pesticide reregistration. The nine-year reregistration mandate requires a

comprehensive reevaluation of all data supporting products containing any active ingredient registered before November 1, 1984.

See Regulatory File in Section D.

Fenaben* Herbicide — Discontinued by Rhone-Poulenc Ag Co.**Fenac** — see Fenatrol*.**Fen-all* Herbicide (trichlorobenzoic acid)** — Discontinued by Tenneco Chemical Inc.**Fenamime* Herbicide (amitrole)** — Discontinued by Rhone-Poulenc Ag Co.**Fenaminosulf** — see Lesan*.**Fenamiphos** — see Nemacur*.**Fenapanil** — see Sisthane*.**Fenarimol** — see Dodine; Rubigan*.**Fenatrol***

(Discontinued 1987 by Rhone-Poulenc Ag Co.)

Identification

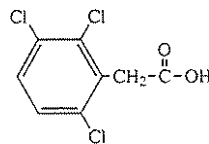
COMMON NAMES: Chlorfenac (ISO, BSI), fenac (WSSA).

CODE NUMBERS: CAS 85-34-7; SHA 082601.

DISCONTINUED NAME: Trifene* (Tenneco Chemical); Rack Granular* (+ atrazine) (Rhone-Poulenc Ag Co.).

Chemistry

COMPOSITION: (2,3,6-Trichlorophenyl)acetic acid.



Chlorfenac

Action/Use

ACTION: Herbicide.

Registration Notes

OUTSIDE U.S.: Tri-Fen*.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1780 mg/kg. (Rabbit): Dermal >3160 mg/kg.**Fenavar* Liquid Herbicide (amitrole + bromacil + fenac)** — Discontinued by Rhone-Poulenc Ag Co.**Fenazaflor****Identification**

COMMON NAMES: Fenazaflor (ISO), fenozaflor (BSI).

EXP. CODE NUMBER: NC 5016 (Fisons Ltd.).

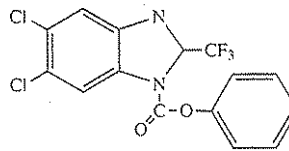
OTHER CODE NUMBERS: CAS 14255-88-0; SHA 598700.

ADDITIONAL TRADE NAME: Tarzol*.

DISCONTINUED NAMES: Fenoflurazole* and Lovozal* (Fisons Ltd.).

Chemistry

COMPOSITION: Phenyl 5,6-dichloro-2-trifluoromethyl-1-benzimidazole carboxylate, or 5,6-dichloro-1-phenoxy-carbinyl-2-trifluoromethyl-benzimidazole.



Fenazaflor

Action/Use

ACTION: Insecticide-acaricide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 283 mg/kg.**Fenbaz*** — see Fenvalerate.**Fenbuconazole** — see Indar*.**Fenbutatin-Oxide**BP: American Cyanamid Co. (Osadan*, Torque*)
Du Pont Agricultural Products (Vendex*)**Identification**

COMMON NAMES: Fenbutatin-oxide (BSI, New Zealand, ISO, proposed), hexakis.

EXP. CODE NUMBER: SD 14114.

CODE NUMBERS: CAS 13356-08-6; SHA 104601.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: bis[tris (2-methyl-2-phenylpropyl)tin] oxide (IUPAC). Hexakis(2-methyl-2-phenylpropyl)distannoxane (CAS).

FAMILY: Organotin.

PROPERTIES: White crystalline solid, mild odor. Melting point approx. 145°C. Low solubility in aromatic solvents (e.g. 14% w/v in benzene).

Action/Use

ACTION: Acaricide.

USE: Selective miticide for deciduous fruits, citrus, grapes, select nut crops, greenhouse crops, ornamentals.

FORMULATIONS: Liquid concentrate; suspension concentrate; wettable powder.

COMBINATIONS: Mitedown* (+ polynactins complex).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.0066 ppm (rainbow trout). 0.0048 ppm (sunfish). Bird: Oral LD₅₀ 2510 mg/kg (quail). (Dietary) LC₅₀ >5620 ppm (mallard).

SOIL PARTICLE ADSORPTION: Not readily biodegradable.

SOLUBILITY: Insoluble but readily dispersible in water.

Safety Guidelines

SIGNAL WORD: CAUTION; DANGER (Vendex*).

TOXICITY CLASS: III; I (Vendex*).

TOXICITY: (Rat): Oral LD₅₀ 2631 mg/kg. (Rabbit): Dermal >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid breathing dust, spray mist, or contact with eyes or skin.

PROTECTIVE CLOTHING: Goggles, gloves during mixing, spraying.

Emergency Guidelines

FLASHPOINT: Nonflammable.

FIRE EXTINGUISHING MEDIA: Dry powder, foam, CO₂, water.

FIRST AID: Get medical aid. Eyes, flush with plenty of water. Skin, remove contaminated clothing, wash skin thoroughly. Inhalation, remove to fresh air. Ingestion, if conscious, give 1-2 glasses water and induce vomiting.

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Fence Rider* — see 2,4,5-T.

Fenchlorfos — see Ronnel.

Fenchlorphos — see Ronnel.

Fendona* — see Fastac*.

Fenetrazole — see Tebuconazole.

Fen-Fen* — see Fenvalerate.

Fenfuram — see Pano-ram*.

Fenfurame — see Pano-ram*.

Fenidim* — see Fenuron.

Fenikan* — see Diflufenican.

Fenikill* — see Fenitrothion; Fenvalerate.

Fenisx* — see Fenvalerate.

Fenitox* — see Fenitrothion.

Fenitrothion

BP: Cheminova Agro A/S (Novathion*)

Forward International Ltd.

HELM AG

Hubei Sanonda Co., Ltd.

Rallis India Ltd.

Rotam Group (Rothion*)

Sanex Inc. (Sanithion*)

Sumitomo Chemical Co., Ltd. (Sumithion*)

Identification

COMMON NAME: Fenitrothion (ISO, BSI, ESA, BAN); MEP (JMAF).

EXP. CODE NUMBERS: Bay S 5660, Bay 41831 (Bayer AG).

OTHER CODE NUMBERS: CAS 122-14-5; SHA 105901; OMS 43, OMS 223 (WHO); ENT-25715; EINECS 204-524-2.

ADDITIONAL TRADE NAMES: Larvos* (Chimac-Agriphar S.A.);

Etalene* (Diachem S.P.A.); Fenitox* (All India Medical Corp.);

Senthion* (VAPCO).

DISCONTINUED NAMES: Accothion*, Cytel* (American Cyanamid Co.);

Agrothion* (ICI Agrochemicals); Badilin Blumenspray* (+ dodine + tetradifon) (BASF AG); Folithion* (Bayer India); Verthion* (Shell International Chemical Co. Ltd.).

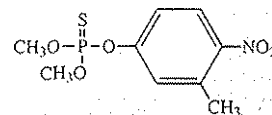
Chemistry

COMPOSITION: O,O-Dimethyl O-4-nitro-m-tolyl phosphorothioate (IUPAC) or O,O-Dimethyl O-(3-methyl-4-nitrophenyl) phosphorothioate (CAS).

FAMILY: Organophosphate.

PROPERTIES: Yellowish-brown oily liquid. Specific gravity 1.328°.

Melting point 3.4°C. Vapor pressure 1.5 × 10⁻⁶ mbar at 20°C. Readily soluble in dichloromethane, 2-propanol, toluene. Hardly soluble in n-hexane.



Fenitrothion

Action/Use

ACTION: Contact insecticide; selective acaricide (low ovicidal activity). USE: For chewing, sucking insects on cereals, cotton, orchard fruits, rice, vegetables, and forest. Fly, mosquito, cockroach residual contact sprays for farms. Sumithion* for locust and grasshopper.

FORMULATIONS: Dust, emulsifiable concentrate, flowable, fogging concentrate, granules, oil-based liquid spray, ULV, wettable powder.

COMBINATIONS: Fenrate* 40EC (+ fenvalerate) (Agro Chemicals Industries Ltd.); Dicontal* (+ trichlorfon), Piliar* (+ beta-cyfluthrin) (Bayer AG); Anthiomix* and Sandothion* (+ formothion) (Sandoz Agro Ltd.); Fenikill* (+ fenvalerate) (VAPCO).

Registration Notes

U.S.: Novathion* 500-E with malathion not marketed.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 1.7 ppm (96 h) (brook trout). 3.8 ppm (bluegill).

Bird: Oral 23.6 mg/kg (quail); 1190 mg/kg (mallard).

SOIL PARTICLE ADSORPTION: Preliminary data indicates degrades fairly rapidly in soil with half-life of < a week in non-sterile muck, sandy loam soils. Intermediately mobile in variety of soils ranging from sandy loam to clay.

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING; CAUTION (Sumithion*).

TOXICITY CLASS: II; III (Sumithion*).

TOXICITY: (Rat): Oral LD₅₀ approx. 250 mg/kg; Dermal LD₅₀ approx. 2500 mg/kg.

Sumithion*: (Rat, female): Oral LD₅₀ 800 mg/kg; Dermal LD₅₀ 1200 mg/kg.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, food, feed. Do not heat above 55°C. Decomposes rapidly above 120°C, explosion may be induced.

Emergency Guidelines

ANTIDOTE: Atropine, PAM, 2-PAMCl, 2-PAMM.

Fénizon — see Fenson.

Fenkill* — see Fenvalerate.

Fennotox* — see Heptachlor.

Fenobucarb — see BPMC.

Fenoflurazole* Insecticide/Acaricide (fenazaflor) — Discontinued by Fisons Ltd.

Fenolovo Acetate — see Triphenyltin Acetate.

Fenophosphon — see Trichloronate.

Fenoprop — see Silvex.

Fenothiocarb — see Panocon*.

Fenothrin — see Pyrethroids.

Fenoxaprop-Ethyl

BP: AgrEvo USA Co. (Acclaim*, Horizon*, Whip* 1EC)

Hoechst Schering AgrEvo GmbH

Identification

COMMON NAME: Fenoxaprop-ethyl (ISO draft, ANSI, BSI).

CODE NUMBERS: CAS 66441-23-4; SHA 128701.

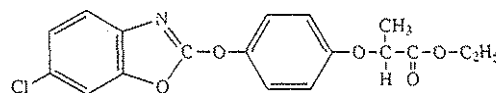
ADDITIONAL TRADE NAMES: Depon*, Excel*, Furore*.

DISCONTINUED NAMES: Whip* (AgrEvo USA CO.).

Chemistry

COMPOSITION: (±)-ethyl 2-[4-[(6-chloro-2-benzoxazolyl)oxy]phenoxy]propanoate (CAS).

PROPERTIES: Light beige to brown, coarse powder. Melting point 80-84°C. Solubility in acetone, >51g/100 ml.



Fenoxaprop-ethyl

Action/Use

ACTION: Selective herbicide.

USE: Selective postemergence annual and perennial grass control in many dicot and monocot crops.

FORMULATIONS: Emulsifiable concentrate; emulsion in water.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Registration Notes

U.S.: Not registered in Hawaii. Whip* 1EC for rice in California. Horizon* for annual and perennial grassy weeds in rights-of-way, section 24 (c) for turfgrass seed production in Oregon.

Environmental Guidelines

HAZARDS: Fish: Acutely toxic. Bird: Nontoxic.
SOIL PARTICLE ADSORPTION: Slightly mobile in two loamy sand soils, two silt loam soils, and an aquatic sediment (clay) soil. Little potential for leaching.

SOLUBILITY: In water, 0.9 mg/l at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech: (Rat): Oral LD₅₀ 2565 mg/kg (male/female). (Rabbit): Dermal LD₅₀ >2000 mg/kg. Inhalation LC₅₀ 0.511 mg/l (4 h). Slight skin and eye irritation.

PROTECTIVE CLOTHING: Wear goggles or face shield and impermeable rubber gloves while mixing. Long sleeved shirt and long pants while mixing and during application.

HANDLING AND STORAGE CAUTIONS: Do not get in eyes. Harmful if swallowed, absorbed through skin, or inhaled. Avoid inhalation of vapor or spray mist. Remove contaminated clothing and wash before reuse. Wash thoroughly with soap and water after handling. Handle only in ventilated area. Do not store above 100°F or below 10°F. Do not store or use near open flame. Store where contamination of fertilizer, seed, or foodstuffs will not occur. Do not contaminate water, food or feed by storage or disposal.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemical of CO₂ for small fires. Foam or water for large fires.

FIRST AID: Get medical aid. Eyes, immediately flush with plenty of water for 15 minutes. Ingestion, do NOT induce vomiting. Vomiting should be supervised by a physician because of the possible pulmonary damage via aspiration of the solvent. If possible, bring container and labeling to attending physician.

EMERGENCY TELEPHONE: 302-892-3000 (AgrEvo USA Co.).

Fenoxaprop-P-ethyl

BP: AgrEvo USA Co. (Bugle*, Option*, Option* II, Whip* 360)

Identification

COMMON NAME: Fenoxaprop-P (BSI, ISO-E draft, ISO-F draft).

EXP. CODE NUMBERS: Hoe-046360 (Hoechst).

CODE NUMBERS: CAS 113158-40-0; (fenoxaprop-P-ethyl) 71238-80-2.

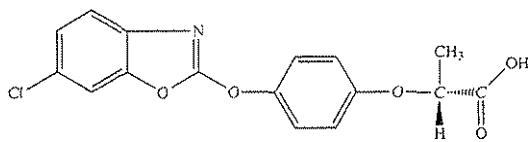
DISCONTINUED NAMES: Dakota* TP (+ MCPA) (AgrEvo USA Co.).

Chemistry

COMPOSITION: (R)-2-[4-(6-chloro-1,3-benzoxazol-2-yloxy)phenoxy]propionic acid (IUPAC); (R)-2-[4-(6-chlorobenzoxazol-2-yloxy)phenoxy]propionic acid (IUPAC); (R)-2-[4-[(6-chloro-2-benzoxazolyl)oxy]phenoxy]propionic acid (CAS).

FAMILY: Benzoxazole; phenoxy.

PROPERTIES: Colorless solid; melting point 84-85°C; vapor pressure 19 nPa at 20°C. Solubility (g/kg at 25°C): in acetone, >500; ethanol, cyclohexane, and *n*-octanol >10; ethyl acetate >200, toluene >300. In water 0.9 mg/l. Partition coefficient (octanol/water) 13,200. Stable for 6 months at 50°C. Not light-sensitive. Decomposed by acids and alkalis.



Fenoxaprop-P-ethyl

Action/Use

ACTION: Herbicide.

USE: For annual and perennial grass weeds in potatoes, beans, soybeans, beets, vegetables, groundnuts, flax, oilseed rape, and cotton. With herbicide safener fenchlorazole-ethyl for annual and perennial grass weeds and wild oats in wheat, rye and triticale.

FORMULATIONS: Emulsifiable concentrate.

COMBINATIONS: Cheyenne* Herbicide [Twin Pack of Cheyenne* FM (fenoxaprop-P-ethyl + MCPA) & X-TRA* (thifensulfuron methyl + tribenuron methyl)], Dakota* (+ MCPA), Horizon* 2000 (+ fluazifop-P-butyl), Tiller* (+ 2,4-D + MCPA) (AgrEvo USA Co.); Djinn* (+ isoproturon) (Hoechst Schering AgrEvo GmbH); Fusion* (+ fluazifop-P-butyl) (ZENECA).

Safety Guidelines

TOXICITY: (Rat): Oral LD₅₀ 3040 mg/kg (male), 2090 mg/kg (female); mice >5000 mg/kg. Dermal LD₅₀ >2000 mg/kg. Inhalation LC₅₀ >6.04 mg/l air.

Fenoxycarb

BP: Ciba (Comply*, Eclipse*, Logic*, Torus*)
Ciba, Ltd. (Insegar*)

Identification

COMMON NAME: Fenoxycarb (ISO, ANSI, BSI).

CODE NUMBERS: CAS 79127-80-3; SHA 125301; OMS 3010 (WHO).

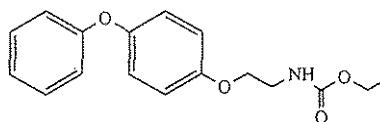
DISCONTINUED NAME: Pictyl* (Maag Agrochemicals).

Chemistry

COMPOSITION: Ethyl [2-(4-phenoxyphenoxy)ethyl] carbamate.

FAMILY: Phenoxyphenoxy.

PROPERTIES: White crystalline solid. Melting point 53-54°C. Vapor pressure (25°C) 1.3×10^{-2} torr. Soluble in organic solvents; slightly in hexane.



Fenoxycarb

Action/Use

ACTION: Insect growth regulator.

USE: Wide range of insects. Bait for ants. Logic* for fire ants. Insegar* 25WP for lepidoptera, psyllids, scales for fruits and ornamentals. In stored products for coleopterous, lepidopterous.

FORMULATIONS: Emulsifiable concentrate, wettable powder, baits.

Registration Notes

U.S.: Comply* and Eclipse*.

OUTSIDE U.S.: Insegar* in Europe.

Environmental Guidelines

SOLUBILITY: In water 6 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 16,800 mg/kg. Dermal >2000 mg/kg. Non-irritating to eyes, skin.

Emergency Guidelines

FLASHPOINT: >150°C.

FIRE EXTINGUISHING MEDIA: Water or other.

Fenozaflo — see Fenazaflo.

Fenpiclonil

BP: Ciba, Ltd. (Beret*, Galbas*, Gambit*)

Identification

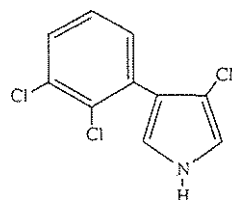
COMMON NAME: Fenpiclonil.

EXP. CODE NUMBER: CGA 142705 (Ciba, Ltd.).

OTHER CODE NUMBER: CAS 74738-17-3.

Chemistry

COMPOSITION: 4-(2,3-dichlorophenyl)-1H-pyrrole-3-carbonitrile (IUPAC).



Fenpiclonil

Action/Use

ACTION: Contact fungicide.

USE: Seed treatment for use on cereals, brassica, oil seed rape, peas, potatoes, maize, and vegetables. Diseases controlled or prevented: Snow mold, common bunt, *Septoria* spp., *Fusarium*, *Rhizoctonia*, *Penicillium*, *Alternaria*, *Helminthosporium* and others.

FORMULATIONS: Water dispersible powder, flowable concentrate, powder for dry seed treatment; emulsifiable concentrate.

COMBINATIONS: For cereal seed treatment: Beret Combi* (+ difenoconazole); Beret Special* (+ imazalil); Beret Universal* (+ imazalil + carboxin). For non-cereals: Beret MLX* (+ metalaxyl).

Registration Notes

OUTSIDE U.S.: Marketed in various European countries.

Environmental Guidelines

HAZARDS: Fish, *Daphnia*, algae: Toxic. Bird: Practically nontoxic. Honey bees: Practically nontoxic.

SOIL PARTICLE ADSORPTION: Low soil mobility by strong adsorption to soil particles.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

TOXICITY CLASS: III (WHO) (practically of no acute toxicity).
 TOXICITY: Tech. (Rat): Oral LD₅₀ >5000 mg/kg. Dermal LD₅₀ >2000 mg/kg. (Rabbit): Non-irritant to skin, eyes.
 PROTECTIVE CLOTHING: Goggles, long-sleeved shirt and pants, boots.
 HANDLING AND STORAGE CAUTIONS: Avoid skin contact and vapor inhalation.

Emergency Guidelines

FIRST AID: Get medical attention. Eyes, wash with plenty of water. Skin, wash with water and remove contaminated clothing. Ingestion, administer medicinal charcoal in large quantity of water. Treat symptomatically.

Fenpropanate — see Pyrethroids.

Fenpropar* — see Propargite.

Fenpropathrin

BP: Sumitomo Chemical Co., Ltd. (Danitol*, Farmatox*)
 Valent U.S.A. (Danitol*, Tame*)

Identification

COMMON NAMES: Fenpropathrin (ISO-E, ANSI, BSI); fenpropathrine (ISO-F).

EXP. CODE NUMBERS: SD-41706, S-3206, WL-41706, XE-938.

OTHER CODE NUMBERS: CAS 39515-41-8; SHA 127901.

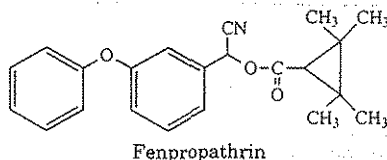
ADDITIONAL TRADE NAMES: Danimen*, Herald*, Meothrin*, Rody*.

Chemistry

COMPOSITION: (RS)-α-Cyano-3-phenoxybenzyl 2,2,3,3-tetramethylcyclopropanecarboxylate (IUPAC).

FAMILY: Pyrethroid.

PROPERTIES: Yellow-brown liquid or solid. Melting point 45-50°C. Soluble in common organic solvents (xylene, cyclohexanone, chloroform, acetone, methanol). Stable except in alkaline solution.



Fenpropathrin

Action/Use

ACTION: Acaricide, insecticide.

USE: For mites, whiteflies, leafminers, cotton bollworms, leafworms, leafrollers, armyworms, cabbageworms, cabbage looper, aphids, tortrixes, psyllas, bugs, fruit moths, tuberworms, cutworms, budworms, diamondback moth, mosquito bugs, stemborer on fruit trees, vegetables, ornamentals, and other field crops.

FORMULATIONS: Emulsifiable concentrate.

Registration Notes

U.S.: For use on ornamentals (Tame*) and cotton (Danitol* 2.4EC).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 2.3 ppb (rainbow trout); 5.5 ppb (channel catfish). Bird: LD₅₀ 1089 mg/kg (mallard duck); LC₅₀ 9026 ppm (mallard duck).

SOLUBILITY: 14 ppb.

Safety Guidelines

SIGNAL WORD: DANGER (eye irritant).

TOXICITY CLASS: I (eye irritant).

TOXICITY: (Rat): Oral LD₅₀ 70.6-164 mg/kg. (Rabbit): Dermal >2000 mg/kg.

PROTECTIVE CLOTHING: Chemical resistant gloves and protective eyewear.

Fenpropathrine — see Fenpropathrin.

Fenpropidin

BP: Ciba, Ltd. (Mildin*, Patrol*, Sorilan*, Tern*)

Identification

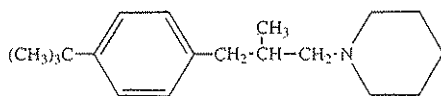
COMMON NAME: Fenpropidin.

EXP. CODE NUMBERS: RO 12-3049, CGA 114900 (Ciba, Ltd.).

OTHER CODE NUMBER: CAS 67306-00-7.

Chemistry

COMPOSITION: (R,S)-1-[3-(4-tert-butylphenyl)-2-methyl-propyl]piperidine (IUPAC).



Fenpropidin

Action/Use

ACTION: Systemic fungicide.

USE: Powdery mildew control in cereals and sugar beet; partial control of rusts and Rhynchosporium in cereals.

FORMULATION: EC.

COMBINATIONS: Boscor* (+ fenpropimorph), Tenere* (+ fenbuconazole), Tournoi* (+ fenpropimorph + propiconazole), Zenit* (+ propiconazole) (Ciba, Ltd.); Sponsor* (+ prochloraz) (Hoechst Schering AgrEvo GmbH); Planete* (+ hexaconazole) (ZENECA Agrochemicals).

Registration Notes

OUTSIDE U.S.: Solo* in France, UK, and Ireland. Combinations in Europe.

Environmental Guidelines

HAZARDS: Fish, *Daphnia*: Toxic. Birds: Slightly toxic. Honey bees: Low toxicity.

SOIL PARTICLE ADSORPTION: Strongly adsorbed to soil and extensively degrading with a half life of 2-3 months.

SOLUBILITY: Rapid dissipation in natural water with a half life less than 14 days.

Safety Guidelines

TOXICITY CLASS: II (WHO) (moderately hazardous).

TOXICITY: Tech. (Rat): Oral LD₅₀ >1800 mg/kg. Dermal LD₅₀ >1800 mg/kg. (Rabbit): Moderately irritating to eyes, skin.

PROTECTIVE CLOTHING: Goggles, long-sleeved shirt and pants, and boots. Rubber gloves for undiluted formulation (Tern*).

HANDLING AND STORAGE CAUTIONS: Avoid skin contact and vapor inhalation.

Emergency Guidelines:

FLASHPOINT: 68°C (Tern*).

FIRST AID: Eyes, wash with plenty of water. Skin, wash with water and removed contaminated clothing. Ingestion, administer medicinal charcoal in large quantities of water. Treat symptomatically.

Fenpropimorph

BP: BASF AG (Corbel*/BAS 421) (U.K.)
 Ciba, Ltd. (Corbel*)

Identification

COMMON NAMES: Fenpropimorph (ISO-E, BSI); fenpropimorphe (ISO-F).

EXP. CODE NUMBER: CGA 101031 (Ciba, Ltd.)

OTHER CODE NUMBER: CAS 67564-91-4; EINECS 266-719-9.

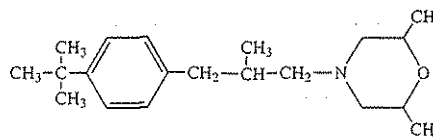
ADDITIONAL TRADE NAMES: Funbas*, Mildofix*, Mistral T*.

DISCONTINUED NAME: Corbel* Duo (+ carbendazim) (BASF AG).

Chemistry

COMPOSITION: (±)-cis-4-[3-(4-tert-butylphenyl)-2-methylpropyl]-2,6-dimethylmorpholine (IUPAC).

PROPERTIES: Yellowish liquid. Boiling point 120°C (0.067 hPa) Solubility: In acetone, ether, ethanol, toluene >100. Density ca. 0.92 kg/l.



Fenpropimorph

Action/Use

ACTION: Systemic fungicide.

USE: For powdery mildew, rusts, Rhynchosporium, side effects on Helminthosporium in cereals; Cercospora, Erysiphe in sugar beets.

FORMULATIONS: Emulsifiable concentrate, suspension concentrate.

COMBINATIONS: Corbel* CL and Corbel* Star (+ chlorothalonil), Corbel* Triple (+ carbendazim + chlorothalonil), Evrest* (+ tridemorph + flusilazole), Opus* Team and Opus* Top (+ epoxiconazole), Rockett-Ultra* and Gemini* (+ tridemorph), Twin* (+ flusilazole) (all BASF AG); Corvet* CM (+ carbendazim + mancozeb); Boscor* (+ fenpropidin), Tilt Top* (+ propiconazole), Orbit*, Magic*, Proton* (+ prochloraz), Sirocco* (+ iprodione), Tournoi* (+ fenpropidin + propiconazole) (all Ciba, Ltd.); Rival*/Sprint*/Stanza* L (+ prochloraz) (Hoechst Schering AgrEvo GmbH); Archer* (+ propiconazole); Simbo* (+ propiconazole).

Registration Notes

OUTSIDE U.S.: Orbit*. U.K.: Corbel*/BAS 421, Corbel* CL, Gemini*, Denmark: Twin*.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 9.5 mg/l (96h) (trout). Bee: Nontoxic. Bird: LC₅₀ 5000 mg/kg (mallard).

SOIL PARTICLE ADSORPTION: Half-life 93 days in clay sand with high humus content; 15 days in clay sand with moderate humus content.

Chemicals are cross-referenced by common and trade name

— Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

SOLUBILITY: In water 5.10-4.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 3515 mg/kg. Dermal LD₅₀ >4000 mg/kg.

Corbel*: (Rat): Oral LD₅₀ 4055 mg/kg; Dermal LD₅₀ 4904 mg/kg.

PROTECTIVE CLOTHING: Goggles, long-sleeved shirt and pants, and boots when handling the undiluted and diluted formulation. Rubber gloves when handling the undiluted formulation (Corbel*).

HANDLING AND STORAGE CAUTIONS: Avoid skin contact, vapor inhalation.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: Tech: 105°C (ca). Corbel*: approx. 60°C.

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. Eyes, skin, wash with plenty of water and remove contaminated clothing. Ingestion, do NOT induce vomiting unless advised by a physician, treat symptomatically. Administer medicinal charcoal in water.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC).

Fenpropimorphe — see Fenpropimorph.

Fenpyroximate

BP: Nihon Nohyaku Co., Ltd. (Acaban*, Acaritan*, Asalto*, Danitron*, Dynamite*, Kendo*, Kiron*, Meteor*, Miro*, Naja*, Ortus*, Salbiwang*, Sequel*)

Identification

COMMON NAME: Fenpyroximate (ISO-E, BSI).

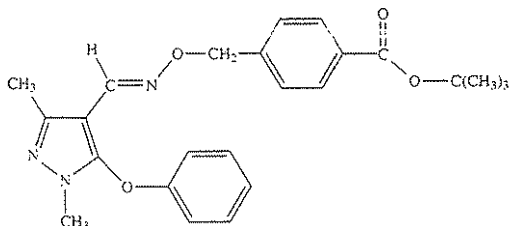
EXP. CODE NUMBER: NNI-850.

OTHER CODE NUMBER: CAS 134098-61-6.

Chemistry

COMPOSITION: *tert*-butyl (E)- α -(1,3-dimethyl-5-phenoxy-pyrazol-4-ylmethyleneamino oxy)-*p*-toluate.

PROPERTIES: Pure fenpyroximate: white crystalline solid, melting point 101.1-102.4°C. Vapor pressure 5.6x10⁻⁶ mmHg/25°C. Stable in acid and alkaline solutions. Solubility in acetone 150 g/l; in methanol 15 g/l.



Fenpyroximate

Action/Use

ACTION: Acaricide.

USE: Controls *Tetranychus* and *Panonychus* spp. and other phytophagous mites.

FORMULATION: Suspension conc rate.

Environmental Guidelines

SOLUBILITY: In water 0.0146 mg/l at 20°C.

Fenrate* 40EC — see Fenitrothion; Fenvalerate.

Fenridazon-potassium — see Hybrex*.

Fenson

Identification

COMMON NAMES: Fenson (ISO, BSI, ESA); fénizon (France).

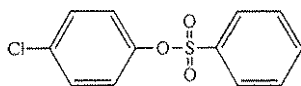
CODE NUMBERS: CAS 80-38-6; SHA 020101.

ADDITIONAL TRADE NAMES: CPBS, Murvesco* (Murphy Chemical); PCPBS.

DISCONTINUED NAMES: Trifenson* (Pennwalt Holland B.V.).

Chemistry

COMPOSITION: *p*-Chlorophenyl benzenesulfonate (CAS 8CI).



Fenson

Action/Use

ACTION: Acaricide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1560-1740 mg/kg.

Fensul* — see Fenvalerate.

Fensulfothion — see Dasanit*.

Fenthiaprop-ethyl — see Joker*.

Fenthion

BP: Bayer AG (Baytex*, Lebaycid*)

Miles Inc. (Baytox*)

Pilarquim Corp. (PilarTEX*)

Identification

COMMON NAME: Fenthion (ISO, BSI, ESA, BAN); MPP (JMAF).

EXP. CODE NUMBERS: Bay 29493, E 1752, S 1752 (Bayer AG).

OTHER CODE NUMBERS: CAS 55-38-9; SHA 053301; OMS-2 (WHO); EINECS 200-231-9.

ADDITIONAL TRADE NAMES: Baycid* (Bayer AG); Entex*.

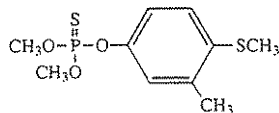
DISCONTINUED NAMES: Queletox* (Bayer AG); Prentox* Fenthion (Prentiss Incorporated).

Chemistry

COMPOSITION: O,O-Dimethyl O-[3-methyl-4-(methylthio)phenyl] phosphorothioate (CAS).

FAMILY: Organophosphorus.

PROPERTIES: Colorless oily liquid. Specific gravity 1.25 at 20°C. Melting point 7.5°C. Boiling point 87°C at 1.4 Pa. Vapor pressure 0.37 mPa at 20°C. Very readily soluble in dichloromethane, toluene. Readily soluble in 2-propanol. Soluble in n-hexane.



Fenthion

Action/Use

ACTION: Insecticide.

USE: For many sucking and biting pests, especially fruit flies, stem borers, Eurygaster cereal bugs, and other insects in fruit, grapes, olives, vegetables, cotton, tea, sugarcane, rice, etc.

FORMULATIONS: Dustable powder, emulsifiable concentrate, granules, concentrates, ULV liquid, wettable powder.

Registration Notes

U.S.: Baytex* not for use on food crops.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.87 mg/l (96 h) (rainbow trout). Bee: Toxic.

Bird: LC₅₀ 60 mg/kg b.w. (bobwhite quail).

SOIL PARTICLE ADSORPTION: Available data indicates degrades fairly rapidly; insufficient data to assess fully.

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 250 mg/kg b.w.; Dermal LD₅₀ 700 mg/kg.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Atropine sulfate in large therapeutic doses. Repeat as necessary to point of tolerance. 2-PAM is also antidotal, may be administered in conjunction with atropine.

EMERGENCY TELEPHONE: 49-2173-38-3030 (Bayer AG).

Fenthiaprop — see Joker*.

Fentiazon — see Celdion*.

Fentin Acetate — see Triphenyltin Acetate.

Fentine Acetate — see Triphenyltin Acetate.

Fentin Chloride — see Triphenyltin Chloride.

Fentin Hydroxide — see Triphenyltin Hydroxide.

Fentine Hydroxide — see Triphenyltin Hydroxide.

Fenulon — see Fenuron.

Fenuron

Identification

COMMON NAMES: Fenuron (ISO, ANSI, BSI, WSSA); fenulon (So.

Africa); fenidim (USSR).

TRIVIAL NAME: PDU.

CODE NUMBERS: CAS 101-42-8; SHA 035507.

DISCONTINUED NAMES: Dybar* (Du Pont); Premalox* (+ chlor-

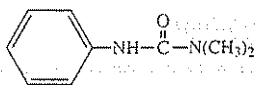
Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

propham + propham) (May + Baker Ltd.); Beet-Kleen* (+ propham + chlorpropham) (Shell Chemicals UK Ltd.).

Chemistry

COMPOSITION: 3-Phenyl-1,1-dimethylurea.

PROPERTIES: Melting point 133-134°C.



Fenuron

Action/Use

ACTION: Herbicide.

USE: Woody plants, deep-rooted perennial weeds.

COMBINATIONS: Herald* (+ chloridazon + chlorpropham + propham) (Rhône-Poulenc Ag Co.).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 160 mg/l (48 h) (guppy). Bee: N/A. Phenylurea derivatives generally nontoxic.

SOIL PARTICLE ADSORPTION: Lowest soil adsorption of the phenylurea herbicides.

SOLUBILITY: In water, 3850 ppm at 25°C.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 6400 mg/kg.

Fenuron Trichloroacetate — see Dozer*.

Fenuron-TCA — see Dozer*.

Fenvalerate

BP: Aimco Pesticide Ltd.

All India Medical Corp. (Sumifox*).

American Cyanamid Co. (Belmark*).

Atabay Agrochemicals & Veterinary Products Inc.

Bharat Pulverising Mills Ltd. (Fen-Fen*).

Gilmore, Inc.

Hubei Sanonda Co., Ltd.

Khatau Junker Ltd. (Khatau Fen*).

Krishi Rasayan

Lucky Ltd.

Paushak Ltd. (Paushafen*).

Rallis India Ltd. (Sumicidin*).

Roussel Uclaf Corp. (Tribute*).

Sanachem (Pty) Ltd. (Sanvalerate*).

Sumitomo Chemical Co., Ltd. (Sumicidin*, Sumifleece*).

United Phosphorus Ltd. (Fenkill*)

Identification

COMMON NAME: Fenvalerate (BSI, ISO).

EXP. CODE NUMBER: S-5602.

OTHER CODE NUMBERS: CAS 51630-58-1; SHA 109301.

ADDITIONAL TRADE NAMES: Fenbaz* (Agro Chemicals Industries Ltd.); Fenix* (Agsin Pte. Ltd.); Profen* (Chimac-Agriphar S.A.); Devifenvalerate* (Devidayal (Sales) Pvt. Ltd.); Sunvale* EC (Gupta Chemicals Pvt. Ltd.); Vegfru Fenrio* (Pesticides India); Fensul* (Sulphur Mills Ltd.); Vapococidin* (VAPCO); Ectrin*; Sanmar-ton*; Sumifly*; Sumipower*; Sumitick*.

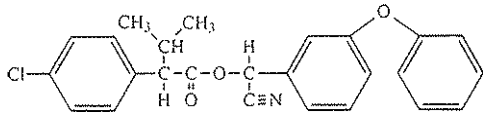
DISCONTINUED NAME: Pydrin* (Du Pont).

Chemistry

COMPOSITION: (RS)-α-Cyano-3-phenoxybenzyl (RS)-2-(4-Chlorophenyl)-3-methylbutyrate or cyano(3-phenoxyphenyl)methyl 4-chloro-(1-methylethyl)benzeneacetate.

FAMILY: Pyrethroid.

PROPERTIES: Molecular weight 419.9. At 23°C a clear viscous yellow liquid, mild odor; density at 23°C, 1.17 g/ml; vapor pressure at 25°C, 2.8 × 10⁻⁷ mm/Hg. Moderately soluble in a range of organic solvents. Soluble in acetone, alcohol, ether, xylene, kerosene. More stable in acidic solution than in alkaline solution. High thermal stability. Relatively nonvolatile. Stable to heat, moisture, most organic solvents except alcohols.



Fenvalerate

Action/Use

ACTION: Broad spectrum insecticide.

USE: Belmark*, Sumicidin* for wide range of crops. Christmas tree plantings, pine seed orchards, forest tree nurseries, noncropland (exclud-

ing public land such as forests, parks, or recreational areas) chiefly for Lepidoptera, Diptera, Orthoptera, Hemiptera, Coleoptera. See labels.

FORMULATIONS: Emulsifiable concentrate, dust, flowable, granule, wettable powder.

COMBINATIONS: Azomark* (+ azodrin) (American Cyanamid); Fen-

rate* 40EC (+ fenitrothion) (Agro Chemicals Industries Ltd.); Mikah-

top* (+ dimethoate), Sumicombi* (+ fenitrothion) (Sumitomo Chem.);

Fenikill* (+ fenitrothion) (VAPCO).

Registration Notes

U.S.: Some or all applications of fenvalerate may be classified as RUP.

OUTSIDE U.S.: Belmark*, Azomark* (American Cyanamid).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.42 ppb (96 h) (bluegill). Bird: (Oral) LD₅₀ 9932 mg/kg (mallard). Dietary: LC₅₀ >10,000 ppm (quail); 5500 ppm (mal-

lard).

SOIL PARTICLE ADSORPTION: Field studies indicate residues remain in 0-4 in. layer with half-life of 1-2 months. After 183 days, residues were at negligible or undetectable levels. Confined and field rotational crop data show residues likely to occur in root crops at intervals of < 9 months.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: DMSO (Rat): Oral LD₅₀ 451 mg/kg. Dermal >5000 mg/kg.

(Rabbit): Dermal LD₅₀ 2500 mg/kg.

PROTECTIVE CLOTHING: Protective gloves, goggles or full face shield when handling.

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin, mouth contact. Store in original containers away from foodstuffs, animal feed.

Emergency Guidelines

FIRST AID: Ingestion, gastric lavage with care to prevent aspiration.

Treat symptomatically.

See Pyrethroids.

Ferbam

BP: ELF Atochem Agri B.V. (Trifungal*)

UCB Chemicals (Agrochemicals Headquarters)

UCB Chemicals Corp. (Carbamate* WDG, Ferbam

76 WDG*, Ferbam Granuflo*)

Identification

COMMON NAMES: Ferbam (ISO-E, BSI, JMAF); ferbame (ISO-F).

EXP. CODE NUMBER: FE-95.

OTHER CODE NUMBERS: CAS 14484-64-1; SHA 034801; ENT-14689.

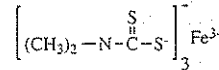
ADDITIONAL TRADE NAMES: Ferberk*, Hexaferb*, Knockmate*.

DISCONTINUED NAMES: Fermate*, Supr'-Flo* Ferbam, Vancide*.

Chemistry

COMPOSITION: Ferric dimethyldithiocarbamate.

FAMILY: Dithiocarbamate.



Ferbam

Action/Use

ACTION: Fungicide.

USE: For apple scab, cedar apple rust, peachleaf curl, tobacco blue mold, cranberry diseases. Protective fungicide to other crops.

FORMULATIONS: Water dispersible granules; wettable powders.

Environmental Guidelines

HAZARDS: Fish: Moderately toxic. Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral >17,000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Ingestion, drink one or two glasses of water and induce vomiting.

Ferbam Granuflo* — see Ferbam.

Ferbam 76 WDG* — see Ferbam.

Ferbame — see Ferbam.

Ferberk* — see Ferbam.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Ferimzone

BP: Takeda Chemical Industries, Ltd.

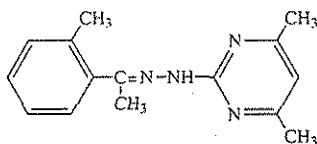
Identification

COMMON NAME: Ferimzone (ISO draft, BSI).
EXP. CODE NUMBER: TF-164 (Takeda Chemical Industries, Ltd.).
OTHER CODE NUMBER: CAS 89269-64-7.

Chemistry

COMPOSITION: (Z)-2'-methylacetophenone 4,6-dimethylpyrimidin-2-ylhydrazone (IUPAC).

PROPERTIES: White to pale yellow crystalline powder; melting point 175-176°C; vapor pressure 3.09×10^{-6} mmHg. Soluble in acetonitrile, chloroform, ethanol, ethyl acetate, methanol, propanol, xylene.



Ferimzone

Action/Use

ACTION: Fungicide.

USE: For control of blast, Cercospora and Helminthosporium leaf spot on rice.

FORMULATIONS: 30% Wettable powder.

COMBINATIONS: Blasin* DL, WP (fthalide). Nonblas* DL, WP (tricyclazole).

Environmental Guidelines

SOLUBILITY: In water 0.162 g/l at 30°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 725 mg/kg (male); 642 mg/kg (female).
Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eye or skin. Store in original container in cool, dry place away from food or feed.

Emergency Guidelines

Fermate* Fungicide (ferbam) — Discontinued by Du Pont Agricultural Products.

Fermide* 850 — see Thiram.

Fernasan* Fungicide (thiram) — Discontinued 1994 by ISAGRO.

Fernesta* Herbicide (2,4-D) — Discontinued 1989 by ICI Agrochemicals.

Fernex* Insecticide (pirimiphos-ethyl) — Discontinued 1992 by ICI Agrochemicals.

Fernide* — see Thiram.

Fernimine* — see 2,4-D.

Fernos* — see Pirimor.

Fernoxone* — see 2,4-D.

Fero-Plus* — see Ferrous Sulfate.

Ferrax*

BP: ZENECA Agrochemicals

Chemistry

COMPOSITION: Flutriafol + thiabendazole + ethirimol ± imazalil.

Action/Use

ACTION: Fungicidal systemic seed treatment.

USE: For all major seed-borne diseases. Early, powdery mildew, other air-borne foliar diseases in barley.

FORMULATION: Flowable suspension.

Ferriamicide

Identification

COMMON NAME: Mirex (ESA).

CODE NUMBERS: CAS 2385-85-5; SHA 039201; ENT-25719.

DISCONTINUED NAME: Mirex*.

Chemistry

COMPOSITION: 1,1a,2,2,3,3a,4,5,5a,5b,6-dodecachlorooctahydro-1,3,4-metheno-1H-cyclobuta[cd]pentalene (CAS 8 and 9CI).

Action/Use

ACTION: Insecticide.

Registration Notes

U.S.: Registration cancelled.

Environmental Guidelines

HAZARDS: Fish: Nontoxic to crawfish.

SOIL PARTICLE ADSORPTION: Half-life is 14-15 days. Was 5-10 years for previous formulation of mirex.

Safety Guidelines

TOXICITY: Dechlorinated to lower toxicity than Mirex*.

Ferrinal* — see Sethoxydim.

Ferrous Sulfate

Identification

CODE NUMBERS: CAS 7782-63-0 (heptahydrate); 7720-78-7 (anhydrous).

OTHER NAMES: Copperas, green vitriol.

Chemistry

COMPOSITION: FeSO₄·7H₂O.

FAMILY: Inorganic salts.

PROPERTIES: Grayish white buff-colored powder. Insoluble in alcohol.

Action/Use

ACTION: Selective herbicide, wood preservative.

USE: For broadleaf weeds. Corrects chlorosis from iron deficiency.

Registration Notes

U.S.: Cleared for April-July use on cranberries.

Environmental Guidelines

SOLUBILITY: Slow in water.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Store in tight containers.

Fertilizer-Insecticide Combinations

These mixtures are mainly made by special order for application at planting.

Fertix*

(Discontinued by Sandoz Ltd.)

Chemistry

COMPOSITION: Ethoxyethylmercury-methylmercury citrate.

Action/Use

ACTION: Seed dressing fungicide.

Fertoxin* — see Aluminum Phosphide.

Fervin* — see Alloxym-Sodium.

Fervinal* — see Sethoxydim.

Ferxone* Herbicide (2,4-D) — Discontinued by Atul Products.

Fez DDT 25% EC — see DDT.

Fezudin* (diazinon) — Discontinued by Zuellig Pte.

Ficam* — see Bendiocarb.

Field Clean Weed Killer* — see 2,4-D.

Fiesta* — see Pyramin*; Quinmerac.

Figaron*

BP: Fujisawa Pharmaceutical (Figaron*)

Identification

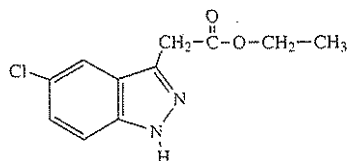
COMMON NAME: Ethychlozate (JMAF).

EXP CODE NUMBER: J-455.

Chemistry

COMPOSITION: Ethyl 5-chloro-3(1H)-indazolylacetate.

PROPERTIES: White crystals. Melting point 76.6-78.1°C.



Ethychlozate

Action/Use

ACTION: Plant growth regulator.

USE: Similar auxin activity to IAA by foliar application.

FORMULATIONS: Emulsifiable concentrate.

Registration Notes

OUTSIDE U.S.: Registered.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4800 mg/kg.

PROTECTIVE CLOTHING: Not required.

Filariol* Acaricide (bromophos-ethyl) — Discontinued by Celamerck GmbH & Co. KG.

Filex — see Propamocarb Hydrochloride.

Filipin*

Action/Use

ACTION: Antibiotic.

USE: Some seed-rot fungi; partially for some bean, tomato diseases.

Filitox* — see Methamidophos.

Film Extender — see Spreader.

Filter-Cel* — see Silica.

Final* — see Glufosinate-ammonium.

Finale* — see Glufosinate-ammonium.

Finaven* — see Avenge*.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Fine Chaff/Pith — see Lite-R-Cobs*.

Finesse* — see Chlorsulfuron; Metsulfuron-methyl.

Finidim* — see Fenuron.

Finrol* Antibiotic (antimycin) — Discontinued 1982 by Ayerst Laboratories.

Fiproles

Under development by Rhone-Poulenc Agrochimie S.A.; these products attack insects' central nervous systems, and are effective at low doses for use on many crops, including corn, cotton, rice, sugar beets, and sunflowers. Product introductions are expected in the mid-1990s.

First* — see Diflufenican.

Fish Oil

Formerly utilized as an adhesive in lead arsenate suspensions applied to forest and shade trees; for the production of fish-oil soap as a spray spreader. Repellent to buffalo gnats. When formulated with other ingredients used as spot treatment for animal wounds to control screwworm.

Fisons B25* Herbicide (carbyne) — Discontinued by Schering AG.

Fitios* Insecticide (ethoate-methyl) — Discontinued by Farmoplant S.p.A.

Fitios B/77*

(Discontinued by Agrimont S.p.A.)

Identification

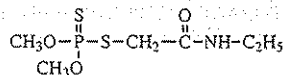
COMMON NAMES: Ethoate-methyl (ISO-E, BSI); éthoate-méthyle (ISO-F).

CODE NUMBERS: CAS 116-01-8; SHA 431200; OMS 252 (WHO); ENT-25506.

DISCONTINUED NAME: Fitios* (Farmoplant S.p.A.)

Chemistry

COMPOSITION: S-ethylcarbamoylmethyl O,O-dimethyl phosphorodithioate (IUPAC).



Ethoate-methyl

Action/Use

ACTION: Insecticide-acaricide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 340-350 mg/kg.

Fitodith 80* — see Zineb.

Fitomyl PB* — see Benomyl.

Flame Cultivation

Weed control with heat from gas flame precisely timed and directed to kill weeds in and near the row. LP-Gas is used for this purpose. Cotton, corn, soybeans, and several other crops are flame cultivated. See LP-Gas; Propane.

Flammable Materials (Regulations)

Regulations covering flammable materials issued by the U.S. Department of Transportation in its Docket HM-102 went into effect January 1, 1976. They specify a new definition for the class of materials identified as flammable liquids, and create and define a new class of materials identified as combustible liquids. In addition, the ordinances modify the definition for pyrophoric liquids with the flammable class, and determine the requirements for the materials that are covered by the new definitions.

Flammable liquids are defined as those having a flashpoint below 100°F (37.8°C). A combustible liquid is one whose flashpoint is at or above 100°F (37.8°C) and below 200°F (93.3°C). A pyrophoric liquid is any liquid that ignites spontaneously in dry or moist air at or below 130°F (54.5°C).

Approved flashpoint testing methods are a tag closed tester or a set-aflash closed tester. Flammable liquids having a flashpoint of 73°F or higher are not subject to specification packaging when in a container having a capacity of 110 gallons or less. However, the flashpoint of the material or an indication that its flashpoint is 73°F or higher must be marked on the outside of the package.

Combustible liquids in portable tanks, cargo tanks, or tank cars are exempt from the subchapter provisions, except those which pertain to shipping papers, waybills, switching orders or other billing. The same exemption applies to the marking of portable tanks, marking or placarding rail cars and motor vehicles, and the reporting of incidents.

Finally, the subchapter requirements do not apply to combustible liquids in packaging having capacities of 110 gallons or less.

Flamprop-Isopropyl — see Barnon*.

Flamprop-Methyl — see Mataven*.

Flamprop-M-isopropyl — see Suffix BW*.

Flashpoint

The lowest temperature at which a combustible liquid will give off a flammable vapor which will burn momentarily.

Flavan

Chemistry

COMPOSITION: 2,4,4',5',6'-pentamethyl-2'-flavanol.

Action/Use

ACTION: Miticide, insecticide.

Flavensomycin*

(Discontinued 1991 by Farmoplant S.p.A.)

Action/Use

ACTION: Antibiotic.

USE: For fungi, insects.

Flazasulfuron

BP: Ishihara Sangyo Kaisha, Ltd. (Shibagen*)

Identification

COMMON NAME: Flazasulfuron (ISO draft, BSI).

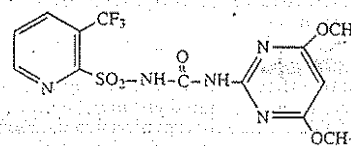
EXP. CODE NUMBERS: SL-160, OK-1166 (Ishihara Sangyo Kaisha, Ltd.).

OTHER CODE NUMBER: CAS 104040-78-0.

Chemistry

COMPOSITION: 1-(4,6-dimethoxypyrimidin-2-yl)-3-(3-trifluoromethyl-2-pyridinylsulfonyl)urea (IUPAC).

PROPERTIES: Dust.



Flazasulfuron

Action/Use

ACTION: Selective herbicide.

USE: Preemergence or postemergence for most broadleaf weeds, annual grass weeds, and sedges in turf.

FORMULATIONS: Wettable powder.

Registration Notes

OUTSIDE U.S.: Registered in Japan.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 5000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

Fielectron* — see Cypermethrin.

Flee* — see Permethrin.

Flex* — see Fomesafen.

Flexidor* — see Gallery*.

Fligene CI* — see Cypermethrin.

Flit Gun — see Hand Sprayer.

Flit* MLO

(Discontinued by Exxon Co.)

Chemistry

COMPOSITION: Low odor, low viscosity petroleum fraction. Boiling point 500°F. Unulfonatable residue is 90% volume.

Action/Use

ACTION: Mosquito larvicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: TLV 200 ppm for vapor; 5 mg/m³ for oil mist (8 h).

FLITeTRAK*

BP: Trece, Inc. (FLITeTRAK*)

Action/Use

ACTION: Insect attractants and monitoring systems.

USE: FLITeTRAK CB* for detection, survey, and monitoring of cigarette beetles and FLITeTRAK M* for red flour, confused flour, saw-toothed grain, merchant grain, Khapra and warehouse beetles in stored products and commodities.

FORMULATIONS: Polymeric dispensers.

Registration Notes

U.S.: No registrations required. No EPA restrictions.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

Flo Pro* D (chloroneb) — Discontinued 1984 by Cargill Inc.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Flo Pro* IMZ — see Imazalil.
Flo Pro* Mc (methoxychlor) — Discontinued 1984 by Cargill Inc.
Flo Pro* T (thiram) — Discontinued 1984 by Cargill Inc.
Flo Pro* V Fungicide (carboxin) — Discontinued by Cargill, Inc.
Flocoumafén — see Storm* (outside U.S.).
Flocoumafène — see Storm* (outside U.S.).
Flo-Gard* Carrier (silicate) — Discontinued by PPG Industries.
Flo-Met* — see Fluometuron.
Flo-Mo*

BP: Witco Corp., Oleo Surfactants Group

Action/Use

ACTION: Series of adjuvants, emulsifiers.
USE: Multipurpose spreading, penetrating, wetting, emulsifying agents for agricultural formulations.

Flonex MST* — see Maneb.

Flonex MZ* 400 — see Mancozeb.

Flonex Z* 400 — see Zineb.

Floraltone* Plant Growth Regulator (gibberellic acid + TIBA) — Discontinued by Rhone-Poulenc Ag Co.

Flordimex* — see Ethephon.

Flordimex* T-Extra — see Ethephon.

Florol* — see Ethephon.

Florex* — see Attapulgitic Clay; Fuller's Earth.

Florocid* — see Sodium Fluoride.

Flotation Sulfur — see Sulfur.

Flo-Tin* Fungicide (triphenyltin hydroxide) — Discontinued by Agtrol Chemical Products.

Flotrazine* — see Atrazine.

Flowable Formulation

A creamy formulation that can be mixed readily with water to form a stable suspension. The active ingredient may be practically insoluble or only slightly soluble in water or organic solvents. Flowable wettable powders are a fairly new type of pesticide formulation also referred to as flowable liquids or water-dispersible suspensions. This formulation consists of a wettable powder suspended in an oil or liquid base of some type. Although the wettable powder in a flowable is usually more finely ground than a regular wettable powder and thus stays in suspension longer, it will gradually settle out in the spray tank.
 See Suspension.

Flowers of Sulfur — see Sulfur.

Fluazifop-butyl

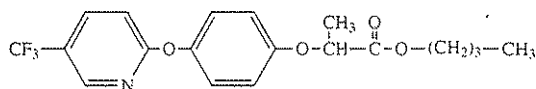
BP: Ishihara Sangyo Kaisha, Ltd. (Onecide*, Hache Uno Super*)
 ZENECA Agrochemicals (Fusilade*)

Identification

COMMON NAME: Fluazifop-butyl (ISO, ANSI, BSI).
EXP. CODE NUMBERS: PP009 (ICI); IH-773B, SL-236, TF-1169, TS-7236 (all Ishihara Sangyo Kaisha, Ltd.).
OTHER CODE NUMBERS: CAS 69806-50-4; SHA 122805.

Chemistry

COMPOSITION: butyl (RS)-2-[4-[[5-(trifluoromethyl)-2-pyridinyl]oxy]phenoxy]propanoate (CAS).
PROPERTIES: Liquid. Boiling point 170°C (0.5 mm Hg). Soluble in most organic solvents.



Fluazifop-butyl

Action/Use

ACTION: Selective herbicide.
USE: Postemergence control of perennial and annual grass weeds over-the-top in cotton, soybeans, and other broadleaf crops including asparagus, carrots, dry bulb onions, spinach, sweet potatoes, and ornamentals.

FORMULATIONS: Emulsifiable concentrate, wettable.

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: For cotton, soybeans.

Safety Guidelines

SIGNAL WORD: WARNING (Irritant).

TOXICITY CLASS: II.

TOXICITY: (Rat) Oral LD₅₀ 3328 mg/kg.

PROTECTIVE CLOTHING: Protective clothing, PVC gloves, apron, full face shield when handling or mixing concentrate. Protective clothing, PVC gloves when spraying Fusilade* 4E. Refer to labels.

HANDLING AND STORAGE CAUTIONS: Tested stable in storages 40°F (5°C)-120°F (50°C).

Fluazifop-P-butyl

BP: PBI/Gordon (Ornamec*)

ZENECA Ag Products (Fusilade* 2000, Fusilade* DX)

ZENECA Agrochemicals (Fusilade* 5, Fusilade* Super)

Identification

COMMON NAME: Fluazifop-P-butyl (ISO, ANSI, BSI).

EXP. CODE NUMBER: PP005.

OTHER CODE NUMBERS: CAS 79241-46-6; SHA 122809.

DISCONTINUED TRADE NAME: Fusilade P* (ICI Agrochemicals).

Chemistry

COMPOSITION: butyl (R)-2-[4-[[5-(trifluoromethyl)-2-pyridinyl]oxy]phenoxy]propanoate (CAS).

PROPERTIES: Light straw-colored, odorless liquid decomposes at 210°C. Contains R-enantiomer (herbicidally active form) of fluazifop-butyl. Soluble in most organic solvents.

Action/Use

ACTION: Selective grass herbicide.

USE: Postemergence for perennial, annual grass weeds (over-the-top in broadleaved crops). The plus (P) enantiomer which contains the herbicidal activity of the original racemic mix has been isolated and formulated at half the concentration of the original mix. Characteristics in all significant respects the same as fluazifop-butyl.

COMBINATIONS: Horizon* 2000 (+ fenoxaprop-P-ethyl) (AgrEvo USA Co.); Tornado* and Typhoon* (+ fomesafen), Fusion* (+ fenoxaprop-P-ethyl) (ZENECA Ag Products).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat) Oral LD₅₀ 2712 mg/kg. (Rabbit) Dermal LD₅₀ >2420 mg/kg.

PROTECTIVE CLOTHING: Wear protective clothing, PVC gloves when spraying Fusilade* 2000. Wear protective clothing, PVC gloves, apron, full face shield when handling, mixing concentrate.

HANDLING AND STORAGE CAUTIONS: Stable for at least one year at ambient temperatures (15-25°C).

Fluazinam

BP: Ishihara Sangyo Kaisha, Ltd. (Altima*, Frownicide*, Shogun*)

Identification

COMMON NAMES: Fluazinam (ISO-E, BSI); fluaziname (ISO-F).

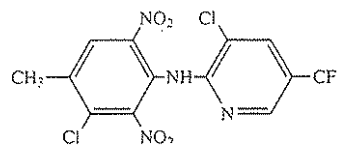
EXP. CODE NUMBERS: IKF-1216; B-1216 (Ishihara Sangyo Kaisha, Ltd.).

ADDITIONAL TRADE NAME: Shirlan* (ZENECA).

Chemistry

COMPOSITION: 3-chloro-N-(3-chloro-5-trifluoromethyl-2-pyridyl)-α, α, α-trifluoro-2,6-dinitro-p-toluidine.

PROPERTIES: Powder. Solubility: Acetone: 645 g/l, Methanol: 162 g/l, n-hexane: 6.7 g/l.



Fluazinam

Action/Use

ACTION: Generation fungicide.

USE: Broad spectrum disease control on *Alternaria*, *Botrytis*, *Phytophthora*, *Plasmopara*, *Sclerotinia*, *Venturia*, and other pathogens. Acaricide on citrus red mites and two-spotted spider mites.

FORMULATIONS: Wettable powder, suspension concentrate, dustable powder.

Registration Notes

U.S.: EUP.

OUTSIDE U.S.: Registered in Japan. For bulb and potato in Holland. For potato in Belgium, France, Sweden, Switzerland.

Environmental Guidelines

SOLUBILITY: Water: 0.071 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat) Oral LD₅₀ >5000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

Flubaalex* Herbicide (benefin) — Discontinued 1994 by Chemol Trading Ltd. Co.

Flubenzimine — see Cropotex*.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

Fluchloralin* — see Basalin*.

Fluchloraline — see Basalin*.

Flucythrinate

BP: American Cyanamid Co. (Cybolt*)
Hubei Sanonda Co., Ltd.

Identification

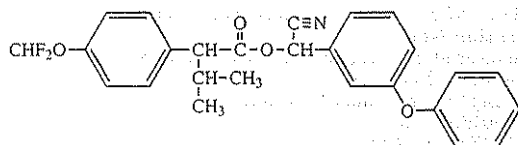
COMMON NAME: Flucythrinate (ISO, ANSI, BSD).
EXP. CODE NUMBERS: AC 222,705, CL-222705 (both American Cyanamid).

OTHER CODE NUMBERS: CAS 70124-77-5; SHA 118301.

DISCONTINUED NAMES: AASTAR* (+ phorate), Fuching Juji* (both American Cyanamid); Pay-Off* (Du Pont).

Chemistry

COMPOSITION: (±)-cyano(3-phenoxyphenyl)methyl (+)-4-(difluoromethoxy)-α-(1-methylethyl)benzeneacetate (CAS).
PROPERTIES: Dark amber viscous liquid. Stable in neutral and acidic conditions. Soluble in most organic solvents (acetone, xylene, etc.).



Flucythrinate

Action/Use

ACTION: Insecticide.
FORMULATIONS: Emulsifiable concentrate, wettable powder.

Registration Notes

U.S.: Some or all applications may be classified as RUP.

Environmental Guidelines

SOLUBILITY: In water, 0.5 ppm at 21°C; at 25°C 0.48 ppm.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat, female): Oral LD₅₀ 67 mg/kg. (Rabbit): Dermal LD₅₀ >1000 mg/kg. Nonirritating to eye, skin.

PROTECTIVE CLOTHING: Goggles or face shield when handling.

HANDLING AND STORAGE CAUTIONS: Hazard to humans, domestic animals. Avoid eye, skin, clothing contact. Causes eye damage. May be fatal if swallowed or absorbed through skin. Harmful if inhaled. Use with adequate ventilation; avoid breathing vapor or mist. Wash thoroughly after handling. Do not allow livestock to feed, forage, or graze on treated fields. Do not contaminate water, food, or feed by storage.

Fludioxonil

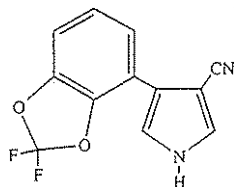
BP: Ciba, Ltd. (Celest*, Maxim*, Sapphire*)

Identification

COMMON NAME: Fludioxonil (proposed).
EXP. CODE NUMBER: CGA 173506 (Ciba, Ltd.).
OTHER CODE NUMBER: CAS 13141-86-1.

Chemistry

COMPOSITION: 4-(2,2-difluoro-1,3-benzodioxol-4-yl)-1H-pyrole-3-carbonitrile (IUPAC).



Fludioxonil

Action/Use

ACTION: Contact fungicide.
USE: Seed treatment (Maxim*) for use on cereals, oil seed rape, peas, maize, rice, and vegetables. Foliar fungicide (Sapphire*) on grapes, vegetables, turf, and ornamentals. Seed-borne diseases controlled or prevented: Snow mold, common bunt, *Septoria* spp., *Fusarium*, *Rhizoctonia*, *Penicillium*, *Alternaria*, *Helminthosporium*, and others. Foliar diseases controlled: *Botrytis*, *Monilinia*, *Sclerotinia*, *Rhizoctonia*.
FORMULATIONS: For seed treatment: water dispersible powder, flowable concentrate, powder for dry seed treatment. For foliar use: water dispersible granules.
COMBINATIONS: For cereal seed treatment: Celest Combi* and Celest Extra* (+ difenoconazole), Celest Special* (+ imazalil), Celest Triple* (+ imazalil + tebuconazole).

Registration Notes

U.S.; OUTSIDE U.S.: Worldwide in development and registration for seed treatment purposes.

Environmental Guidelines

HAZARDS: Fish: Highly toxic. *Daphnia*, algae: Toxic. Birds: Practically nontoxic. Honey Bees: Practically nontoxic.
SOIL PARTICLE ADSORPTION: Immobile in soil by strong adsorption to soil particles.

Safety Guidelines

TOXICITY CLASS: III (WHO) (practically of no acute toxicity).
TOXICITY: Tech. (Rat): Oral LD₅₀ >5000 mg/kg. Dermal LD₅₀ >2000 mg/kg. (Rabbit): Nonirritant to eyes, skin.
PROTECTIVE CLOTHING: Goggles, long-sleeved shirt and pants, boots.
HANDLING AND STORAGE CAUTIONS: Avoid skin contact and vapor inhalation.

Emergency Guidelines

FIRST AID: Get medical attention. Eyes, wash with plenty of water. Skin, wash with water and remove contaminated clothing. Ingestion, administer medicinal charcoal in large quantity of water. Treat symptomatically.

Fluénéthyl — see Lambrol*.

Fluenteil — see Lambrol*.

Fluényl — see Lambrol*.

Flufenoxuron — see Cascade*.

Flumetralin

BP: Ciba (Prime+*)
Ciba, Ltd.
Parsol Indústria E Comércio Ltda.

Identification

COMMON NAMES: Flumetralin (ISO-E draft, BSD); flumétraline (ISO-F).

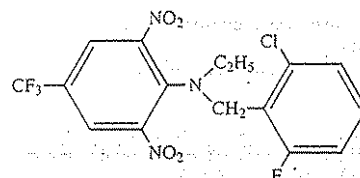
EXP. CODE NUMBER: CGA-41065.

OTHER CODE NUMBER: CAS 62924-70-3.

DISCONTINUED TRADE NAME: Premier* (Ciba).

Chemistry

COMPOSITION: 2-chloro-N-[2,6-dinitro-4-(trifluoromethyl)-phenyl]-N-ethyl-6-fluorobenzenemethanamine (CAS).
PROPERTIES: Yellow solid, melting point of 103°C. Soluble in several organic solvents.



Prime+*

Action/Use

ACTION: Prime+*. Tobacco sucker control agent.
USE: Apply by spray or hand for residual control of axillary buds (suckers) in tobacco.
FORMULATIONS: Emulsifiable concentrate.

Safety Guidelines

SIGNAL WORD: DANGER (Eye).
TOXICITY CLASS: I (Prime+).
TOXICITY: (Prime+) (Rat): Oral LD₅₀ 3100 mg/kg.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water. Do NOT induce vomiting.

Flumétraline — see Prime+*.

Flumetsulam — see Broadstrike* + Dual*; Broadstrike* + Treflan*; Broadstrike* Plus.

Fluometuron

BP: Agrolinz (Austria)
Chemol Trading Ltd. Co.
Ciba (Cotoran*)
Ciba, Ltd. (Cotoran*)
Griffin Corp. (Meturon*)
Makhteshim-Agan (Cottonex*)
Micro Flo Co. (Flo-Met*)

Identification

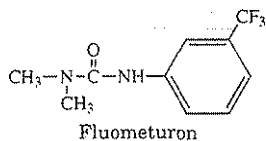
COMMON NAME: Fluometuron (ISO, ANSI, BSI, WSSA).
CODE NUMBERS: CAS 2164-17-2; SHA 035503.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: 1,1-Dimethyl-3-(α,α,α -trifluoro-*m*-tolyl)urea (IUPAC).
 FAMILY: Substituted urea.
 PROPERTIES: White crystals. Melting point 163-164°C. Readily soluble in organic solvents.



Fluometuron

Action/Use

ACTION: Herbicide.
 USE: Cotoran* or Meturon* for pre- and postemergence weed control in cotton.
 FORMULATIONS: Liquid, dry flowable, wettable powder.
 COMBINATIONS: Cotolina* (+ trifluralin) (Aragonesas Agro S.A.); Cotoran* Multi (+ metolachlor) (Ciba, Ltd.); Croak* (+ MSMA) (Drexel Chemical).

Registration Notes

U.S.: California, Arizona, New Mexico (cotton) preplant incorporated after beds have been formed. Registered for use sequentially or in tank mix with Zorial* for weed control in cotton.

Environmental Guidelines

SOLUBILITY: Soluble 90 ppm in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 8900 mg/kg. (Rabbit): Dermal LD₅₀ >10,000 mg/kg. Moderate eye irritation. Nonirritating to skin.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemical, foam, or CO₂.

Fluor Chrome Arsenate Phenol

Identification

ADDITIONAL TRADE NAMES: Osmosalts*, Osmosar*, Tanalith*.

Action/Use

ACTION: Water-borne wood preservative.

See Wolman Salts.

Fluorakil 100* — see Fluoroacetamide.

Fluorbenside

Identification

COMMON NAME: Fluorbenside (ISO, BSI, ESA).

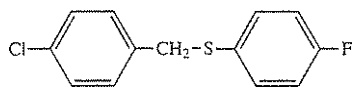
EXP. CODE NUMBERS: HRS-924, RD-2454 (Boots Co.).

OTHER CODE NUMBER: CAS 405-30-1.

DISCONTINUED NAMES: Fluorparacide*, Fluorsulphacide* (Boots Co.).

Chemistry

COMPOSITION: p-Chlorobenzyl p-fluorophenyl sulfide (IUPAC).



Fluorbenside

Action/Use

ACTION: Acaricide.

Fluorine Compounds

This group includes a number of fluorine salts, many of which are highly toxic to warm-blooded animals. Sodium fluoride was the first to be used as an insecticide being applied to cockroaches, poultry lice and ants. Later various fluorine compounds were added to poison baits and eventually the very insoluble fluosilicates and fluoaluminates were found to be effective stomach poisons for application to plants. Included among fluorine materials that have been or are now in use are sodium fluoride, sodium fluosilicate, barium fluosilicate, cryolite and potassium hexafluoroaluminate. As a rule they effect a quicker kill than arsenicals and are often cheaper. Acting both as stomach and contact poisons they are less toxic to warm-blooded animals and may be safer to the treated plants. In some instances they exhibit a repellent effect. At present they still are used widely in roach powders, lice powders, wood preservatives and moth-proofing agents. Organic fluorine compounds have value as rodenticides (sodium fluoroacetate, fluoroacetamide).

Fluoroacetamide

F: Jewnin-Joffe Industry Ltd. (Rodex*)

Identification

COMMON NAME: Fluoroacetamide (ISO, BSI, JMAF).

CODE NUMBER: CAS 640-19-7.

ADDITIONAL TRADE NAMES: 1081, Fluorakil* 100, Navron*, Yanock*.

DISCONTINUED NAMES: Fussol* (Sankyo Co. Ltd.); Baran* (Tatmogan).

Chemistry

COMPOSITION: F-CH₂-CO-NH₂.

Action/Use

ACTION: Rodenticide.

USE: Moderately fast-acting, closely related to fluoroacetate. Lower mammalian toxicity, longer latent period before animals become distressed and stop feeding. Less likely to lead to poison shyness because of sublethal dosing. Baran* for control of field mice (400-500 g/1000 sq. meters).

FORMULATIONS: Poisoned grains, bait pellets.

Registration Notes

U.S.: Some or all applications may be classified as RUP.

Environmental Guidelines

SOLUBILITY: Very soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 15 mg/kg.

HANDLING AND STORAGE CAUTIONS: Highly toxic material, handle accordingly. Wash hands after use. Store in closed containers in secure area. All precautions for sodium fluoroacetate pertain to fluoroacetamide.

Emergency Guidelines

ANTIDOTE: Monoacetin.

Fluoroacetanilide

(Discontinued 1975 by Aceto Chemical Co.)

Identification

EXP. CODE NUMBER: AFL-1082.

OTHER CODE NUMBER: CAS 330-68-7.

Chemistry

COMPOSITION: 2-fluoroacetanilide (IUPAC); 2-fluoro-N-phenylacetamide (CAS).

Action/Use

ACTION: Systemic insecticide. some fumigant properties.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 10-12 mg/kg.

Fluorodifen

Identification

COMMON NAME: Fluorodifen (ISO, ANSI, BSI, JMAF, WSSA).

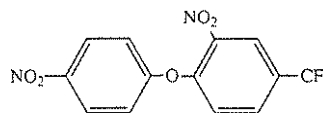
EXP. CODE NUMBER: C 6989 (Ciba-Geigy Ltd.).

OTHER CODE NUMBERS: CAS 15457-05-3; SHA 085001.

DISCONTINUED NAME: Preforan* (Ciba-Geigy Ltd.).

Chemistry

COMPOSITION: 4-nitrophenyl α,α,α -trifluoro-2-nitro-*p*-tolyl ether (IUPAC).



Fluorodifen

Fluorogesarol* — see DFDT.

Fluoroglycofen

Identification

COMMON NAME: Fluoroglycofen (BSI, ANSI, draft E-ISO).

CODE NUMBERS: CAS 77501-60-1.

Action/Use

ACTION: Herbicide.

COMBINATIONS: Competitor* (+ isoproturon) (Hoechst Schering AgrEvo GmbH).

Fluoroglycofen-ethyl — see Compete*; Dichlorprop-P.

Fluoroglycofene-ethyl — see Compete*; Dichlorprop-P.

Fluoromide

BP: Kumiai Chemical Industry Co., Ltd. (Sparticide*)
 Mitsubishi Kasei Corp.

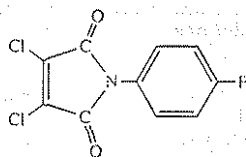
Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

Identification

COMMON NAME: Fluoromide (JMAP).
 EXP. CODE NUMBER: MK-23.
 OTHER CODE NUMBER: CAS 41205-21-4.

Chemistry

COMPOSITION: 2,3-dichloro-N-4-fluorophenylmaleimide (IUPAC).



Fluoromide

Action/Use

ACTION: Fungicide.
 USE: Controls scab, Monilia disease, and Alternaria leaf spot on apples.

Registration Notes

OUTSIDE U.S.: Registered for apple, citrus and persimmon in Japan.
Fluorparacide* Acaricide (fluorbenside) — Discontinued 1987 by Boots Co. Ltd.

Fluorsulphacide* Acaricide (fluorbenside) — Discontinued 1987 by Boots Co. Ltd.

Fluothiuiron — see Clearcide*.

Fluquinconazole

BP: Hoechst Schering AgrEvo GmbH (Castellan*, Vista*)

Identification

COMMON NAME: Fluquinconazole (BSI, ISO).
 EXP. CODE NUMBER: SN 597265 (Hoechst Schering AgrEvo GmbH).
 OTHER CODE NUMBERS: CAS 136426-54-5.

Chemistry

COMPOSITION: 3-(2,4-dichlorophenyl)-6-fluoro-2-(1H-1,2,4-triazol-1-yl)quinazolin-4(3H)-one (IUPAC): 3-(2,4-dichlorophenyl)-6-fluoro-2-(1H-1,2,4-triazole-1-yl)-4(3H)-quinazolinone (CAS 9CI).

MOLECULAR FORMULA: C₁₆H₈Cl₂FN₃O.

FAMILY: Quinazolinone; triazole; conazole.

PROPERTIES: Cream-to-pale-brown crystalline solid; melting point 191.9-193°C.; vapor pressure 6.4 x 10⁻⁹ Pa at 20°C; specific gravity or density 1.58 D₄²⁰; partition coefficient 1737 at pH 5.6 (octanol/water). Solubility in water 0.001 g/l at 20°C and pH 6.6; acetone 50, xylene 10, ethanol 3, and dimethyl sulfoxide 200 g/l.

Action/Use

ACTION: Fungicide.
 USE: Controls a wide range of *Ascomycetes*, *Basidiomycetes*, and *Deuteromycetes* diseases on broadleaf and cereal crops, apples, vines, wheat, sugarbeets, oil seed rape, stone fruit, and other crops.
 FORMULATIONS: Suspension concentrate, wettable powder.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96h) 1.34 mg/l (bluegill sunfish), 1.90 mg/l (rainbow trout). Bee: LD₅₀ >100 µg/bee. Bird: LD₅₀ >2000 (bobwhite quail, mallard duck).

DEGRADATION AND METABOLISM: Photochemical degradation: stable.

SOLUBILITY: In water 0.001 g/l at 20°C and pH 6.6.

Safety Guidelines

TOXICITY: (Rat): Oral LD₅₀ 112 mg/kg; Dermal LD₅₀ 2679 (male), 625 (female); Inhalation LC₅₀ (4 h) 0.754 mg/l. (Mouse): Oral LD₅₀ 325 mg/kg (male), 180 mg/kg (female). (Rabbit): Non-irritating to skin and eyes. (Guinea pig): Not a skin sensitizer.

Emergency Guidelines

EMERGENCY TELEPHONE: 49 69 305 6418 (Hoechst Shering AgrEvo GmbH).

Flurecol — see Aniten*.

Flurene SE* — see Trifluralin.

Flurenol — see Aniten*.

Flurenol-n-butylester — see Aniten*.

Fluridone — see Sonar*.

Fluroxypyr Meptyl

BP: DowElanco (Starane*)

Identification

COMMON NAME: Fluroxypyr-meptyl (ISO draft, BSI).
 CODE NUMBER: CAS 81406-37-3.

Chemistry

COMPOSITION: 1-methylheptyl 4-amino-3,5-dichloro-6-fluoro-2-pyridyloxyacetate (IUPAC).

PROPERTIES: Forms crystals. Melting point 56-57°C. Solubility: (27.7°C): In acetone 867 g/l; dichloromethane 896 g/l; ethyl acetate 792 g/l.

Action/Use

ACTION: Herbicide.
 USE: Postemergent foliar application for control of broadleaf weeds in cereals.

COMBINATION: Stexal* (+ ioxynil) (Rhone-Poulenc).

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96h) 0.07 mg (rainbow trout) (Solubility constraints limit test system). Bird: LD₅₀ >2000 (quail).

SOLUBILITY: (27.7°C): In water 0.9 mg/l. (20°C).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Stable under normal conditions. Decomposes above melting point.

Flurprimidol — see Cutless*.

Flurtamone — see Benchmark*.

Flusilazole

BP: Du Pont Agricultural Products (Nustar*, Punch*)

Identification

COMMON NAME: Flusilazole (proposed).

EXP. CODE NUMBER: DPX H6573.

OTHER CODE NUMBER: CAS 85509-19-9.

ADDITIONAL TRADE NAME: Olymp*.

Chemistry

COMPOSITION: 1-[[Bis(4-fluorophenyl)methylsilyl]methyl]-1H-1,2,4-triazole.

PROPERTIES: Pure: crystalline solid. Melting point 55°C. Vapor pressure 1.1 x 10⁻⁴ mm/hg at 25°C. Soluble in many organic solvents, >2g/ml.

Action/Use

ACTION: Fungicide.
 USE: For various *Ascomycete*, *Basidiomycete*, *Deuteromycete* fungi in cereals, fruit, vegetables.

FORMULATIONS: Dry granules, emulsifiable concentrate.

COMBINATIONS: Cerelux* and Meld* (+ tridemorph), Everest* (+ fenpropimorph + tridemorph), Twin* (+ fenpropimorph) (all BASF AG).

Registration Notes

OUTSIDE U.S.: Denmark: Twin*. France: Cerelux*. U.K.: Meld*.

Environmental Guidelines

SOLUBILITY: In water 900 mg/l (pH 1.1) - 45 mg/l (pH 7.8).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1110 mg/kg (male); 674 mg/kg (female).

(Rabbit): Dermal LD₅₀ >2000 mg/kg. Inhalation LC₅₀ >5 mg/l.

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Flusul* — see Basalin*.

Flutolanil — see Moncut*.

Flutriafoi — see Ethirimol; Ferrax*; Imazalil; Impact*; Thiabendazole; Vincit*.

Fluvalinate — see tau-Fluvalinate.

tau-Fluvalinate

BP: Sandoz Agro, Inc. (Mavrik*, Mavrik Aquaflo*)

Sandoz Agro Ltd. (Mavrik*, Klartan*)

Identification

COMMON NAMES: tau-fluvalinate (ISO, ANSI, BSI); fluvalinate (ANSI).

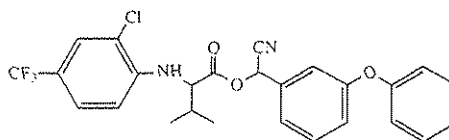
CODE NUMBERS: CAS 102851-06-9; SHA 109302.

DISCONTINUED NAME: Spur* (Sandoz Agro, Inc.).

Chemistry

COMPOSITION: (RS)-α-cyano-3-phenoxybenzyl N-(2-chloro-α,α,α-trifluoro-p-toyl)-D-valinate (IUPAC).

PROPERTIES: Viscous yellow oil. Boiling point >450°C. Vapor pressure <1 x 10⁻⁷ Torr, at 25°C. Soluble in most organic solvents.



Fluvalinate

Action/Use

ACTION: Broad spectrum contact, stomach insecticide.
 USE: For Coleoptera, Hemiptera, Lepidoptera, etc. on cereal, cotton, fruit trees, plantation crops, potato, rape, vegetable, wine.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

FORMULATIONS: Emulsifiable concentrate, flowable. ULV.
COMBINATIONS: Mavrik* B (+ thiometon) (Sandoz Agro Ltd.).

Registration Notes

U.S.: Voluntary cancellation of dormant, non-bearing, and seed crop uses of Spur* on some fruits, nuts, vegetables, and tobacco. The manufacturer may sell or distribute existing stocks until April 1993.

Environmental Guidelines

HAZARDS: Fish: Toxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ 261-282 mg/kg. Dermal >20,000 mg/kg. (Rabbit): Dermal LD₅₀ >20,000 mg/kg.

PROTECTIVE CLOTHING: Wear goggles, face shield, rubber gloves when opening or pouring formulated products.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, immediately flush with water. Skin, wash with plenty of soap, water. Ingestion, do NOT induce vomiting. Gastric lavage indicated.

Fluxofenim — see Concep* III.

Fly Bait Grits* Insecticide (bomyl)— Discontinued 1990 by HACO, Inc.

Fly-Bate* — see DDVP.

Fly-Die* — see DDVP.

Fly Fighter* — see DDVP.

FMC 5452 — see Endosulfan.

FMC 9044 — see Morocide*.

FMC 9102 — see Metiram.

FMC 9260 — see Tetramethrin.

FMC 10242 — see Carbofuran.

FMC 11092 — see Karbutilate.

FMC 17370 — see Resmethrin.

FMC 30980 — see Cypermethrin.

FMC 33297 — see Permethrin.

FMC 35001 — see Marshal*.

FMC 45806 — see Cypermethrin.

FMC 54800 — see Bifenthrin.

FMC 57020 — see Command*.

FMC 67825 — see Rugby*.

Foam

Foam as used in pesticide application is a milky, sloshy solution which releases the chemical to plant surfaces quickly. Foam applying equipment functions to produce many small bubbles by mixing the spray formulation with air and a foaming agent. The greatest advantage lies in the reduction of drift. Other benefits are an extension of application time (wind no longer being an important factor), better coverage, fewer reloading trips since less water is used, etc. See Foaming Adjuvant.

Foam Buster*

BP: Helena Chemical Co.

Chemistry

COMPOSITION: Dimethylpolysiloxane.

Action/Use

ACTION: Silicone defoamer and antifoam agent.

USE: For aqueous solutions.

Registration Notes

U.S.: For food use limitations refer to Title 21, CFR, and 173-340.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

See Foam Suppressant.

Foam Fighter*

BP: Miller Chemical & Fertilizer Corp. (Foam Fighter*)

Identification

COMPOSITION: Dimethyl silicone fluid emulsion.

PROPERTIES: White milky liquid, little odor. Boiling point 212°F.

Action/Use

ACTION: Defoaming agent.

USE: Reduces foam in agricultural chemical sprayers, dip tanks.

Environmental Guidelines

SOLUBILITY: In water dispersible.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, immediately flush with water. Skin, wash with plenty of soap, water. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting.

(The) Foam Marker*

BP: HACO, Inc.

Chemistry

PROPERTIES: Clear, yellow liquid.

Action/Use

ACTION: Foam marking agent.

USE: Agricultural foam marking agent with softeners, conditioners.

Environmental Guidelines

SOLUBILITY: Complete in water.

Safety Guidelines

SIGNAL WORD: CAUTION (May cause eye irritation).

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed. Do not use, pour, spill, or store near heat, open flame.

Emergency Guidelines

FLASHPOINT: Combustible.

FIRST AID: Ingestion, give 1-2 glasses of water. If conscious, induce vomiting by touching back of throat with finger or blunt object. Get medical aid.

See Foam Marking Agent.

Foam Marking Agent

For use in foam generating equipment to mark limits of spray swath and thereby avoid overlap or missed areas. Highly visible, stable foam. Example: AgRHO* FM (Rhône-Poulenc Surfactants & Specialties).

Foam Suppressant

Spray adjuvant useful for suppressing both surface foam and entrained air.

Some examples are: Surfynol* (Air Products & Chemicals, Inc.); Foamgard* (Custom Chemicides); Combat Plus*, Foam Buster* (Helena Chemical Co.); Anti-Foam*, Defoamer* (Kalo, Inc.); Foamex* AD, Rhodorsil* (Rhône-Poulenc Surfactants & Specialties); Bubblegon* (Sanag); Taylor* Antifoams (Taylor Chemical Co., Inc.); No Foam (Wilbur-Ellis Co.).

Foamaster*

BP: Henkel Corp. (Foamaster*)

Action/Use

ACTION: Defoaming-antifoam.

Foamer*

BP: Helena Chemical Co. (Foamer*)

Chemistry

COMPOSITION: Sodium α -olefin sulfonate.

Action/Use

ACTION: Foam marking agent.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

See Foaming Adjuvant.

Foamex* AD — see Foam Suppressant.

Foamgard*

BP: Custom Chemicides (Foamgard*)

Chemistry

COMPOSITION: Silicone + dimethylpolysiloxane.

Action/Use

ACTION: Anti-foam agent.

USE: Controls foaming in emulsions, wettable powders.

FORMULATION: Liquid concentrate.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Foaming Adjuvant

Surface-active substance that forms a fast-draining foam to provide maximum contact of the spray with the plant surface, to insulate the surface, and to reduce rate of evaporation. Used to enhance herbicide action, reduce drift of sprays, and mark spray swath widths.

Focus*

BP: BASF AG (Focus*, Focus* Ultra, Laser*, Stratos*, Stratos* Ultra)

Identification

COMMON NAMES: Cycloxydim (ISO-E draft, BSI); cycloxydime (ISO-F draft).

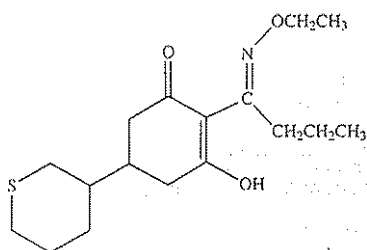
CODE NUMBER: CAS 101205-02-1.

Chemistry

COMPOSITION: 2-[1-(ethoxyimino)butyl]-3-hydroxy-5-(tetrahydro-2H-thiopyran-3-yl)-2-cyclohexen-1-one (CAS).

PROPERTIES: Tech: Dark brown oily liquid, which can crystallize by standing; then yellow-beige crystalline substance. Melting point ca. 37°C. Readily soluble in most organic solvents.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.



Cycloxydim

Action/Use

ACTION: Herbicide, graminicide.
USE: Postemergence for annual, perennial grasses (absorbed by foliage). Selective in broadleaf crops (cotton, flax, oil rapeseed, onion, ornamentals, nurseries, potatoes, soybeans, sugar beet, sunflowers, vegetables). For burndown, chem-fallow, soil conservation tillage.
FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 220 mg/l (96 h) (trout). Bee: Nontoxic; Bird: LD₅₀ >2000 mg/l (quail).

SOLUBILITY: (a.i. in water 20°C): 0.004g/100g water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Focus*: (Rat): Oral LD₅₀ >5000 mg/kg. Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Protective clothing and boots when handling the undiluted and diluted product. Rubber gloves when handling the undiluted product.

HANDLING AND STORAGE CAUTIONS: Store (<25°C) away from feed, foodstuffs, out of reach of children. Avoid eye, mouth, skin contact.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: Focus*: 60-70°C. Tech: 119°C.

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. Skin, eyes, flush immediately with plenty of water. Ingestion, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC).

Focus* Ultra — see Focus*.

Fog Treatment

Application of a pesticide as a fine mist for the control of pests.

See Steam Aerosol Fog; Thermal Aerosol Fog.

Foil* BFC

BP: Ecogen Inc. (Foil* BFC)

Chemistry

COMMON NAME: *Bacillus thuringiensis* var. *kurstaki*.

Action/Use

ACTION: Biological insecticide.

USE: For Colorado potato beetle on potatoes, tomatoes, and eggplant.

Environmental Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Causes eye and skin irritation.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry area.

Folbex* Acaricide (chlorobenzilate) — Discontinued by Ciba-Geigy Ltd.

Folbex* VA — see Acarol.

Folcid* Fungicide (captafol) — Discontinued by SOPRA.

Folcidin* Fungicide (cypendazole) — Discontinued by Bayer AG.

Folcord* — see Cypermethrin.

Folex* 6EC

BP: Miles Inc. (Folex* 6EC)

Identification

TRIVIAL NAMES: Merphos, tribufos.

EXP. CODE NUMBER: B-1776 (Chemagro).

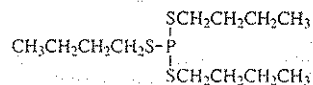
OTHER CODE NUMBERS: CAS 150-50-5; SHA 074901.

DISCONTINUED NAMES: Deleaf Defoliant*, Easy Off-D* (Rhône-Poulenc Ag Co.).

Chemistry

COMPOSITION: S,S,S-Tributyl phosphorotrithioate (IUPAC). phosphotrithioate.

PROPERTIES: Pale amber liquid. Soluble in acetone, ethyl alcohol, benzene, hexane, kerosene, diesel oil, heavy aromatic naphthas, xylene, and methylated naphthalenes.



Tribufos

Action/Use

ACTION: Cotton defoliant.

USE: Bottom defoliation to reduce, prevent losses due to boll rot organisms. Removal of bottom leaves up to the level of the highest mature bolls permits sunlight to penetrate and air to circulate, eliminating the environmental conditions favorable to the development of boll rot. Tall, rank, dense, actively growing cotton can be preconditioned (accelerates the aging process of cotton leaves) for total defoliation by using small quantities in the last insecticide application or as separate application 10-14 days before total defoliation is desired. For total defoliation of cotton preparatory to machine harvesting; causes leaves to drop in a relatively green state with fresh weight adequate to cause fall.
FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat) Oral LD₅₀ 348-712 mg/kg; Dermal LD₅₀ 850 mg/kg

PROTECTIVE CLOTHING: Hat, long-sleeved shirt, trousers for applying. Latex or neoprene gloves for mixers, loaders.

HANDLING AND STORAGE CAUTIONS: Handle carefully. Do not contaminate water, food, or feed by storage or disposal.

Emergency Guidelines

FLASHPOINT: Folex* 130°F (TCC).

FIRE EXTINGUISHING MEDIA: Water fog, foam, CO₂, dry chemical.

Foliatume* — see Rotenone.

Folian* — see Cytex*.

Foliar Application

Application of a chemical preparation to the leaves or foliage of plants.

Foliar TRIGRR*

BP: Westbridge Agricultural Products (Foliar TRIGRR*, Soil TRIGRR*)

Chemistry

COMPOSITION: Cytokinins (mixed).

PROPERTIES: Concentrated aqueous solution approx. 5% by weight of undissolved solids.

Action/Use

ACTION: Plant growth regulator.

USE: Used as a foliar spray to increase crop yields in alfalfa, corn, cotton, jojoba, lupine, peanuts, rice, sorghum, soybeans, sugar beets, triticale, wheat, fruits and vegetables. Used to increase growth and development in ornamentals, trees and turf.

FORMULATIONS: Liquid, concentrate.

COMBINATIONS: Compatible with most foliar fertilizers, herbicides, fungicides, insecticides and growth regulators.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in a cool place, out of direct sunlight.

Environmental Guidelines

SOLUBILITY: Approx. 95% in water.

Foliatox*

Chemistry

COMPOSITION: Sodium arsenite, potassium arsenite.

Action/Use

USE: Formerly in England for burning off leaves and stalks of potatoes at harvest.

Folic Acid — see Ergostim*.

Folicur*

BP: Bayer AG (Folicur*, Horizon*, Raxil*)
 Miles Inc. (Elite*, Lynx*, Raxil*)

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Identification

COMMON NAME: Tebuconazole (ISO draft, BSI). Terbuconazole and terbutrazole (both abandoned).

EXP. CODE NUMBER: BAY HWG 1608.

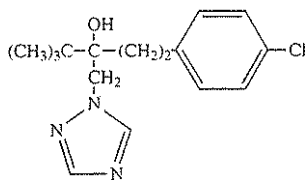
OTHER CODE NUMBER: CAS 107534-96-3.

Chemistry

COMPOSITION: α -[2-(4-chlorophenyl)ethyl]- α -(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol (CAS).

FAMILY: Triazole.

PROPERTIES: Colorless crystals. Vapor pressure 1.3 μ Pa. Melting point 102.4°C. Soluble in most organic solvents.



Folicur*

Action/Use

ACTION: Systemic fungicide.

USE: Effective as a seed treatment against smuts and bunts of cereals. As a foliar spray against Erysiphe, Puccinia, Septoria spp., Pyrenophora spp., Rhynchosporium, and other diseases of cereal. Mycosphaerella, Puccinia, and Sclerotium on peanuts. Phoma, Pyrenopeziza, Sclerotinia, Alternaria, and Mycosphaerella on oilseed rape. Botrytis, Guignardia and Uncinula on grapes. Sigatoka on bananas. Monilinia on stonefruit. Venturia and Podosphaera on pome fruit.

FORMULATIONS: Emulsifiable concentrate, flowable, seed dressings (DS, FS, WS); oil-water emulsion, water dispersible granules, wettable powder.

COMBINATIONS: Aurore* (+ tridemorph), Matador* and Silvaur* (+ triadimenol), Raxil* T (+ thiram) (Bayer AG); Celest Triple* (+ fludioxonil + imazalil) (Ciba, Ltd.).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 6.4 mg/l (96 h) (rainbow trout). Bee: Nontoxic.

Bird: LD₅₀ 1988 mg/kg (bobwhite quail).

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech: (Rat): Oral LD₅₀ approx. 4000 mg/kg b.w.; Dermal LD₅₀ >5000 mg/kg b.w.

Emergency Guidelines

EMERGENCY TELEPHONE: 816-242-2582 (Miles Inc.).

Folicur* BT — see Bayleton*[†]; Tebuconazole.

Folidol E-606* Insecticide (parathion) — Discontinued 1992 by Bayer AG.

Folidol M* — see Methyl Parathion.

Folimat*

BP: Bayer AG (Folimat*, Le-mat*)

Identification

COMMON NAMES: Omethoate (ISO, BSI).

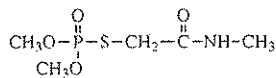
EXP. CODE NUMBERS: Bay 45432, S 6876.

OTHER CODE NUMBERS: CAS 1113-02-6 (omethoate); EINECS 214-197-8.

Chemistry

COMPOSITION: O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] phosphorothioate; oxygen analog of dimethoate.

PROPERTIES: Colorless to yellowish oily liquid; specific gravity 1.32. Vapor pressure 3.3 mPa at 20°C. Soluble in toluene. Miscible in dichloromethane, 2-propanol. Nearly insoluble in n-hexane.



Omethoate

Action/Use

ACTION: Systemic insecticide-acaricide.

USE: Controls aphids (including woolly aphids), scales, mealybugs, thrips, suckers, and spider mites on fruit crops, potatoes and other vegetables, cereals, hops, rice, and ornamentals.

FORMULATIONS: Emulsifiable concentrates, ULV, soluble concentrate.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 9.1 mg/l (96 h) (rainbow trout). Bee: Toxic. Bird:

LD₅₀ 80-83 mg/kg (Japanese quail).

SOLUBILITY: Miscible in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ approx. 25 mg/kg/b.w. Dermal approx. 200 mg/kg/b.w.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, food, feed.

Foliothion* Insecticide (fenitrothion) — Discontinued by Bayer India Ltd.

Folosan* — see PCNB.

Folpan* — see Folpet.

Folpel — see Folpet.

Folpet

BP: Inchema, Inc.

Kuo Ching Chemical Co., Ltd.

Makhteshim-Agan (Folpan*)

Identification

COMMON NAMES: Folpet (ISO, ANSI, BSI, JMAF); folpet (France).

CODE NUMBERS: CAS 133-07-3; SHA 081601.

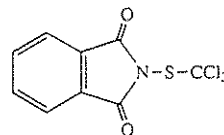
ADDITIONAL TRADE NAMES: Chimac Fol* (Chimac-Agriphar S.A.); Faltex* (Diachem S.P.A.); Thiophal*.

DISCONTINUED NAMES: Serinal* F (+ chlozolinate), Tairel* F (+ benalaxyl) (Agrimont S.p.A.); Fungitrol* II, Phaltan* (Chevron Chemical Co.); Folpex* (Crystal Chemical Inter-America).

Chemistry

COMPOSITION: N-[(Trichloromethyl)thio]phthalimide.

PROPERTIES: White crystals. Melting point 180°C. Only slightly soluble in organic solvents.



Folpet

Action/Use

ACTION: Protective fungicide.

USE: Seed and plant bed treatment for fruits, berries, vegetable flowers, and ornamentals. Controls apple scab, cherry leaf spot, rose black spot, rose mildew.

FORMULATIONS: Dust, wettable powder.

COMBINATIONS: Galben* F (+ benalaxyl) (ISAGRO); Comac* 23-35 (+ cupric hydroxide) (La Cornubia S.A.).

Registration Notes

U.S.: Agricultural uses temporarily suspended.

OUTSIDE U.S.: Additional data is being generated in support of one agricultural use by Makhteshim-Agan (Israel).

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic.

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg.

PROTECTIVE CLOTHING: Goggles or a face shield.

HANDLING AND STORAGE CAUTIONS: Stable, except under alkaline conditions. Store in dry place at ambient or lower temperatures.

Emergency Guidelines

FIRST AID: Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. If irritation persists, see a physician.

Folpex* Fungicide (folpet) — Discontinued by Crystal Chemical Inter-America.

Foltaf* — see Captafol.

Fomark*

BP: Kalo, Inc. (Fomark*, Fomark* XL)

Chemistry

PROPERTIES: Principal agents: Alkyl-omega-hydroxypoly (oxyethyl)ene sulfate, bis (di-alkyl) sodium 1,4-butanedioate- α -hydro-omega-hydroxypoly (oxypropylene).

Action/Use

ACTION: Foaming agent.

USE: Produces stable, visible, nonstaining, noncontaminating foam to mark fertilizer, pesticide applications for uniformity without wasteful overlaps or skips.

FORMULATIONS: Liquid concentrate.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Environmental Guidelines

SOLUBILITY: Complete in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Store >40°F. Protect from freezing. Causes eye irritation. Avoid prolonged contact with skin.

Emergency Guidelines

FIRST AID: Eyes, flush immediately with water.

Fomesafen

BP: ZENECA Ag Products (Reflex*)
ZENECA Agrochemicals (Flex*)

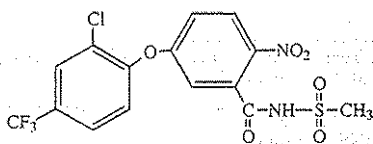
Identification

COMMON NAMES: Fomesafen (ISO-E, ANSI, BSD); fomesaféne (ISO-F).
CODE NUMBER: CAS 72178-02-0. SHA 123802.

Chemistry

COMPOSITION: 5-[2-chloro-4-(trifluoromethyl)phenoxy]-N-(methylsulfonyl)-2-nitrobenzamide.

PROPERTIES: Flex*, white crystalline solid. Melting point 220°C. Stable up to 2 years at 25°C; 6 months at 50°C. Reflex*, clear pale yellow odorless liquid. Boiling point 213°F (100.6°C). Incompatible with acids. Soluble in range of organic solvents.



Fomesafen

Action/Use

ACTION: Contact broadleaf herbicide.

USE: Postemergence, over the top, on soybeans.

FORMULATIONS: Aqueous concentration, liquid concentration.

COMBINATIONS: Tornado* and Typhoon* (+ fluzifop-P-butyl) (ZENECA Ag Products).

Environmental Guidelines

SOLUBILITY: Soluble in water (α pH).

Safety Guidelines

SIGNAL WORD: WARNING (eye, skin) (Reflex*).

TOXICITY CLASS: II (eye, skin) (Reflex*).

TOXICITY: Reflex* (Rat): Oral LD₅₀ 1858 mg/kg (male), 1499 mg/kg (female). (Rabbit): Moderate eye, skin irritation. Sodium salt (Rat): Oral LD₅₀ 1500 mg/kg (female).

PROTECTIVE CLOTHING: Wear protective clothing, rubber gloves for spraying. Wear protective clothing, goggles or full face shield, and rubber gloves when handling or mixing concentrate.

Emergency Guidelines

FLASHPOINT: Formulation >212°F.

Fomesaféne — see Fomesafen.

Fomex* Adjuvant — Discontinued by Kalo, Inc.

Fondaren* — see Sapecron* C.

Fongarid*

BP: Ciba, Ltd.

Identification

COMMON NAME: Furalaxyl (ISO, ESA).

EXP. CODE NUMBER: CGA 38140 (Ciba, Ltd.)

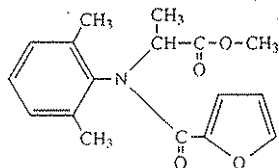
OTHER CODE NUMBER: CAS 57646-30-7.

ADDITIONAL TRADE NAME: Fonganil*.

Chemistry

COMPOSITION: Methyl N-(2,6-dimethylphenyl)-N-(2-furanylcarbonyl)-DL-alaninate (CAS).

PROPERTIES: White crystals. Melting point 70-84°C. Readily soluble in organic solvents.



Furalaxyl

Action/Use

ACTION: Soil fungicide with curative and systemic properties.

USE: For soil borne diseases caused by Phytophthora and Pythium spp. on ornamentals.

FORMULATIONS: Wettable powder.

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bee: Nontoxic.

SOLUBILITY: In water 230 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 940 mg/kg. Dermal >3100 mg/kg.

Fongaril* — see Fongarid*.

Fongorene* — see Pyroquilon.

Fonofos — see Dyfonate*.

Foray* — see *Bacillus thuringiensis* var. *kurstaki*.

Forbel* — see Fenpropimorph.

Force*

BP: ZENECA Ag Products (Force*)

ZENECA Agrochemicals (Force*, Forza*, Komet*)

Identification

COMMON NAME: Tefluthrin.

EXP. CODE NUMBER: PP993 (ZENECA Agrochemicals).

OTHER CODE NUMBER: CAS 79538-32-2.

Chemistry

PROPERTIES: White solid. Melting point 44.6°C.

Action/Use

ACTION: Insecticide.

USE: For field corn, popcorn, seedcorn.

FORMULATIONS: Emulsifiable concentrate, granule.

Environmental Guidelines

HAZARDS: Fish: Highly toxic.

SOLUBILITY: Extremely low in water. Soluble in most common organic solvents.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 1531-3091 mg/kg.

PROTECTIVE CLOTHING: Wear goggles or face shield when handling.

HANDLING AND STORAGE CAUTIONS: Avoid skin contact or breathing dust. Wash thoroughly with soap, water after handling. Remove contaminated clothing and wash before reuse.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush with plenty of water. Skin, wash with plenty of soap, water. Ingestion, if conscious, give 1-2 glasses of water, induce vomiting by touching back of throat with finger.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Fore*

BP: Rohm and Haas Co.

Chemistry

COMPOSITION: Coordination product of zinc ion, manganese ethylene bisdithiocarbamate.

PROPERTIES: Blue to green powdered solid with musty odor.

Action/Use

ACTION: Fungicide.

USE: Broad spectrum for flowers, ornamental trees, shrubs, turf sod, golf courses.

FORMULATIONS: Wettable powder.

Environmental Guidelines

HAZARDS: (a.i.): Fish: LD₅₀ (96 h) 0.46 mg/l (rainbow trout). Bird:

Oral LD₅₀ >6400 mg/kg (mallard duck).

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg; Inhalation LC₅₀ >5.14 mg/L (4 h). (Rabbit): Dermal LD₅₀ >5000.

PROTECTIVE CLOTHING: Safety glasses, chemically resistant gloves and apron or other impervious clothing.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated area away from food, feed or drinking water.

Emergency Guidelines

FLASHPOINT: 148°C/295°F (Tag open cup).

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Ingestion, drink two glasses of water. Inhalation, remove to fresh air.

See Dithiocarbamates; Mancozeb.

Forlin* — see Lindane.

For-Mal 50* — see Malathion.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Formaldehyde

BP: Georgia-Pacific Corp.

Identification

COMMON NAMES: Formaldehyde (ISO-E, BSI, JMAF); aldéhyde formique (ISO-F).

CODE NUMBERS: CAS 50-00-0; SHA 043001.

DISCONTINUED NAME: Formalin (aqueous solution) (The Chemical Supply Co., Ltd.).

Chemistry

COMPOSITION: Methanal.

Action/Use

ACTION: Fumigant, germicide.

USE: No longer used as a pesticide.

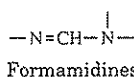
Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Very toxic to plants.

See Paraformaldehyde (the solid polymer of formaldehyde).

Formalin (formaldehyde) — Discontinued by The Chemical Supply Co., Ltd.**Formamidines**

A class of insecticide-acaricides which includes chlordimeform, formetanate and U-36059, having the characteristic nitrogen structure:

**Formetanate** — see Carzol*.**Formetanate Hydrochloride** — see Carzol*.**Formocarbam**

(Discontinued by Murphy Chemical Ltd.)

Chemistry

COMPOSITION: S-(methoxymethyl)carbamoylmethyl O,O-dimethylphosphorodithioate. (IUPAC).

Action/Use

ACTION: Systemic insecticide-acaricide.

Formothion — see Anthio*.**Formula 40*** — see 2,4-D.**Formula 358***

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: Polyacrylamide, 1% actives.

Action/Use

ACTION: Adjuvant, deposition-coverage aid.

USE: Mixed with spray solutions to reduce evaporation, mist of spray and drift.

FORMULATIONS: Liquid.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Long shelf-life. Does not separate, settle out, or harden.

See Drift Control Agents.

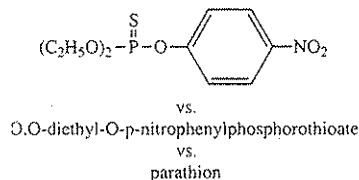
Formula (Chemical)

Chemical formulas are of several kinds according to the information they convey.

Molecular (or empirical) formulas indicate the kind and number of atoms for each element contained in a molecule for a particular compound, e.g. H₂O (water), or As₂O₃ (arsenic trioxide).

Organic chemicals (those containing carbon atoms), constitutional formulas are more informative as to relationships among the large number of these compounds now known, e.g., dichloropropionic acid (dalapon).

Structure of a compound is illustrated by a graphic formula, a description in symbols for the words of a constitutional formula:



A compound is shown thus as though it were in a single plane, although it actually exists in 3 dimensions. Some compounds have the same constitution but with different configuration, as in dieldrin and endrin. Such chemicals are known as stereoisomers and require three dimensional formulas if their difference is to be shown graphically. See Isomer.

Formulation

Few pesticidal substances are sold commercially without being mixed with other ingredients (carriers, diluents, solvents, wetting agents, emulsifiers, etc.). The chemicals are usually too concentrated and immiscible with water to be prepared directly for use by the purchaser. The prepared, or formulated, mixture concocted to give proper results is spoken of as a formulation. The process, carried out by manufacturers, of preparing a pesticide for practical use is also called a formulation.

Forron* Herbicide (2,4,5-T) — Discontinued.**Forstenon****Chemistry**

COMPOSITION: Diethyl carbethoxydichloromethylphosphonate.

Action/Use

ACTION: Insecticide.

Fortex* — see Diuron; MSMA.**Fortress***

BP: Du Pont Agricultural Products

Identification

COMMON NAME: Chlorethoxyfes (proposed).

EXP. CODE NUMBERS: SD 208304; DPX 43898.

OTHER CODE NUMBER: CAS 54593-83-8.

Chemistry

COMPOSITION: O,O-diethyl O-1,2,2,2-tetrachloroethyl phosphorothioate.

FAMILY: Organophosphate insecticide, phosphorous triester.

PROPERTIES: Tech: Light to dark brown liquid; strong odor. Vapor pressure 1.7 x 10⁻³ mm Hg at 25°C.**Action/Use**

ACTION: Soil insecticide.

FORMULATIONS: Granules.

Registration Notes

U.S.: Not registered. Development candidate for corn soil pests.

Environmental Guidelines

HAZARDS: Fish: Highly toxic. Bird: Highly toxic.

SOIL PARTICLE ADSORPTION: Strongly adsorbed.

SOLUBILITY: 3 ppm (20°C).

Safety Guidelines

SIGNAL WORD: DANGER

TOXICITY CLASS: I.

TOXICITY: Tech: (Rat): LD₅₀ 1.8-4.8 mg/kg (male/female); Inhalation: LC₅₀ 0.4-0.7 ppm (male/female); (Rabbit): Dermal LC₅₀ 12.5-18.5 mg/kg (male/female). 5G: (Rat): LD₅₀ 44-224 mg/kg (male/female); (Rabbit): Dermal >2000 mg/kg. Not a skin irritant or sensitizer. Mild eye irritation.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, long-sleeved shirt and long pants when handling product. Dust mask or respirator when loading.

HANDLING AND STORAGE CAUTIONS: Store in original container in a cool, dry, well-ventilated, secure area out of reach of children and animals. Do not transport or store near food or feed stuffs.

Emergency Guidelines

FLASHPOINT: 105°C.

FIRE EXTINGUISHING MEDIA: Water, dry powder, dry chemical, carbon dioxide.

ANTIDOTE: Atropine.

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Fortrol* — see Cyanazine.**Forum*** — see Dimethomorph.**Forza*** — see Force*.**Fosamine Ammonium**

BP: Du Pont Agricultural Products (Krenite*)

Identification

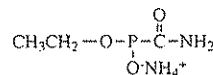
COMMON NAME: Fosamine-ammonium (ISO, ANSI, BSI, WSSA).

CODE NUMBERS: CAS 25954-13-6; SHA 106701 (IUPAC).

Chemistry

COMPOSITION: Ammonium ethyl carbamoylphosphonate.

PROPERTIES: White crystalline solid. Melting point 175°C. Sparingly soluble in methanol (15.8 grams/100 grams). Slightly soluble in most common organic solvents.



Fosamine Ammonium

Action/Use

ACTION: Brush control agent, growth regulant.

USE: Foliar spray applied full leaf to early fall for many woody species. Krenite* (commercial, liquid formulation) for field bindweed and leafy spurge control in noncropland areas.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

FORMULATIONS: Liquid.
Environmental Guidelines
 HAZARDS: Fish: LC₅₀ >1000 mg/l (96 h) (rainbow trout; minnows).
 Bee: Nontoxic. Bird: Oral LD₅₀ >10,000 mg/kg (quail).
 SOLUBILITY: Soluble in water (179 grams/100 grams).

Safety Guidelines
 SIGNAL WORD: WARNING (eye) (Krenite®).
 TOXICITY CLASS: II (eye) (Krenite®).
 TOXICITY: Krenite® S: (Rat): Oral LD₅₀ >5000 mg/kg.
 PROTECTIVE CLOTHING: Use good sanitary practices.
 HANDLING AND STORAGE CAUTIONS: Irritating to eyes. May irritate nose, throat, skin. Avoid breathing spray or mist. Do not contaminate water by cleaning of equipment or disposal of wastes.

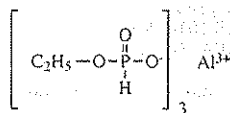
Emergency Guidelines
 EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Fosdan* — see Phosmet.
 Fosethyl-Aluminum — see Fosetyl-Aluminum.

Fosetyl-Aluminum
 BP: Rhone-Poulenc Agrochimie S.A. (Alette® WDG; Chipco® Alette)

Identification
 COMMON NAMES: Fosetyl-aluminum (ISO, BSI); fosethyl-aluminum (France).
 EXP. CODE NUMBERS: LS 74783, 32545 RP (both Rhone-Poulenc).
 OTHER CODE NUMBERS: CAS 39148-24-8; SHA 123301.
 DISCONTINUED NAMES: Efosite-Al®, Epal® (both Rhone-Poulenc Agrochimie S.A.).

Chemistry
 COMPOSITION: Aluminum tris (O-ethyl phosphonate).
 PROPERTIES: Solid crystals. Stable under normal storage conditions.



Fosetyl-Aluminum

Action/Use
 ACTION: Bactericide, systemic fungicide.
 USE: Preventive and curative activity against Oomycetes, Alternaria, and Penicillium on avocado, cacao, citrus, hops, ornamentals, pineapple, rubber, strawberries, fruit crops, tobacco, vegetable crops, and vines. Suppression of bacterial pathogens: fireblight (*Erwinia*) on pome fruit, xanthomonas on ornamentals.
 FORMULATIONS: Water dispersable granule, wettable powder, 10% liquid injectable.
 COMBINATIONS: Mikal® (+ folpet), Rhodax® (+ mancozeb), Valiant® (+ folpet + cymoxanil) (all Rhone-Poulenc Agrochimie S.A.); R6 Triplo® (+ mancozeb + cymoxanil).

Registration Notes
 OUTSIDE U.S.: For cacao, rubber, strawberries, tobacco and vines.

Environmental Guidelines
 SOLUBILITY: Soluble in water (120 g/l).

Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: III.
 TOXICITY: Tech (Rat): Oral LD₅₀ 5000 mg/kg. (Rabbit); Dermal LD₅₀ >2000 mg/kg. 80WP: Oral LD₅₀ 4600 mg/kg.

Emergency Guidelines
 FLASHPOINT: Nonflammable.
 FIRST AID: Get medical aid. Eyes, flush with a large volume of water for 15 minutes. Skin, wash with plenty of soap and water. Inhalation, remove from area of exposure. Ingestion, induce vomiting.

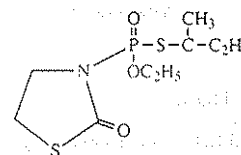
Fos-Fall A* Defoliant (butifos) — Discontinued.
 Fosfamid* — see Dimethoate.
 Fosferno 50* Insecticide (parathion) — Discontinued by ICI Agrochemicals.
 Fosferno M50* Insecticide (methyl parathion) — Discontinued by ICI Agrochemicals.
 Fosmazina* — see Glyphosate.
 Fosmethilan — see Nevifos®.
 Fosmethilane — see Nevifos®.

Fosthiazate
 BP: Ishihara Sangyo Kaisha, Ltd. (Eclahra®, Ecclesis®, Nemathorin®)

Identification
 COMMON NAME: Fosthiazate (ISO-E draft, BSI).

EXP. CODE NUMBER: IKI-1145.
 OTHER CODE NUMBER: CAS 98886-44-3

Chemistry
 COMPOSITION: (RS)-S-sec-butyl O-ethyl 2-oxo-1,3-thiazolidin-3-ylphosphonothioate (IUPAC).
 PROPERTIES: Liquid. Boiling point 198°C (0.5 mmHg).



Fosthiazate

Action/Use
 ACTION: Contact nematicide.
 USE: Systemic action against various species of nematode, insect and mite pests on crops. High activity against some pests having the resistance to conventional insecticides.
 FORMULATIONS: Granule, emulsifiable concentrate.

Registration Notes
 U.S.: EUP.

OUTSIDE U.S.: Japan.
Environmental Guidelines
 SOLUBILITY: 0.98% at 20°C.

Safety Guidelines
 SIGNAL WORD: WARNING.
 TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 57 mg/kg.
 PROTECTIVE CLOTHING: Gloves, goggles.

Emergency Guidelines
 FLASHPOINT: 80°C.

Fosthietan — see Nem-A-Tak®
 Fostion* — see Prothoate.

Fostion* MM Insecticide (dimethoate) — Discontinued by American Cyanamid.

Foxpro* — see Isoproturon.
 Foxpro* D — see Bifenox; Ioxynil + D-MCPP.
 Foxtar* — see Bifenox; Isoproturon; MCPP.
 Foxtar* D — see Bifenox; Isoproturon; D-MCPP.
 Foxto* — see Bifenox; Isoproturon; Neburon.
 Foxtril* — see Bifenox®.

Framed* Herbicide (simazine) — Discontinued by Agrimont S.p.A.

Fratal* — see Sodium Fluoroacetate.

Freedom*
 BP: Monsanto Co., The Agricultural Group (Freedom®)

Chemistry
 COMPOSITION: Alachlor + trifluralin.

Action/Use
 ACTION: Selective herbicide.
 USE: Preplant incorporated in soybeans.
 FORMULATIONS: Emulsifiable concentrate.

Registration Notes
 U.S.: RUP.

Environmental Guidelines
 SOIL PARTICLE ADSORPTION: Possible leaching, especially where soils are coarse and ground water is near the surface.

Safety Guidelines
 SIGNAL WORD: WARNING.
 TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 2650 mg/kg. Inhalation LC₅₀ >3.9 mg/l, highest concentration achievable. (Rabbit): Dermal >5000 mg/kg. Severe eye, skin irritant.

PROTECTIVE CLOTHING: Coveralls over short sleeved shirt and short pants, chemical resistant gloves, socks, chemical resistant footwear, chemical resistant apron when cleaning equipment, mixing or loading, chemical resistant headgear.
 HANDLING AND STORAGE CAUTIONS: Store >32°F to keep product in solution.

French Green — see Paris Green.

Freon — Discontinued by Du Pont Agricultural Products.

Frescon*
 (Discontinued by Shell International Chemical Co. Ltd.)

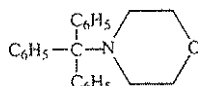
Identification
 COMMON NAMES: Trifenmorph (ISO-E, BSI); triphenmorphe (ISO-F).
 CODE NUMBERS: CAS 1420-06-0; SHA 498300.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: N-Tritylmorpholine.



Trifenmorph

Action/Use

ACTION: Molluscicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1200-1600 mg/kg.

Freshgard* — see Imazalil; Thiabendazole.

Frigate* Lo-Dose

BP: ISK Biosciences Corp.

Chemistry

COMPOSITION: Mixture of ethoxylated long-chain fatty amines.

PROPERTIES: Yellow liquid. Form. boiling point 108°C; pH value, 9.8 (1% in water). Miscible in alcohol. Insoluble in kerosene.

Action/Use

ACTION: Agricultural adjuvant, activator, penetrant.

USE: Tank-mixed with EPA-approved glyphosate herbicide formulations.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Miscible in water.

Safety Guidelines

SIGNAL WORD: DANGER (Eye irritation).

TOXICITY CLASS: I (Eye irritation).

TOXICITY: (Rat): Oral LD₅₀ 710 mg/kg (male); 620 mg/kg (female).

Dermal 10,000 mg/kg. (Rabbit): Positive eye, moderate skin irritant.

PROTECTIVE CLOTHING: Goggles or full face shield when handling.

HANDLING AND STORAGE CAUTIONS: May cause moderate to severe eye irritation. Causes skin irritation. Avoid contact with eyes, skin and clothing. Wash exposed areas of skin thoroughly after use. Do not contaminate ponds, waterways or ditches with chemical or used container. Store in original container, tightly closed, in a cool, secure place with adequate ventilation. Keep away from heat, sparks and flame.

Emergency Guidelines

FLASHPOINT: Flammable. 76°C (Abel closed cup).

FIRST AID: Get medical aid. **Eyes**, immediately flush with plenty of water for at least 15 minutes. **Skin**, flush with water. **Ingestion**, have conscious person drink several glasses of water, then induce vomiting by tickling back of throat with finger. Keep airway clear.**Frontier***

BP: Sandoz Agro, Inc. (Frontier*)

Identification

COMMON NAME: Dimethenamid.

CODE NUMBER: CAS 87674-68-8.

Chemistry

COMPOSITION: 2-chloro-N-(2,4-dimethyl-3-thienyl)-N-(2-methoxy-1-methylethyl)acetamide.

FAMILY: Chloroacetamide.

PROPERTIES: Clear brown liquid with moderate sweet odor. Boiling point not determined.

Action/Use

ACTION: Herbicide.

USE: For weed control in field corn, seed corn, popcorn and soybeans.

COMBINATIONS: Guardsman* (+ atrazine) (Sandoz Agro, Inc.).

Registration Notes

OUTSIDE U.S.: Received full Canadian registration for corn and soybeans in 1994.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ 2.1 mg/l (rainbow trout).

SOLUBILITY: Forms emulsion in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II

TOXICITY: (Rat): Oral LD₅₀ 2400 mg/kg; inhalation LC₅₀ >3.4 mg/l.(Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Use protective clothing, neoprene or nitrile gloves, eye protection.

HANDLING AND STORAGE CAUTIONS: Follow label instructions. Avoid contact with skin, eyes, or clothing. Store original container away from fertilizer, feed, or foodstuffs and separated from other pesticides.

SPILL CONTROL/CLEANUP: Contain liquid spill with absorbent material, collect in a suitable waste container. Wash affected area with water and detergent. Keep wash water out of drains. Waste resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Emergency Guidelines

FLASHPOINT: 151°F (67°C) (Pensky-Martens closed cup).

COMBUSTION MATERIALS: SO₂, NO₂, HCl.FIRE EXTINGUISHING MEDIA: Water, foam, CO₂, dry chemical.FIRST AID: Get medical attention. **Eyes**, flush with water for 15 minutes. **Skin**, wash thoroughly with soap and water. **Ingestion**, drink 1-2 glasses of water and induce vomiting. **Inhalation**, remove to fresh air.

EMERGENCY TELEPHONE: 708-699-1616 (Sandoz Agro).

Frostgard*

BP: Custom Chemicides

Action/Use

ACTION: Anti-frost agent.

USE: For fruit, foliage protection.

FORMULATIONS: Spray concentrate.

Frownicide* — see Fluazinam.

Frucote* — see Deccotane*.

Fruit and Vegetable Attack* WP — see *Bacillus thuringiensis* var. *hurstahi*.

Fruit Fix* — see 1-Naphthaleneacetic Acid.

Fruit Fix* 200 — see 1-Naphthaleneacetic Acid.

Fruit Fix* 800 — see 1-Naphthaleneacetic Acid.

Fruitido* — see Copper 8-Quinolinolate.

Fruite* — see 1-Naphthaleneacetic Acid.

Fruitone* A Herbicide (2,4,5-T) — Discontinued by Rhone-Poulenc.

Fruitone* CPA

(Discontinued 1993 by Rhone-Poulenc Ag Co.)

Identification

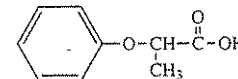
COMMON NAME: Cloprop.

CODE NUMBER: CAS 101-10-0.

OTHER NAMES: 3-CPA, 3-CP.

Chemistry

COMPOSITION: 2-(3-chlorophenoxy)propionic acid (IUPAC).



3-CPA

Action/Use

ACTION: Plant growth regulator.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 750 mg/kg.**Emergency Guidelines**

FIRST AID: Treatment directed at control of symptoms and the clinical conditions.

Fruitone* N — see 1-Naphthaleneacetic Acid.

Fruitone* T — see Silvex.

Frumidor — see Thiophanate-Methyl.

Frumin Al* — see Disulfoton.

FST-7*

BP: Fair Products, Inc.

ChemistryCOMPOSITION: C₁₀ fatty alcohol + maleic hydrazide.**Action/Use**

ACTION: Tobacco sucker control agent.

USE: For burley and flue-cured tobacco.

Environmental Guidelines

SOLUBILITY: An emulsion of a.i. in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

HANDLING AND STORAGE CAUTIONS: Shelf-life indefinite; store at room temperature. Mix, shake well before measuring.

Fthalide — see Kasugamycin; Rabcide*.

Fuberidazole

BP: Bayer AG

Identification

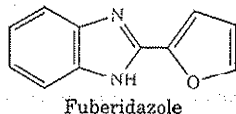
COMMON NAME: Fuberidazole (ISO, BSI).

EXP. CODE NUMBER: Bay 33172 (I).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

OTHER CODE NUMBERS: CAS 3878-19-1; EINECS 223-404-0.
DISCONTINUED NAMES: Neo Voronit* (+ P 666), Voronit*, Voronit Special* (+ quintozene) (Bayer AG).

Chemistry
COMPOSITION: 2-(2-furanyl)-1H-benzimidazole (CAS).
FAMILY: Benzimidazole, MBC.
PROPERTIES: Colorless crystals. Melting point 292°C. Vapor pressure <10⁻⁸ mbar at 20°C. Soluble in acetone, methanol, ethanol.



Fuberidazole

Action/Use
ACTION: Systemic fungicide for seed dressing.
USE: For Fusarium; as formulation to prevent emergence damage and snow mold in cereals; in combination with other fungicides to control soil and seed-borne diseases.
FORMULATIONS: Water dispersible powder, dry seed treatment powder, flowable.
COMBINATIONS: Baytan Universal* (+ triadimenol + imazalil), Cereline* (+ bitertanol + triadimenol), Sibutol* (+ bitertanol) (Bayer AG).
Registration Notes
U.S.: Not marketed.
OUTSIDE U.S.: Not marketed in Canada.

Environmental Guidelines
HAZARDS: Fish: LC₅₀ 2.5 mg/l (96 h) (rainbow trout). Bee: Nontoxic. Bird: LD₅₀ >500 mg/kg b.w. (Japanese quail).
SOLUBILITY: Practically insoluble in water.

Safety Guidelines
TOXICITY CLASS: II.
TOXICITY: Tech. (Rat): Oral LD₅₀ approx. 500 mg/kg b.w.; Dermal >5000 mg/kg b.w.

Fubol* — see Mancozeb; Metalaxyl; Ridomil* MZ.
Fuching Jujr* (flucythrinate) — Discontinued 1987 by American Cyanamid Co.

Fuciram* — see Ziram.
Fuciasin Ultra* Fungicide (ziram) — Discontinued by Schering AG.

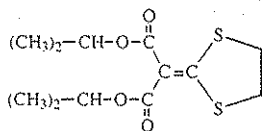
Fudiolan* — see Fuji-One*.
Fuel Oils
Petroleum fractions used for burning are used also as solvents. Distillate fuel oil has been recommended for application by itself against mosquito larvae.

See Petroleum Oils.
Fuji-One*
BP: Nihon Nohyaku Co., Ltd. (Fudiolan*, Fuji-One*, Fujiwang*)

Identification
COMMON NAME: Isoprothiolane (ISO, BSI, JMAF).
EXP. CODE NUMBER: NNF-109.
OTHER CODE NUMBER: CAS 50512-35-1.
TRIVIAL NAME: IPT.

ADDITIONAL TRADE NAME: Isoran* (Jin Hung Fine Chemical Co., Ltd.).

Chemistry
COMPOSITION: di-isopropyl 1,3-dithiolan-2-ylidenemalonate.
PROPERTIES: Pure colorless crystal. Yellow solid, melting point 54.0-54.5°C (pure), 50-51°C, vapor pressure 1.4 × 10⁻⁴ mmHg/25°C, boiling at 167-169°C/0.5 mmHg. Solubility in organic solvents at 25°C: Methanol, 150g/100g solvent; dimethyl sulfoxide, 230g/100g solvent; acetone, 400g/100g solvent; Chloroform, 230g/100g solvent; benzene, 300g/100g solvent; xylene, 230g/100g solvent; n-Hexane, 4g/100g solvent.



Isoprothiolane

Action/Use
ACTION: Systemic fungicide, systemic insecticide.
USE: Fuji-one* for rice blast (Pyricularia oryzae).
Submerged, foliar, or nursery box applications to suppress the population of rice planthoppers (Nilaparvata lugens and Sogatella furcifera).

FORMULATIONS: Emulsifiable concentrate, granule, wettable powder, ULV, LV.

Environmental Guidelines
SOLUBILITY: In water 48 ppm at 20°C.

Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1190 mg/kg.
Dermal >10,250 mg/kg.

PROTECTIVE CLOTHING: Gloves, gas mask or respirator, goggles and protective clothes.

HANDLING AND STORAGE CAUTIONS: Avoid skin, eye contact and inhalation. Store in cool place.

Emergency Guidelines
FLASHPOINT: Nonflammable, non-autoignitable.

FIRST AID: Treatment is symptomatic.
Fujigrass*
BP: ZENECA Ag Products (Fujigrass*)

Identification
CODE NUMBER: CAS 85785-20-2 (esprocarb).

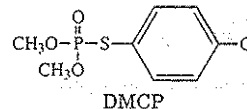
Chemistry
COMPOSITION: Bensulfuron-methyl + esprocarb.

Registration Notes
OUTSIDE U.S.: Registered in Japan for rice.

Fujithion*
(Discontinued by Kumiai Chemical Industry Co., Ltd.)

Identification
COMMON NAME: DMCP (JMAF).
CODE NUMBER: CAS 3309-87-3.

Chemistry
COMPOSITION: S-(p-Chlorophenyl) O,O-dimethyl phosphorothioate.



DMCP

Action/Use
ACTION: Insecticide.
Fujiwang* — see Fuji-One*.

Fuklasin* Fungicide (ziram) — Discontinued by Schering AG.
Full* — see Beta-cyfluthrin.

Full Coverage Spray
This term on a label signifies that the total volume of spray to be applied will cover thoroughly the crop being treated to the point of runoff or drip.

See Low Volume Spray; Ultra Low Volume Spray.

Fuller's Earth
BP: Agrisorbents Product Group, Div. of OIL-DRI Corp. of America (Agsorb*)

American Colloid Co. (Carri-All*)
Floridin Co. (Diluex*, Florex*)

Identification
COMMON NAMES: Fuller's Earth, Porter's Creek Clay.
DISCONTINUED NAME: Emathlite*, Terra Seal* (Mid-Florida Mining Co.).

Chemistry
COMPOSITION: Magnesium aluminum silicate mineral.
PROPERTIES: Excellent oil-pesticide absorption. Carri-All*: Liquid holding capacity, 28.7% (Mobil Method); 115% water absorptivity; 1.0% free moisture; 86.5% attrition resistance; 36.1% loose bulk density (lb./ft.³); 7.4% pH.

Action/Use
ACTION: Absorbent, adsorbent carrier, diluent, anti-caking agent.
USE: For use with a variety of active materials, such as pesticides, fertilizers and vitamins.

FORMULATIONS: Granules, powder, semipulverized, pulverized powder.

Fumarin — see Fumarin*.
Fumarin*
(Discontinued by Rhone-Poulenc)

Identification
COMMON NAMES: Coumafuryl (ISO, BSI), fumarin (Canada, former BSD); tomarin (Turkey).

CODE NUMBERS: CAS 117-52-2; SHA 086001.
DISCONTINUED NAME: Kill-Ko Rat and Mouse Blues* (Rigo Co.).

Chemistry
COMPOSITION: 3-(α-Acetylonylfurfuryl)-4-hydroxycoumarin (CAS 8CI).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Anticoagulant rodenticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 25 mg/kg. (Mouse): Oral LD₅₀ 14.7 mg/kg.

See also Anticoagulant-Rodenticide.

Fumazone* Fumigant (dibromochloropropane) — Discontinued by Dow Chemical.

Fumed Silica

BP: Cabot Corp., CAB-O-SIL Div. (Cab-O-Sil*)

Degussa Corp. (Aerosil*)

Identification

COMMON NAME: Fumed silica.

CODE NUMBERS: CAS 112945-52-5 (silica).

Chemistry

COMPOSITION: Silicon dioxide, amorphous.

PROPERTIES: 99.8% Silicon dioxide, amorphous. White powder, ultrafine particle size (.014 microns).

Action/Use

ACTION: Suspension aid, thixotrope in wettable powders, flowable gels, other liquid systems.

USE: Free flow additive to powders, granules.

FORMULATIONS: Various including water dispersible.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

TOXICITY: Nontoxic.

PROTECTIVE CLOTHING: Gloves and respirator recommended when handling.

HANDLING AND STORAGE CAUTIONS: Avoid dusty atmosphere.

PRODUCT/WASTE DISPOSAL: May be swept up or vacuumed for normal disposal.

Emergency Guidelines

EMERGENCY TELEPHONE: 217-253-3370 (Cabot Corp., CAB-O-SIL Div.).

Fumi-Cel* — see Magnesium Phosphide.

Fumigant

The AAPCO has adopted this definition: "A substance or mixture of substances which produce gas, vapor, fume or smoke intended to destroy insects, bacteria or rodents." Fumigants may be volatile liquids and solids as well as substances already gaseous. They may be used to disinfest the interiors of buildings, objects and materials that can be enclosed so as to retain the fumigant, and the soil where crops are valuable enough to warrant the treatment.

Fumigant-1* Fumigant (methyl bromide) — Discontinued by Velsicol Chemical Corp.

Fumi-Strip* — see Magnesium Phosphide.

Fumitoxin* — see Aluminum Phosphide.

Funbas* — see Fenpropimorph.

Funconil* — see Chlorothalonil.

Fundai* Insecticide (chlordimeform) — Discontinued by NOR-AM, Schering AG.

Fundex* (chlordimeform) — Discontinued by Schering AG.

Fungaflo* — see Imazalil.

Fung-Aid*

BP: Stoller, Inc.

Chemistry

COMPOSITION: Calcium + boron bases.

FAMILY: Inorganic salt solution.

PROPERTIES: Brown liquid.

Action/Use

ACTION: Fungicide.

USE: Foliar nutrition to increase plant resistance to disease.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Fungazil* — see Imazalil.

Fungchex* — see Calomel.

Fungicap* 2-4 Fungicide (cupric hydroxide + captan) — Discontinued 1984 by Asgrow Florida Co.

Fungicide

Fungicides are used on farm crops, preferably as protective rather than curative treatments applied to the surface of the plant in water suspensions or dusts before attack of a fungus. Deciduous fruit trees and numerous vegetable crops and ornamentals, as well as germinating seeds, are usually subject to attack unless protected. Fungicides include inorganic forms of copper and sulfur, mercury, and metallic complexes of cadmium, chromium and zinc along with a wide variety of organic compounds, and materials used in control of specific plant

diseases. Use of some metallic compounds, especially mercurials, is now forbidden in many countries because of the hazard of poisonous residues. Some organic fungicides are systemic in action, absorbed, and distributed within the plant.

A classification of fungicides is as follows:

Inorganic:

1. Sulfur.
2. Copper.
3. Mercury (see also Mercury, Inorganic).

Organic:

1. Dithiocarbamates.
2. Thiazoles, as terrazole.
3. Triazines, as anilazine.
4. Substituted aromatics, as hexachlorobenzene, PCP, PCNB, chlorothalonil.
5. Dicarboximides, as captan, folpet, captafol.
6. Systemics, as oxathiins including carboxin, oxycarboxin, and benzimidazoles including benomyl, thiophanate, thiabendazole.
7. Fumigants, as chloropicrin, methyl bromide, methylisothiocyanate.
8. Antibiotics, as cycloheximide, streptomycin.
9. Dinitrophenols, as dinocap.
10. Quinones, as dichlone.
11. Organotins, as fentin hydroxide.
12. Aliphatic nitrogens, as dodine.
13. Mercury, as PMA.

Fungilon*

(Discontinued 1969 by Chemagro Corp.)

Chemistry

COMPOSITION: Tris(1(or 3)-dodecyl-3(or 1)-methyl-2-phenylbenzimidazolium) hexacyanoferrate.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 500 mg/kg.

Funginex* — see Triforine.

Funginex* DC — see Triforine.

Funginex* WP — see Triforine.

Fungi-Rhap* Cu-53 Fungicide (copper oxide) — Discontinued by CP Chemical, Inc.

Fungi-Rhap* Cu-56 Fungicide (copper oxychloride) — Discontinued by CP Chemical, Inc.

Fungi-Rhap* Cu-75 Fungicide (copper oxide) — Discontinued 1990 by CP Chemical, Inc.

Fungistat

A chemical that prevents the germination of fungus spores or the growth and development of mycelium while in continued contact with the fungus, but does not kill the fungus.

Fungistemic* — see Carbendazim.

Fungitrol II* Fungicide (folpet) — Discontinued by Chevron Chemical Co.

Fungizeb* — see Mancozeb.

Fungo* 50 — see Thiophanate-methyl.

Funguran*-OH — see Copper Hydroxide.

Fungi (Fungi)

A nonchlorophyll-bearing plant. Some fungi are able to infect and cause diseases in plants, animals, and man. Others can attack and destroy non-living things such as wood and fiber products. Examples of disease-causing fungi: rusts, mildews, molds, smuts; also storage rots and seedling blights. Fungi cause many destructive plant diseases.

Funomyl* — see Benomyl.

Furacarb* — see Carbofuran.

Furacon — see Oncol.

Furadan* — see Carbofuran.

Furadex* — see Carbofuran.

Furado* — see Pyrifenoxy.

Furalaxyl — see Fongarid*.

Furasul* — see Carbofuran.

Furasun* GR — see Carbofuran.

Furathiocarb — see Promet*.

Furcarbanil — see Benodil*.

Furesan* Fungicide (pyrazophos) — Discontinued 1984 by Hoechst AG.

Furethrin**Identification**

TRIVIAL NAME: Furethrin.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

CODE NUMBERS: CAS 17080-02-3; SHA 466300.

Chemistry

COMPOSITION: (RS)-3-furfuryl-2-methyl-4-oxocyclopent-2-enyl (IRS, 2RS; IRS, 2SR)-2,2-dimethyl-3-(2-methylprop-1-enyl)cyclopropanecarboxylate (IUPAC).

PROPERTIES: Synthetic pyrethrin-like (pyrethroid) furfuryl derivative, first prepared in Japan.

Action/Use

ACTION: Insecticide.

USE: Intended to be competitive with allethrin. Experiments showed a rapid knockdown of house flies.

Registration Notes

U.S.: Furethrin not in commercial production.

See Pyrethroids.

Furloe* Herbicide/Plant Growth Regulator (chlorpropham) —

Discontinued by Mirfield.

Furmecyclox — see Epic* 500.

Furore* — see Fenoxaprop-ethyl.

Fury*

BP: FMC Corp. (Fury*, Mustang*)

Identification

COMMON NAME: Zeta-cypermethrin.

Chemistry

COMPOSITION: α -cyano(3-phenoxyphenyl)methyl (\pm)-cis/trans 3-(2,2-dichloroethyl)-2,2-dimethylcyclopropanecarboxylate (CAS).

FAMILY: Non ester synthetic pyrethroid.

Action/Use

ACTION: Insecticide.

USE: Fury* is used for control of boll weevil, cabbage looper, cotton bollworm, cotton fleahopper, cotton leaf perforator, cutworms, European corn borer, fall armyworm, pink bollworm, saltmarsh caterpillar, soybean (banded thrips), tarnished plant bug, tobacco budworm, tobacco thrips, and yellow striped armyworm. Mustang* is used on lettuce, pecans and cotton.

FORMULATIONS: Emulsifiable concentrate.

Registration Notes

U.S.: Classified as RUP.

Environmental Guidelines

HAZARDS: Fish: Toxic.

Bees: Toxic.

SOLUBILITY: Emulsifies in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II

PROTECTIVE CLOTHING: Applicators must wear long sleeved shirt and trousers. Mixers/loaders must wear long sleeved shirts, trousers, chemical resistant gloves and safety glasses. Clothing which has been drenched or heavily contaminated should be disposed of in accordance with state or local regulations.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Hazardous decomposition products: carbon monoxide, carbon dioxide, hydrogen cyanide, chlorine, hydrogen chloride.

Emergency Guidelines

FLASHPOINT: >82°C (>180°F) TCC.

FIRE EXTINGUISHING MEDIA: CO₂ or dry chemical. Soft stream water fog only if necessary.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** do NOT induce vomiting. Drink water but do NOT administer milk, cream, animal or vegetable fats or alcohol as they enhance absorption.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC). 800-331-3148 (FMC Corp.).

Fusarex*

F: ZENECA Agrochemicals

Identification

COMMON NAME: Tecnazene (ISO, BSI).

TRIVIAL NAME: TCNB.

CODE NUMBERS: CAS 117-18-0; SHA 055201.

Chemistry

COMPOSITION: 1,2,4,5-tetrachloro-3-nitrobenzene (IUPAC and CAS).

Action/Use

ACTION: Fungicide, growth regulator.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

Fusilade* — see Fluazifop-P-butyl.

Fusilade* 5 — see Fluazifop-P-butyl.

Fusilade* 2000 — see Fluazifop-P-butyl.

Fusilade* DX — see Fluazifop-P-butyl.

Fusilade P* Herbicide (fluazifop-P-butyl) — Discontinued by ICI Agrochemicals.

Fusilade* Super — see Fluazifop-P-butyl.

Fusion* — see Fenoxaprop-P-butyl; Fenoxaprop-P-ethyl.

Fussol* Rodenticide (fluoroacetamide) — Discontinued by San-kyo Co. Ltd.

Futura* — see Carbofuran.

FW-293 — see Dicofol.

FW-734 — see Propanil

Fyduan G* — see Dichlobenil.

Fydulex G* — see Dichlobenil.

Fydumas G* — see Dichlobenil.

Fydusit G* — see Dichlobenil.

Fyfanon* — see Malathion.

Fylene* — see Metoxuron.

Fytolan* — see Copper Oxychloride.

G 18359 — see KIK.

G 19258 — see Dimetan.

G 22008 — see Pyrolan*.

G 22870 — Discontinued by Ciba-Geigy Ltd.

G 23027 — see Pyrazothion*.

G 23133 — see Coumachlor.

G 23330 — see Pyramat*.

G 23622 — see Pirazinon.

G 23645 — see Etoxinol*.

G 23611 — see Isolan.

G 23992 — see Chlorobenzilate.

G 24163 — Discontinued by Ciba-Geigy Ltd.

G 24480 — see Diazinon.

G 24483 — see Pyrazoxon*.

G 24522 — see Pirazinon.

G 27692 — see Simazine.

G 27901 — see Trietazine.

G 28029 — see Phencapton.

G 30026 — see Norazine.

G 30027 — see Atrazine.

G 30028 — see Propazine.

G 30044 — see Simetone.

G 30494 — see Methyl Phencapton.

G 31717 — see Ipatone.

G 32165 — see Diethofencarb.

G 32911 — see Simetryn.

G 34161 — see Prometryn.

G 34162 — see Ametryn.

G 34360 — see Semeron*.

G 34690 — see Methometon.

G 36393 — Discontinued by Ciba-Geigy Ltd.

GA₃ — see Gibberellic Acid.

GA 4 + 7 + BA — see Promalin*.

GA₄/GA₇ — see Gibberellic Acid.

Gacid* — see Gibberellic Acid.

Gafac* Surfactants (complex organic phosphate ester) —

Discontinued by GAF Chemical.

Gafgro* Plant Growth Regulator (ethephon) — Discontinued

1981 by GAF Corp.

Galactic*

BP: Custom Chemicides (Galactic*)

Chemistry

COMPOSITION: Polydimethylsiloxane + nonionic surfactants.

Action/Use

ACTION: Nonionic silicone wetting agent/penetrator.

USE: With pesticides.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Galaxy* — see Bentazone; Blazer*.

Galaxy* Top — see Bentazone; Blazer*.

Galbas* — see Fenpiclonil.

Galben*

BP: ISAGRO (Galben* Tairel*, Trecatol*)

Identification

COMMON NAME: Benalaxyl (ISO, BSI).

EXP. CODE NUMBER: M 9834 (Montecatini).

OTHER CODE NUMBERS: CAS 71626-11-4; SHA 127001.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

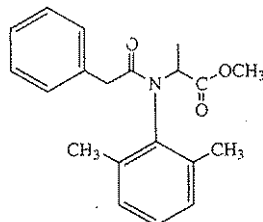
Galben A Fungicide

DISCONTINUED NAMES: Galben* A, Galben* Z, Tairel* Z (all + zineb), Galben* R and Tairel* R (+ copper oxychloride), Tairel* F (+ folpet), Tairel* M (+ mancozeb) (Agrimont S.p.A.).

Chemistry

COMPOSITION: Methyl N-phenylacetyl-N-2,6-xylyl-DL-alaninate (IUPAC).

PROPERTIES: Colorless crystals, melting point 78-80°C, vapor pressure 5.10⁻⁶ torr at 25°C; 37 ppm at 25°C. Soluble in most organic solvents except saturated hydrocarbons such as hexane; stable to hydrolysis at 25°C in acid and neutral media.



Benalaxyl

Action/Use

ACTION: Systemic fungicide.

USE: Controls Oomycetes fungi, including blue mold (*Peronospora tabacina*), late blight (*Phytophthora infestans*), and downy mildew (*Plasmopara viticola*), of potatoes, tomatoes, tobacco, hops, grapes, lettuce, peppers, onions, strawberries, sunflowers, soybeans, turf, flowers and ornamentals.

FORMULATIONS: Suspension concentrate, granules, wettable powder, slurry for seed treatment.

COMBINATIONS: Galben* C (+ copper oxychloride), Galben* F (+ folpet), Galben* M (+ mancozeb) (ISAGRO).

Environmental Guidelines

SOLUBILITY: Readily in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4200 mg/kg. (Rabbit): Dermal LD₅₀ >5000.

Non-irritating to eye, skin.

PROTECTIVE CLOTHING: Wear appropriate protective equipment and clothing.

HANDLING AND STORAGE CAUTIONS: Store in sealed original containers, in well-aired, fresh, dry storehouses or in shaded and possibly well-aired places. Product temperature should not exceed 25-30°C. Keep away from sources of heat, free flames or spark-generating equipment. Stack containers to permit free circulation of air at the bottom and inside of the piles. Storage areas must be away from inhabited buildings, animal shelters, and food stores, inaccessible to unauthorized persons, children, and domestic animals. Biological activity remains practically unvaried for 2 years under environmental conditions, provided stored as recommended.

Emergency Guidelines

FLASHPOINT: Approx. 195°C.

Galben* A Fungicide (benalaxyl + zineb) — Discontinued by Agrimont S.p.A.

Galben* C — see Galben*; Copper Oxychloride.

Galben* F — see Galben*; Folpet.

Galben* M — see Galben*; Mancozeb.

Galben* R Fungicide (benalaxyl + copper oxychloride) — Discontinued 1994 by ISAGRO.

Galben* Z Fungicide (benalaxyl + zineb) — Discontinued 1989 by Agrimont S.p.A.

Galecron* Insecticide (chlordimeform) — Discontinued 1989 by Ciba-Geigy.

Galex* — see Metobromuron.

Galipan* — see Galtak*.

Gallant* — see Verdict*.

Gallery*

BP: DowElanco

Identification

COMMON NAME: Isoxaben (WSSA).

EXP. CODE NUMBER: EL-107 (DowElanco).

OTHER CODE NUMBERS: CAS 82558-50-7; SHA 125851.

ADDITIONAL TRADE NAME: Flexidor* (U.K.).

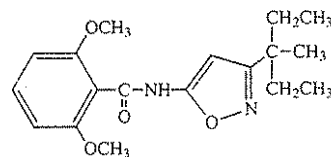
Chemistry

COMPOSITION: N-[3-(1-ethyl-1-methylpropyl)-5-isoxazolyl]-2,6-dimethoxybenzamide.

PESTICIDE DICTIONARY

PROPERTIES: Light tan granule with mild aromatic odor.

FORMULATIONS: Water dispersible granules. Slight solubility in organic solvents (methanol, ethyl acetate, dichloromethane, acetonitrile).



Isoxaben

Action/Use

ACTION: Herbicide.

USE: Incorporated or applied to soil surface preemergence for annual broadleaf weeds in turf, ornamentals.

FORMULATIONS: Dry flowable, suspension concentrate.

COMBINATIONS: Snapshot* 2.5TG (+ trifluralin) (DowElanco); Glytex* (+ methabenzthiazuron); Mesox* (+ methabenzthiazuron).

Environmental Guidelines

SOLUBILITY: Soluble in water at 1.0-2.0 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech: (Rat): Oral LD₅₀ >10,000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, impermeable gloves, waterproof boots, long-sleeved shirt and long pants.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** do NOT induce vomiting, administer activated charcoal (6-8 tsp.) with large quantity of water.

Gallex*

BP: AgBioChem, Inc.

Chemistry

COMPOSITION: 2,4-Xylenol, meta-Cresol, and penetrants.

PROPERTIES: Ready-to-use emulsion.

Action/Use

ACTION: Crown gall eradicator.

USE: Eradicator chemotherapeutant on bacterial disease and hypertrophic cells. Controls apple burrknot. Postplant control of crown gall and olive knot bacterial tumors on fruit and nut trees, vines, ornamentals.

FORMULATIONS: Ready-to-use paint-on emulsion.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Low. (Rat): Oral LD₅₀ 4640 mg/kg.

HANDLING AND STORAGE CAUTIONS: Do not contaminate water, food or feed by storage or disposal. Store in a cool place. Shelf life of 3-5 years.

Emergency Guidelines

FLASHPOINT: 220°F.

FIRST AID: **Ingestion,** induce vomiting.

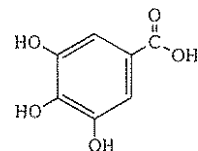
EMERGENCY TELEPHONE: 510-254-0789 or 916-527-8028 (AgBioChem, Inc.).

Gallic Acid

Action/Use

ACTION: Plant growth regulator.

USE: Inhibits plant physiological processes.



Gallic Acid

Gallotox — see Setrete*.

Galltrol-A*

BP: AgBioChem, Inc.

Identification

CODE NUMBER: SHA 114201.

Chemistry

COMPOSITION: Agrobacterium radiobacter (strain 84).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

PROPERTIES: Culture of live bacteria. Shelf life of 120 days under refrigeration.

Action/Use

ACTION: Biological control; ecological crown gall preventative.
 USE: Preplant prevention of crown gall infection on stems and roots of certain fruits, nuts, vines, ornamentals. For nonfood and nonbearing plants only. Apply as dip or spray on seeds, cuttings, and seedling bare-root stock.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Very low. Galltrol-A* bacteria shown not to cause eye or skin irritation when applied in conc. form as sold.

HANDLING AND STORAGE CAUTIONS: Storage life prolonged by 4-5 months by keeping in refrigerated or cool area. Dispose of through normal channels for nontoxic, nonburnable household wastes.

EMERGENCY TELEPHONE: 510-254-0789 or 916-527-8028 (AgBio-Chem, Inc.).

Gallup* — see Glyphosate.

Galop* — see Bifenox; Ioxynil; Isoproturon; MCPP.

Galoryl*

BP: Lobeco Products, Inc.

Chemistry

COMPOSITION: Naphthalene sulfonate derivatives.

Action/Use

ACTION: Anti-caking, anti-dusting agent.

USE: Spray liquid/dry blend.

FORMULATIONS: Liquid concentrate, free-flowing dry powder.

Emergency Guidelines

EMERGENCY TELEPHONE: 803-846-8171 (Lobeco Products).

Galoryl* Dispersants

BP: Lobeco Products, Inc. (Galoryl* DM-74, Galoryl* DT-120, Galoryl* DT-505, Galoryl* PA-340)

Chemistry

COMPOSITION: Sodium naphthalene formaldehyde sulfonate polymer.

Action/Use

ACTION: Dispersant.

USE: Rheology control agent for extruded granules.

FORMULATIONS: Free-flowing powder or aqueous solution, wettable powders, dry flowables, suspension concentrates.

Galoryl* Wetting Agents

BP: Lobeco Products, Inc. (Galoryl* MT-704, Galoryl* MT-705, Galoryl* MT-800, Galoryl* MT-810)

Chemistry

COMPOSITION: Sodium alkyl naphthalene sulfonates.

Action/Use

ACTION: Wetting agent.

FORMULATIONS: Wettable powders, dry flowables.

Galtak*

BP: Hoechst Schering AgrEvo GmbH (Galtak*)

Identification

COMMON NAMES: Benazolin (ISO-E, BSI, WSSA); benazoline (ISO-F).
 CODE NUMBER: CAS 3813-05-6 (benazolin); CAS 25059-80-7 (benazolin-ethyl); CAS 67338-65-2 (benazolin-potassium).

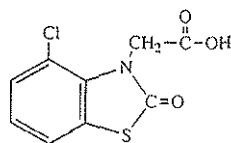
ADDITIONAL TRADE NAMES: Chamilox*, Cresopur*, Keropur*, Millox*.

DISCONTINUED NAMES: Grassland Weedkiller* (Boots Co., Ltd.); Ley-Cornox*, Leymin* (FBC Ltd.); Benazolin Liquid*, Bencornox*, Benopan*, Bensecal*, Benzan*, Benzar*, Catt*, Cornox CWK*, Herbazolin*, Herbitox*, Springclene* 2, Tri-Cornox*, Tri-Cornox Special*.

Chemistry

COMPOSITION: Benazolin: 4-Chloro-2-oxobenzothiazolin-3-ylacetic acid. Benazolin-potassium: Potassium 4-chloro-2-oxobenzothiazolin-3-ylacetate. Benazolin-ethyl: Ethyl 4-chloro-2-oxobenzothiazolin-3-ylacetate.

PROPERTIES: White crystalline solid, melting point 193°C (acid) and 79°C (ester). Ester soluble in organic solvents.



Benazolin

Action/Use

ACTION: Selective postemergence systemic herbicide showing synergistic action with dicamba, clopyralid or other herbicides.

USE: Alone as an ester formulation for selective control of chickweed, cleavers, wild mustard in oilseed rape, cereals. Early-late post applications for cocklebur, jimsonweed, lambsquarter, pigweed, ragweed, velvetleaf in corn, soybeans.

FORMULATIONS: Suspension concentrate of the ethyl ester (50%).
 COMBINATION: Benazlox* (+ clopyralid), Asset* (+ ioxynil + bromoxynil), Legumex* Extra (+ 2,4-DB + MCPA), Tillox* (+ bromoxynil + CMPP) (Schering AG).

Registration Notes

U.S.: Not registered.

Environmental Guidelines

SOLUBILITY: Ester not readily water-soluble.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Benazolin-ethyl (Rat): Oral LD₅₀ >5000 mg/kg. (Mouse): >4000 mg/kg.

Gamaphex* — see Lindane.

Gamatin* Fungicide (lindane + thiram) — Discontinued by Kemira Oy.

Gambit* — see Fenpiclonil.

Gamete

A mature germ cell, as in pistil (female) or in pollen (male) of a flower. Some plants bear only one or the other, and these must be cross-pollinated.

Gameticide

A substance that prevents pollination.

Gamit* — see Command*.

Gamma-BHC

Identification

COMMON NAME: Gamma-BHC or gamma-HCH (ISO, BSI).

CODE NUMBER: CAS 608-73-1.

ADDITIONAL TRADE NAME: Gammexane* (ZENECA Agrochemicals).

Chemistry

COMPOSITION: gamma-1,2,3,4,5,6-Hexachlorocyclohexane.

See BHC; Lindane.

Gamma-HCH — see Gamma-BHC.

Gamma-Hytox*

(Discontinued 1984 by Planters Products, Inc.)

Chemistry

COMPOSITION: Gamma isomers of BHC + MIPC (2-isopropylphenyl N-methylcarbamate).

Action/Use

ACTION: Insecticide.

Safety Guidelines

TOXICITY: Similar to individual components (gamma BHC, MIPC).

Gamma-Mean 400* — see Lindane.

Gamma-Mean L.O.* — see Lindane.

Gamma Mean Seed* — see Lindane.

Gamma-Up* — see Lindane.

Gammalin* 20 Insecticide (lindane) — Discontinued 1984 by ICI Agrochemicals.

Gammasan* — see Captan; Lindane.

Gammex* — see Lindane.

Gammexane* — see BHC.

Gandie* — see Burgundy Mixture.

Ganex* P-904 — see Dispersant; Wetting Agent.

Ganocide* Fungicide (drazoxolon) — Discontinued by ICI Agrochemicals.

Gantrez* AN-119 — see Dispersant; Wetting Agent.

Gapol*

BP: Gapol de Mexico, S.A. de C.V.

Action/Use

ACTION: Abscission reducer.

USE: For flowers, fruit and vegetables.

FORMULATIONS: Miscible liquid.

Gardcide* — see Tetrachlorvinphos.

Gardentox* — see Diazinon*.

Gardona* — see Tetrachlorvinphos.

Gardoprim* — see Terbutylazine.

Garlon* — see Triclopyr.

Garrathion* — see Trithion*.

Garvox* — see Bendiocarb.

Gas Mask

A device which filters out chemicals in spray, dust or gas from air breathed by the wearer. A full-face gas mask must be worn to protect from gases; it should be equipped with adequate canisters of

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

absorbent materials (or with oxygen supply). Simple respirators protect from spray and dust, but not from poisonous gases. Respirators that give eye as well as nose and mouth protection are important especially for irritant materials.

GASPA*

(Discontinued by Nihon Nohyaku Co., Ltd.)

Chemistry

COMPOSITION: Volatile liquid (dichlorodinitromethane + 1,1,2,2-tetrachloronitroethane + trichloronitroethylene).

Action/Use

ACTION: Soil fumigant, fungicide.

Gastoxin* — see Aluminum Phosphide.

Gastropocide — see *Molluscicide*.

Gatnon*

(Discontinued 1989 by Bayer AG).

Identification

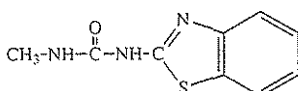
COMMON NAME: Benzthiazuron (ISO, BSI).

EXP. CODE NUMBERS: Bay 60618, S 22012.

OTHER CODE NUMBERS: CAS 1929-88-0; SHA 281400.

Chemistry

COMPOSITION: N-2-Benzothiazolyl-N'-methylurea (CAS).



Benzthiazuron

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1280 mg/kg.

Gaucha* — see Imidacloprid.

Gazelle* — see Carbosulfan.

GC 1189 — Discontinued by Allied Chemical Co.

GC 1283 — Discontinued by Allied Chemical Co.

GC 2466 — see Mucchloric Anhydride.

GC 3707 — see Bomyl*.

GCC-711 — see Diquat Dibromide.

GCP-5126 — Discontinued by Gulf Oil Co.

Gearphos* — see Methyl Parathion.

Gebutox* Herbicide/Desiccant (dinoseb) — Discontinued 1987 by Hoechst AG.

Gemini* Fungicide (U.K. only) — see Calixin*; Fenpropimorph.

Gemini* Herbicide (U.S.)

BP: Du Pont Agricultural Products (Gemini*)

Chemistry

COMPOSITION: Linuron + chlorimuron-ethyl.

Action/Use

ACTION: Herbicide.

USE: Annual broadleaf control in soybeans.

FORMULATIONS: Dry flowable.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2300 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Genate* Plus Herbicide (butylate) — Discontinued by Valent.

Gencor* Insect Growth Regulator (hydroprene) — Discontinued by Zoccon Corp.

Genep* EPTC — see EPTC.

General-Use Pesticide

A pesticide which can be purchased and used by the general public without undue hazard to the applicator and environment as long as the instructions on the label are followed carefully.

See Restricted Use Pesticide.

Genicide**Identification**

TRIVIAL NAMES: Oxoxanthone, xanthone.

CODE NUMBER: CAS 90-47-1.

Chemistry

COMPOSITION: 9-Xanthone.

Action/Use

ACTION: Miticide, insecticide, ovicide.

Genite*

(Discontinued by Allied Chemical Corp.)

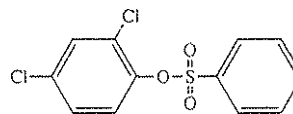
Identification

EXP. CODE NUMBER: EM 923 (Allied Chemical Corp.).

DISCONTINUED NAME: Genitol* (Allied Chemical Corp.).

Chemistry

COMPOSITION: 2,4-Dichlorophenyl benzenesulfonate.



Genite*

Action/Use

ACTION: Acaricide with little insecticidal activity.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat, male): Oral LD₅₀ 1400 mg/kg.

Genitol* Acaricide (2,4-dichlorophenyl benzenesulfonate) —

Discontinued by Allied Chemical Corp.

Genitox* Insecticide (DDT) — Discontinued by Ciba-Geigy Ltd.

Genois* — see Prochloraz.

Genpest* — see Chlorpyrifos.

GenTrol*

BP: Sandoz Agro, Inc. (GenTrol*, Mator*)

Identification

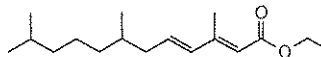
COMMON NAME: Hydroprene (ISO, ANSI, BSI, ESA).

CODE NUMBERS: CAS 41096-46-2; SHA 486300; OMS 1696 (WHO).

DISCONTINUED NAME: Gencor* (Zoccon Corp.).

Chemistry

COMPOSITION: Ethyl (2E,4E)-3,7,11-trimethyldodeca-2,4-dienoate (IUPAC).



Hydroprene

Action/Use

ACTION: Insect growth regulator.

USE: For control of Blattaria, Coleoptera and Orthoptera. Inhibits normal molting processes causing mortality or sterility of insect at or before the final molt.

FORMULATIONS: Aerosols, emulsifiable concentrates, foggers, ready-to-use.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >34,000 mg/kg. Negative cellular immune response. Acute inhalation LC₅₀ >5 mg/l. (Rabbit): Dermal LD₅₀ 5100 mg/kg. No skin or eye irritation. (Guinea pig): No sensitization.

Geocarb* Insecticide (BPMC) — Discontinued 1992 by Chemol Trading Ltd. Co.

Geofos — see Nem-A-Tak*.

Geomet* — see Phorate.

Geonter* Herbicide (terbacil) — Discontinued 1994 by Chemol Trading Ltd. Co.

Genpest* — see Chlorpyrifos.

Geraniol**Chemistry**

COMPOSITION: An alcohol closely related to cyclic terpenes (e.g., camphor).

Action/Use

ACTION: Attractant.

USE: For Japanese beetle. Major component in citronella.

Germate* — see Lindane; Maneb.

Germate Plus* — see Carboxim; Diazinon; Lindane.

Germination

The sprouting of a seed or the production of a germ tube (mycelium) from a fungus spore.

See Spore.

Gerono! — see Crop Oil Concentrates; Penetrant.

Gesabal* Herbicide (ipazin) — Discontinued by Ciba-Geigy Ltd.

Gesadural* Herbicide (sime-tone) — Discontinued by Ciba-Geigy Ltd.

Gesafloc* Herbicide (trietazine) — Discontinued by Ciba-Geigy Ltd.

Gesaftram* — see Pramitol*.

Gesagard* — see Prometryn.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Gesamil* Herbicide (propazine) — Discontinued by Ciba-Geigy.
Gesapax* — see Ametryn.
Gesapax-H* — see Trinatox-D*.
Gesapon* Insecticide (DDT) — Discontinued by Ciba-Geigy Ltd.
Gesaprim* — see Atrazine.
Gesaprim Combi* — see Aterbutox* 20/20.
Gesaran* Herbicide (methoprotrotryne) — Discontinued 1984 by Ciba-Geigy Ltd.
Gesarex* Insecticide (DDT) — Discontinued by Ciba-Geigy Ltd.
Gesarol* Insecticide (DDT) — Discontinued by Ciba-Geigy Ltd.
Gesatamin*
 (Discontinued by Ciba-Geigy Ltd.)

Identification

COMMON NAMES: Atraton (ISO, BSI); atratone (France).
 CODE NUMBERS: CAS 1610-17-9; SHA 080802.

Chemistry

COMPOSITION: 2-(Ethylamino)-4-(Isopropylamino)-6-methoxy-s-triazine (CAS 8CI).

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1465-2400 mg/kg.

Gesatop* — see Simazine.

Gesfid* Insecticide/Acaricide (mevinphos) — Discontinued 1984 by Celamerck.

Get-Down*

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: Polyacrylamide.

Action/Use

ACTION: Adjuvant, drift-control agent, deposition-coverage aid.

USE: Improves deposition and coverage, increases effective swath width, reduces water evaporation, restricts fine particles and mist from spray.

FORMULATION: Concentrated powder.

See Drift Control Agents.

Getter* — see Diethofencarb.

Gexane* — see BHC.

Gexarex* (DDT) — Discontinued by Ciba-Geigy Ltd.

Geyser* — see Difenconazole.

Gibberellic Acid

BP: Abbott Laboratories (ProGibb*, ProVide*, Release*, RyzUp*)

AgriDyne Technologies Inc. (Gibrel*)

Agrol Chemical Products (GibGro*)

Biesterfeld U.S., Inc.

Burlington Bio-Medical & Scientific Corp.

Ciech-Agrochemia (Pol-Gibrescol*)

Fine Agrochemicals Ltd. (Falgro*)

Forward International Ltd.

HELM AG (Gibberellins*)

Hubei Sanonda Co., Ltd. (Gibberellins*)

Krishi Rasayan

Rotam Group (Ro-Gibb*)

ZENECA Agrochemicals (Activol*, Berelex*)

Identification

COMMON NAMES: Gibberellic acid (ISO-E draft, BSI); acide gibbérellique (ISO-F draft).

TRIVIAL NAME: Gibberellin*.

EXP. CODE NUMBER: CA 38083090 (Ciech-Agrochemia).

CODE NUMBERS: CAS 77-06-5; SHA 043801.

ADDITIONAL TRADE NAMES: Agga*, Gacid* (Agsin Pte. Ltd.);

Cekugib* (Cequisa); PGR-IV* (Plant Growth Formulations, Inc.)

DISCONTINUED NAMES: Floraltone* (+ TIBA) (Rhône-Poulenc); Gib-Sol*, Gib-Tabs* (Elanco Products Co.); Grocel* (ICI Agrochemicals).

Chemistry

COMPOSITION: (1 α ,2 β ,4 α ,4 β ,10 β)-2,4a,7-Trihydroxy-1-methyl-8-methylenegibb-3-ene-1,10-carboxylic acid 1,4a-lactone.

PROPERTIES: Crystalline powder also in form of tablets. Melting point 210-235°C.

Action/Use

ACTION: Plant growth regulator.

USE: Blueberries, cherries (sweet, sour), grapes, grapefruit, Italian prune, lemons, navel oranges, Orlando tangelo, strawberries, Artichokes, beans, celery, cotton, lettuce, oats, peas, rice, rye, rhubarb, seed potatoes, soybeans, spinach, sugarcane, tomatoes, Fuggle hops

and certain grasses.

FORMULATIONS: Tablets, soluble granules, liquid concentrate.

COMBINATIONS: Compatible with most spray materials but do NOT combine with alkaline sprays (lime sulfur).

Registration Notes

OUTSIDE U.S.: Berelex* not registered.

Environmental Guidelines

SOLUBILITY: Water solubility 0.5%. Sodium, potassium and ammonium salts very soluble in water (solubility, 5 g/l water). Slowly hydrolyzed by water and rapidly decomposed by heat or chlorine (e.g. in water).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Mouse): Oral 1500 mg/kg. No toxic symptoms in mice.

HANDLING AND STORAGE CAUTIONS: Avoid open flames, excessive storage temperatures and direct sunlight. Avoid all contact with skin and eyes. Wash splashes from skin or eyes immediately. Ensure adequate ventilation in confined spaces. Store in original container, tightly closed, away from all sources of heat. Wash out container thoroughly and dispose of safely. Shelf-life of at least 2 years under normal storage conditions in unopened containers.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Gibberellin* — see Gibberellic Acid.

Gibberellins* — see Gibberellic Acid.

Gibberellins A4/A7 — see Gibberellic Acid.

GibGro* — see Gibberellic Acid.

Gibrel* — see Gibberellic Acid.

Gib-Sol* (gibberellic acid) — Discontinued by Elanco Products.

Gib-Tabs* (gibberellic acid) — Discontinued by Elanco Products.

GIFAP

Groupement International Produits Agrochimiques des Associations Nationales de Fabricants de Produits Agrochimiques (GIFAP) is the international trade association of pesticide manufacturers.

Gingill Oil — see Sesame Oil.

Ginstar*

BP: AgrEvo USA Co. (Ginstar*)

Chemistry

COMPOSITION: Thidiazuron + diuron.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg (low toxicity). Inhalation LC₅₀ (4 hr.) >4.0 mg/l (toxic). (Rabbit): Dermal LD₅₀ >2000 mg/kg (low toxicity)

Emergency Guidelines

EMERGENCY TELEPHONE: 302-892-300 (AgrEvo USA Co.).

GIX — see DFDT.

Glacier* 325**Identification**

COMMON NAME: Talc.

Chemistry

COMPOSITION: Hydrous magnesium silicate: Mg₃(SiO₄)₂(OH)₂.

Action/Use

USE: Inert carrier and diluent in pesticides. When ultra fine grinds are used (Mistron grades), they contribute to large surface areas and are non-reactive with sensitive toxicants and can be used in wettable powders.

Safety Guidelines

SIGNAL WORD: Nontoxic.

HANDLING AND STORAGE CAUTIONS: Non-hazardous "inert" dust nuisance.

GLADZ* — see PCP.

Glean* — see Chlorsulfuron.

Glean T* — see Chlorsulfuron; Tribunil*.

Glenbar*

(Discontinued 1969 by Velsicol Chemical Corp.)

Identification

EXP. CODE NUMBER: OCS-21944 (Velsicol Chemical Corp.).

OTHER CODE NUMBER: CAS 3765-57-9.

Chemistry

COMPOSITION: Methyl 2,3,5,6-tetrachloro-4-(methylthio)carbonylbenzoate (CAS).

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3300 mg/kg.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Glialka* — see Glyphosate.
Glifogarde* — see Glyphosate.
Glifosato Estrella* — see Glyphosate.
Gliflor

Action/Use
COMPOSITION: Difluorhydrine of glycerin + chlorofluorhydrine of glycerin.

Action/Use
ACTION: Rodenticide.
USE: Russian preparation intended to kill "mice-like rodents."

Glint* — see Tilt*.

Gliotoxin
Action/Use
ACTION: Fungicide (antibiotic).

Glisompa* — see Glyphosate.

Glistar* — see Glyphosate.

Glitex* — see Glyphosate.

GLP

Acronym for Good Laboratory Practices.

Glufosinate-ammonium

BP: Hoechst Schering AgrEvo GmbH (*Basta**, *Buster**, *Challenge**, *Conquest**, *Dash**, *Final**, *Finale**, *Harvest**, *Ignite**)

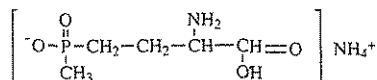
Identification

COMMON NAME: Glufosinate-ammonium (ISO, BSI).
EXP. CODE NUMBERS: Hoe 039866 (Hoechst AG).
OTHER CODE NUMBERS: CAS 77182-82-2; SHA 128850.

Chemistry

COMPOSITION: Ammonium DL-homoalanin-4-yl(methyl)phosphinate (IUPAC).

PROPERTIES: Solid, melting point approx. 210°C.



Glufosinate-ammonium

Action/Use

ACTION: Non-selective contact herbicide with some systemic action.
USE: For a wide spectrum of annual, perennial broadleaved weeds and grasses in fruit orchards, grapes, plantations, and ornamentals; along drains, canals, noncropland, and for desiccation of agricultural crops.
FORMULATIONS: Aqueous solution.

Registration Notes

U.S.: *Ignite**.

OUTSIDE U.S.: *Basta**, *Buster**, *Final**, *Finale**, *Harvest** in Canada. *Dash**, *Challenge**, and *Conquest** in U.K.

Environmental Guidelines

SOLUBILITY: Water solubility, 1370 g/l ± 11%.

Safety Guidelines

TOXICITY: (Rat): Oral LD₅₀ (male) 2000 mg/kg; 1620 mg/kg (female); Dermal LD₅₀ >4000 mg/kg (male), approx. 4000 mg/kg (female).

Glutaraldehyde

Identification

CODE NUMBERS: CAS 111-30-8; SHA 043901.

Action/Use

ACTION: Disinfectant.

Glycel* — see Glyphosate.

Glycolate

Action/Use

ACTION: Growth regulator.

USE: Decelerates fruit ripening process of tomatoes.

Glycophene — see Iprodione.

Glyfonox* — see Glyphosate.

Glyodex* (glyodin/dodine) — Discontinued by Agway, Inc.

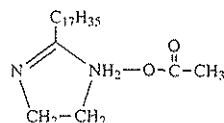
Glyodin

Identification

COMMON NAME: Glyodin (ISO, BSI).

CODE NUMBERS: CAS 556-22-9; SHA 043601.

DISCONTINUED NAMES: Crag 341* (Union Carbide Corp.); Glyoxide* (Agway Inc.)



Glyodin

Chemistry

COMPOSITION: 2-Heptadecyl-2-imidazoline acetate.

Action/Use

ACTION: Protective fungicide with acaricidal activity, adjuvant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4600-7600 mg/kg.

Emergency Guidelines

FIRST AID: Get immediate medical aid. **Eyes,** immediately flush with plenty of water for at least 15 minutes. **Skin,** flush with plenty of water for at least 15 minutes. Remove and wash contaminated clothing before reuse. **Ingestion,** give promptly large quantities of milk, egg whites, gelatin solution, or if these are unavailable, large quantities of water. Avoid alcohol. Note to physician: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

Glyoxaline — see Imutex*.

Glyoxide* Fungicide (glyodin) — Discontinued by Agway Inc.

Glyoxime — see Pik-Off*.

Glyphogan* — see Glyphosate.

Glyphosamine

Identification

COMMON NAME: Glyphosamine.

CODE NUMBERS: CAS 2439-99-8; SHA 103602.

Chemistry

COMPOSITION: Ethylene diamine of N-phosphonomethyl glycine.

Action/Use

ACTION: Herbicide.

USE: General systemic weed control, direct weed control in row crops.

Glyphosate

BP: AImco Pesticides Ltd.

Alkaloida Chemical Co., Ltd.

Aragonesas Agro, S.A. (*Herbalex**, *Police**)

Barclay Chemicals Mfg. Ltd. (*Dart**, *Gallup**)

Cheminova Agro A/S

Chemol Trading Ltd. Co. (*Glialka**)

Comlets Chemical Industrial Co., Ltd.

Crystal Chemical Inter-America (*Arbex**, *Banox**,

*Glyfonox**, *Supex**)

Excel Industries Ltd. (*Glycel**)

Fersol Indústria E Comércio Ltda.

Forward International Ltd. (*Herb-neat**)

Gilmore, Inc.

HELM AG

Herbex Produtos Químicos, Lda. (*Erranca**, *Glifogarde**)

Hubei Sanonda Co., Ltd. (*Glyphoz**)

Krishi Rasayan

Kuo Ching Chemical Co., Ltd.

Makhteshim-Agan (*Glyphogan**)

Mastra Corp. Sdn. Bhd.

Monsanto Co., The Agricultural Group (*Honcho**,

*Pondmaster**, *Rodeo**, *Roundup**)

Pilarquim Corp. (*Pilarsato**)

Probelte, S.A. (*Tomcato**, *Athado Super**, *Glisompa**,

*Fosmazina**)

Productos OSA S.A.C.I.F.I.A. (*Rondo**)

Pyosa, S.A. de C.V. (*Lider**)

Q.E.A.C.A. S.A. (*Glifosato Estrella**, *Glyphosate 48**)

Rotam Group (*Rophosate**)

Sanachem (Pty) Ltd. (*Mamba**)

Sanex Inc. (*Glitex**, *Glytix**)

Shinung Corp.

Sundat (S) Pte. Ltd. (*Sunup**)

Identification

COMMON NAME: Glyphosate isopropylammonium (ISO, ANSI, JMAF, WSSA).

CODE NUMBERS: CAS 1071-83-6; SHA 103601 (glyphosate);

CAS 38641-94-0 (isopropylamine salt).

ADDITIONAL TRADE NAMES: *Glystate** (Agro Chemicals Industries Ltd.); *PinUp** (Agsin Pte. Ltd.); *Glistar** (Alkaloida Chemical Co., Ltd.); *Glyphotox** (All India Medical Corp.); *Weedoff** (E.P.I.C. Pvt. Ltd.); *Rattler** (Helena Chemical Co.); *Winner* 41* (Lupin Agrochemicals (I) Ltd.); *Glyphosul** (Sulphur Mills Ltd.); *Jury** (Terra International, Inc.); *Ground-Up** (VAPCO).

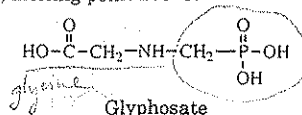
Chemistry

COMPOSITION: Isopropylamine salt of N-(phosphono-methyl)glycine.

PROPERTIES: *Glyfonox**, *Roundup**: Clear, viscous amber-colored solution; pH 4.4 to 4.9; specific gravity (Water = 1), 1.17. Practically

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

odorless to slight amine-like odor. **Lider***: Colorless crystals; molecular weight 169.08; melting point 200°C.



Action/Use

ACTION: Nonselective, postemergence herbicide.

USE: Roundup® controls many annual and perennial grasses and broadleaf weeds plus many tree and woody brush species in cropland and noncrop sites. Roundup® has no soil activity, thus can be applied prelant to over 140 crops. A foliar-applied, translocated herbicide, it may be applied in spring, summer, or fall to undesirable vegetation by boom equipment, hand-held and high volume equipment and selective equipment throughout the U.S. and in some states, by aerial application equipment. May be applied to undesirable species in four ways in the culture of desirable species or applied by conventional means or through selective equipment for general weed control in noncrop areas such as industrial, recreational, and public areas such as airports, ditch banks, dry ditches and canals, fencerows, golf courses, highways, industrial plant sites, rights-of-way, and in farmstead weed control. Rodeo® for broad-spectrum control of emerged weeds in and around aquatic and noncrop sites including industrial, recreational, and public areas such as airports, ditchbanks, dry ditches and canals, fencerows, golf courses, highways, industrial plant sites, and rights-of-way. Glifonox®, Glycel® for control of most stubborn annual and perennial grasses and broadleaf weeds in plantation and other crops, and general weed control in noncrop areas and as no-tillage in farmland. **FORMULATIONS:** Aqueous solution, water soluble liquid, soluble liquid, water soluble concentrate. **COMBINATIONS:** Sable* (+ MCPA) (Aragonesas Agro, S.A.); Fallowmaster* and Wallop* (+ dicamba) (Monsanto Co., The Agricultural Group).

Registration Notes

OUTSIDE U.S.: Glifonox*

Environmental Guidelines

HAZARDS: Pondmaster®: Fish LC₅₀ 120 mg/l (trout); 230 mg/l (bluegill).

SOLUBILITY: Glifonox®, Glycel®, Roundup® readily soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (tech - eye); WARNING (Roundup®).

TOXICITY CLASS: I (tech - eye); II (Roundup®).

TOXICITY: Glyphosate (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >5000 mg/kg. Severely irritating to eyes, non irritating to skin.

Roundup® (Isopropylamine salt) (Rat): Oral LD₅₀ >5000 mg/kg.

Glycel® (Rat): Oral LD₅₀ 4320 mg/kg.

PROTECTIVE CLOTHING: Long-sleeved shirt, long pants, and protective eyewear.

HANDLING AND STORAGE CAUTIONS: Roundup® stable up to 5 years under normal conditions.

Emergency Guidelines

FLASHPOINT: Glifonox®, Roundup®: >200°F (tag closed cup).

FIRE EXTINGUISHING MEDIA: Water spray, foam, dry chemical, CO₂, or any Class B agent.

FIRST AID: Get medical aid. Eyes, flush with plenty of water for 15 minutes. Ingestion, immediately dilute by swallowing milk or water.

EMERGENCY TELEPHONE: 314-694-4000 (Monsanto Co., The Agricultural Group).

Glyphosate 48* — see Glyphosate.

Glyphosate-trimesium — see Touchdown*.

Glyphosine — see Polaris*.

Glyphosphates

A class of herbicides active against many weeds. Because they are translocated they are active against perennial weeds. They are not residual in the soil and crops can be sown soon after application.

Glyphosul* — see Glyphosate.

Glyphotox* — see Glyphosate.

Glyphoz* — see Glyphosate.

Glystate* — see Glyphosate.

Glytac*

(Discontinued by Occidental Chemical Co.)

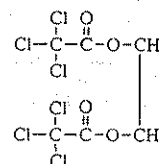
Identification

CODE NUMBERS: CAS 2514-53-6; SHA 042201.

OTHER NAME: EGT.

Chemistry

COMPOSITION: Ethylene bis(trichloroacetate) (IUPAC).



Active Ingredient of Glytac*

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: A.i. in corn oil (Rat): Oral LD₅₀ 7000 mg/kg.

Glytex* — see Gallery*; Glyphosate; Tribunil*.

Gnatrol* — see *Bacillus thuringiensis* var. *israelensis*.

Goal*

BP: Rohm and Haas Co. (Goal*)

Identification

COMMON NAMES: Oxyfluorfen (ISO-E, ANSI, BSI, WSSA); oxyfluorfen (ISO-F).

EXP. CODE NUMBER: RH-2915.

OTHER CODE NUMBERS: CAS 42874-03-3; SHA 111601.

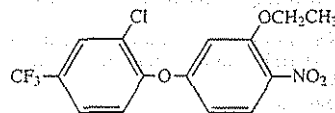
ADDITIONAL TRADE NAME: Koltar*.

Chemistry

COMPOSITION: 2-chloro-1-(3-ethoxy-4-nitrophenoxy)-4-(trifluoromethylbenzene) (CAS).

FAMILY: Diphenyl ether.

PROPERTIES: Orange crystalline solid at room temperature. Readily soluble in most organic solvents.



Oxyfluorfen

Action/Use

ACTION: Pre and postemergence herbicide.

USE: Selective herbicide for preemergence and/or postemergence control of certain annual broadleaf and grassy weeds. Registered for use in artichokes, avocados, broccoli, cabbage and cauliflower (pretransplant), citrus (non-bearing), clary sage, coffee, conifers, (seedbeds, container stock, field grown transplants), corn (witchweed control), cotton (post-direct), cottonwoods, fallow bed, feijoa, grapes, guava, horseradish, jojoba, kiwi fruit, macadamia nut, mayhaws, mint, noncrop, nut crops, olives, onions, papaya, persimmons, taro and tree fruit (stone fruit, pome fruit).

FORMULATIONS: Emulsifiable concentrate, granular formulations.

COMBINATIONS: Rout* (+ oryzalin) (Grace-Sierra Crop Protection);

Scotts Progrow* (+ pendimethalin) (O.M. Scott & Sons).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96 hr.) 0.2-0.4 mg/l (freshwater); Bee: Nontoxic.

Bird: LD₅₀ >2200 mg/kg.

DEGRADATION AND METABOLISM: Soil photolysis half-life 20-30 days; aqueous photolysis half-life 5 days.

SOIL PARTICLE ADSORPTION: Tightly bound to soil.

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal

>10,000 mg/kg.

CARCINOGENICITY CATEGORY: C.

PROTECTIVE CLOTHING: Coveralls, gloves, chemical resistant footwear, protective eyewear, apron when mixing, loading or cleaning equipment, headgear for overhead exposure.

STORAGE AND HANDLING CAUTIONS: Do not contaminate water, food or feed by storage or disposal. Keep from freezing. Store about 32° F.

Emergency Guidelines

FLASHPOINT: 40°C/104°F (Seta Flash, closed cup).

FIRE EXTINGUISHING MEDIA: CO₂, dry chemical, water spray, polar solvent (alcohol) foam.

FIRST AID: Eyes, flush with plenty of water for 15 minutes. Get medical attention. Skin, wash affected areas thoroughly with soap and water. Remove and wash contaminated clothing thoroughly. Do NOT take clothing home to be laundered. Get prompt medical attention.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Ingestion. give 2 glasses of water. Do NOT induce vomiting, petroleum distillate present. Get immediate medical attention. **Inhalation.** move to fresh air. If breathing is difficult, give oxygen. Give artificial respiration if breathing has stopped. Get prompt medical attention. **EMERGENCY TELEPHONE:** Health: 215-592-3000 (Rohm and Haas); Spill: 215-592-3000 or 1-800-424-9300 (CHEMTREC).

Go-Go-San* — see Prowl*.

Gokilaht*

BP: Sumitomo Chemical Co., Ltd.

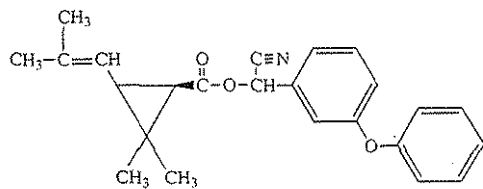
Identification

COMMON NAMES: Cyphenothrin (ISO-E, BSI); cyphénothrine (ISO-F).
EXP. CODE NUMBER: S-2703 Forte*.
OTHER CODE NUMBERS: CAS 39515-40-7; OMS 3032 (WHO).

Chemistry

COMPOSITION: (RS)- α -Cyano-3-phenoxybenzyl (1R)-cis,trans-chrysanthematate.

PROPERTIES: Yellowish viscous liquid, specific gravity at 25°C, 1.085. Relatively thermostable. Miscible with most organic solvents at 20-25°C.



Cyphenothrin

Action/Use

ACTION: Insecticide.

USE: Flying and crawling insect control for household, industrial locations, and outdoor use.

FORMULATIONS: Aerosol, emulsifiable concentrate, oil, liquid, micro capsule, dust, wettable powder, and fumigant.

Registration Notes

U.S.: Not for edible crop use.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 318-2640 mg/kg. Dermal LD₅₀ >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Ordinary good manufacturing practices and sanitation.

Ventilate well. Store in closed drum in a cool, dry place.

Emergency Guidelines

FIRST AID: Treatment is symptomatic.

Gold Coin Amine* — see 2,4-D.

Gold Crest C-100* Insecticide (chlordane) — Discontinued by Velsicol Chemical Corp.

Gold Crest* H-60 Insecticide (heptachlor) — Discontinued.

Gold Crest Vengeance* (bromethalin) — Discontinued.

Golden Decoy* — see DDVP.

Golden Dew* — see Sulfur.

Golden Natur'l Spray Oil*

BP: Stoller, Inc.

Action/Use

ACTION: Miticide.

USE: For citrus mite, citrus rust mite, citrus red mite, and loosening sooty mite.

Environmental Guidelines

HAZARDS: Fish: Toxic.

Golden Nutrient — see Sulfur; Zinc Sulfate.

GoldenLeaf Tobacco Spray* — see Endosulfan.

Goldquat* Herbicide (paraquat) — Discontinued by F.E. Zuellig.

Goltix*

BP: Bayer AG (Goltix*)

Identification

COMMON NAME: Metamitron.

EXP. CODE NUMBER: DRW 1139.

OTHER CODE NUMBERS: CAS 41394-05-2 (metamitron); EINECS 255-349-3.

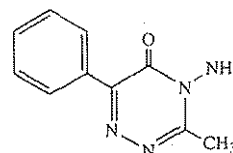
DISCONTINUED NAMES: Herbrak* (Bayer AG).

Chemistry

COMPOSITION: 4-amino-3-methyl-6-phenyl-1,2,4-triazin-5(4H)-one.

PROPERTIES: Colorless crystals. Melting point 166.6°C. Vapor pressure 8.6 μ Pa at 20°C.

FAMILY: Triazinone.



Goltix*

Action/Use

ACTION: Herbicide.

USE: Controls broadleaf, grass weeds in sugar and fodder beets; also used in marigolds, red beets, and in some strawberry varieties.

FORMULATIONS: Water dispersible granule, wettable powder.

COMBINATIONS: Betanal Trio* (+ ethofumesate + phenmedipham) (Hoechst Schering AgrEvo GmbH).

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Not marketed in Canada.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 326 mg/l (96 h) (rainbow trout). Bee: Nontoxic.

Bird: LD₅₀ 1930 mg/kg (Japanese quail, female).

SOLUBILITY: In water 1.7 g/l at 20°C.

Safety Guidelines

TOXICITY CLASS: III

TOXICITY: Tech: (Rat): Oral LD₅₀ 2000 mg/kg b.w.; Dermal LD₅₀ >4000 mg/kg b.w.

Good Laboratory Practices

EPA regulations regarding how to conduct laboratory and field trials designed for submission to EPA of candidate pesticides or new uses of registered pesticides.

Goodrite n.i.x.* Herbicide (proxan) — Discontinued 1992 by B.F. Goodrich Chemical.

Goodrite ZAC*

(Discontinued 1974 by NOR-AM Chemical Co.)

Chemistry

COMPOSITION: A ziram cyclohexylamine complex (Goodrich).

Action/Use

ACTION: Fungicide.

Gophacide*

(Discontinued by Bayer AG)

Identification

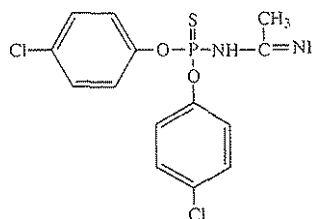
COMMON NAME: Phosacetim (ISO-E, BSI); phosacétime (ISO-F).

EXP. CODE NUMBER: Bay 33819.

OTHER CODE NUMBERS: CAS 4104-14-7; SHA 018501.

Chemistry

COMPOSITION: O,O-bis(p-chlorophenyl) acetimidoylphosphoramidothioate.



Phosacetim

Action/Use

ACTION: Rodenticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ 3.7-7.5 mg/kg. Dermal LD₅₀ 25 mg/kg.

Gossyplure*

BP: Agri-Pharm International Inc.

Chemistry

COMPOSITION: Hexadecadienyl Acetate.

Action/Use

USE: Trapping pink bollworm.

Registration Notes

U.S.: For federal and state programs.

Gossyplure

Identification

CODE NUMBER: CAS 50933-33-0.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: A mixture of geometrical isomers of the same chemical — 50% (7Z,11Z)-hexadecadien-1-ol acetate and 50% (7Z, 11E)-hexadecadien-1-ol acetate.

Action/Use

USE: Attractant.

ACTION: The natural sex attractant of the pink bollworm used to replace hexalure in male moth trapping programs.

See Also: Hercon[®] Disrupt; Hercon[®] Luretape[®]; Hexalure; NoMate[®] SW MEC; Pherocon[®]; Propylure; Stirrup-M[®].

Govern[®] — see Indar[®].

Grain Guard[®] — see Mancozeb.

Grain Guard Plus[®] — see Lindane; Mancozeb.

Grain Preservatives

Grain preservatives are liquids containing propionic acid and/or mixtures of closely related acids or salts used for early harvesting of high moisture grain and storage of feeds to combat problems of handling and spoiling, especially mold growth. Used on grain and feeds for animal nutrition only.

Grain Savor[®]

BP: Kemin Industries Inc. (Grain Savor[®])

Chemistry

COMPOSITION: Propionic acid.

PROPERTIES: Clear liquid with fruity odor, specific gravity 1.050-1.085.

Action/Use

ACTION: Fungicide.

USE: Control of molds and fungi in stored corn, oats, barley, wheat or sorghum.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

PROTECTIVE CLOTHING: Goggles, rubber gloves and local exhaust.

HANDLING AND STORAGE CAUTIONS: May be corrosive under certain conditions. Store in warm, dry place above 10°F to prevent freezing.

PRODUCT/WASTE DISPOSAL: Use an approved landfill. Consult supplier for additional information.

Emergency Guidelines

FIRST AID: **Eyes,** immediately flush with plenty of water for at least 15 minutes. Call a physician. **Skin,** wash with plenty of soap and water. Get medical attention. **Inhalation,** remove to fresh air. **Ingestion** Do NOT induce vomiting. Rinse mouth immediately with abundant quantities of water, then promptly drink a large quantity of milk mixed with egg whites. If these are not available, drink as much water as possible. Obtain medical attention immediately.

Grain Storer P[®]

(Discontinued 1985 by Cenex, Inc.)

Identification

CODE NUMBER: CAS 79-0-4.

Chemistry

COMPOSITION: Propionic acid.

Action/Use

ACTION: Fungicide.

Emergency Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Grain Treet[®]

(Discontinued 1994 by Kemin Industries Inc.)

Chemistry

COMPOSITION: Propionic acid.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Emergency Guidelines

FIRST AID: **Eyes,** immediately flush with plenty of water for at least 15 minutes. Call a physician. **Skin,** wash with plenty of soap and water. Get medical attention. **Inhalation,** remove to fresh air. **Ingestion** Do NOT induce vomiting. Rinse mouth immediately with abundant quantities of water, then promptly drink a large quantity of milk mixed with egg whites. If these are not available, drink as much water as possible. Obtain medical attention immediately.

Gralit 85[®] Herbicide (chloral chloroamide) — Discontinued 1972 by Farbwerke Hoechst AG.

Gramevin[®] — see Dalapon.

Graminon[®] — see Isoproturon.

Graminon[®] Forte — see Amber[®]; Isoproturon.

Graminon-Plus[®] Herbicide (dichlorprop + isoproturon) — Discontinued 1989 by BASF AG.

Gramocil[®] — see Paraquat.

Gramonol[®] — see Monolinuron; Paraquat.

Gramoxone[®] — see Paraquat.

Gramoxone Extra[®] — see Paraquat.

Gramoxone S[®] Herbicide (paraquat) — Discontinued 1987 by ICI Agrochemicals.

Gramuron[®] — see Diuron; Paraquat.

Granat[®] — see Pyridate.

Grand[®] — see Cypermethrin.

Grand Emulsion[®]

(Discontinued by Nihon Nohyaku Co., Ltd.)

Chemistry

COMPOSITION: 2,3-dibromopropionitrile + trichloronitroethylene.

Action/Use

ACTION: Soil fungicide.

Grandamone[®] Attractant (grandlure) — Discontinued by Zeecon Corp.

Grandiure

BP: Agri-Pharm International Inc.

Identification

COMMON NAME: Grandlure.

CODE NUMBERS: CAS 26532-22-9; SHA 112401.

DISCONTINUED NAME: Grandamone[®] (Zeecon).

Chemistry

COMPOSITION: Two terpene alcohols + two terpene aldehydes.

(+)-cis-2-isopropenyl-1-methylcyclobutaneethanol; cis-3,3-dimethyl-Δβ-cyclohexaneethanol; cis-3,3-dimethyl-Δα-cyclohexaneacetaldehyde; and trans-3,3-dimethyl-Δα-cyclohexaneacetaldehyde.

Action/Use

ACTION: Boll weevil sex attractant. (USDA, April 1970).

See Hercon[®] Luretape[®].

Grandox[®]

(Discontinued 1976 by Nihon Nohyaku Co., Ltd.)

Chemistry

COMPOSITION: Trichloronitroethylene + dichloropropene + other chlorinated hydrocarbons.

Action/Use

ACTION: Fumigant, bactericide, nematocide.

Grandslam[®] — see Methiocarb.

Grandstand[®] Fungicide — Discontinued by Dow Chemical Co.

Graneor[®] — see Dithiocarbamates.

Granero[®] Seed Protectant (hexachlorobenzene) — Discontinued 1993 by Atanor S.A.

Granol[®] — see Lindane; Maneb.

Granosan[®] Fungicide (ethylmercury chloride) — Discontinued 1981 by Du Pont Agricultural Products.

Granosan[®] M Fungicide (ethylmercury p-toluene sulfonamide) — Discontinued 1974 by Du Pont Agricultural Products.

Granox[®] Fungicide (maneb + hexachlorobenzene) — Discontinued 1985 by Chipman Chemicals.

Granox[®] P-F-M — see Captan; Maneb.

Granox[®] Plus — see Maneb; Thiabendazole.

Granular Formulation

Similar to an impregnant dust in that the dissolved chemical is sprayed into or mixed with a carrier such as clay. The carrier differs from a dust carrier in having larger particles, ideally all in a limited size range, generally less than 10 cubic millimeters. A common range is 15/30, meaning at least 98% by weight will pass through a screen with 15 openings per linear inch, but not more than 5% will pass through a 30 mesh screen. Particles in the 15/30 range are slightly coarser than granulated sugar. Particles small enough to pass a 60-mesh screen are considered to be dusts. Granular formulations are primarily soil treatments in vegetation since the granules can fall through or roll off the plants to the ground surface. Chemicals normally injurious to plants can be used because they do not stick to plants and crop residues are minimized.

Granurex[®] — see Neburon.

Granutox[®] — see Phorate.

Grap[®] — see Deltamethrin.

Graphite — see Captan.

Grasidim[®] — see Sethoxydim.

Grasip[®] — see Alloxydim-Sodium.

Grasipan[®] — see Alloxydim-Sodium.

Graslam[®] — see Asulam; MCPA; Mecoprop.

Graslan[®] Herbicide (tebuthiuron) — Discontinued 1989 by Elanco Products.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Grasp*

BP: ZENECA Agrochemicals

Identification

COMMON NAMES: Tralkoxydim (ISO-E draft, BSI); tralkoxydime (ISO-F).

CODE NUMBER: CAS 87820-88-0.

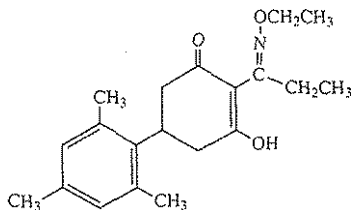
ADDITIONAL TRADE NAME: Achieve* (ZENECA Agro).

Chemistry

COMPOSITION: 2-[1-(ethoxyimino)propyl]-3-hydroxy-5-(2,4,6-trimethylphenyl)-2-cyclohexen-1-one (CAS).

FAMILY: Cyclohexandione (enol).

PROPERTIES: White solid; melting point 106°C. Soluble in a range of organic solvents.



Tralkoxydim

Action/Use

ACTION: Herbicide.

USE: Post crop emergence for grass weeds in barley, wheat.

FORMULATIONS: Emulsifiable concentrates, suspension concentrate.

Registration Notes

U.S.: Not marketed in U.S.

Environmental Guidelines

SOLUBILITY: Low in water.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 934-1324 mg/kg.

PROTECTIVE CLOTHING: Skin, eye protection when handling concentrate.

Grasshopper Attack* Insecticide (Nosema locustae canning) — Discontinued 1992 by Ringer Corp.**Grasshopper Spore* Insecticide (Nosema locustae canning)** — Discontinued 1987 by Reuter Laboratories.**Grassland Weedkiller* (benazolin)** — Discontinued by Boots Co. Ltd.**Grasszin* D** — see Bentazone; 2,4-D.**Gratil*** — see Amidosulfuron.**Grazon*** — see Picloram; Triclopyr.**Grazon* P + D**

BP: DowElanco

Chemistry

COMPOSITION: Picloram + 2,4-D.

Action/Use

ACTION: Herbicide.

USE: Control of annual and perennial broadleaf weeds, and certain woody species on rangeland and permanent grass pastures.

Registration Notes

U.S.: RUP.

Green Valley* Natural Plant Wash

BP: Western Nutrients Corp.

Action/Use

ACTION: Plant wash.

USE: Soap base insecticide.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Temperature variations will not harm product; shelf life indefinite.

Green Vitriol — see Ferrous Sulfate.**Greensalt*** — see Chromated Copper Arsenate.**Griffex* Herbicide (atrazine)** — Discontinued by Griffin Ag.**Griseofulvin****Identification**

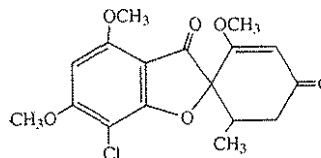
COMMON NAMES: Griseofulvin (ISO-E, BSI, CSA, BAN, JMAF, USAN, USP); griséofulvine (ISO-F).

CODE NUMBERS: CAS 126-07-8; SHA 471400.

ADDITIONAL TRADE NAME: Grisetin*.

Chemistry

COMPOSITION: 7-Chloro-4,6-dimethoxycoumaran-3-one-2-spiro-1'-(2'-methoxy-6'-methyl)cyclohex-2'-en-4'-one).



Griseofulvin

Action/Use

ACTION: Antibiotic fungicide.

Griséofulvine — see Griseofulvin.**Grisetin*** — see Griseofulvin.**Grit-O'Cobs***

BP: The Andersons Industrial Products Group (Grit-O' Cobs*)

Identification

COMMON NAME: Corncobs.

OTHER NAMES: Ground Corncobs, Ground Woody Ring, Woody Ring.

Chemistry

PROPERTIES: Inert toward almost all pesticides. Stable substrate for carbamates and phosphates.

Action/Use

ACTION: Carrier.

USE: Pesticide carrier and other uses. Pesticides formulated on Grit-O'Cobs tend to roll off leaves and fall to the ground.

COMBINATIONS: Combinations of pesticides have been formulated on Grit-O'Cobs*.

Safety Guidelines

SIGNAL WORD: Nontoxic.

PROTECTIVE CLOTHING: Eye protection, dust respirator recommended.

HANDLING AND STORAGE CAUTIONS: Grit-O'Cobs* are combustible and should be handled and stored as such.

Grocel* Plant Growth Regulator (gibberellic acid) — Discontinued 1992 by ICI Agrochemicals.**Grodyl*** — see Amidosulfuron.**Gropper*** — see Metsulfuron methyl.**Ground Corncobs** — see Grit-O'Cobs*; Lite-R-Cobs*.**Ground Limestone** — see Calcium Carbonate, Surface Treated.**Ground Non-Woody Ring** — see Lite-R-Cobs*.**Ground-Up*** — see Glyphosate.**Ground Woody Ring** — see Grit-O'Cobs*.**Grow Aid***

BP: American Colloid Co.

Identification

COMMON NAME: Montmorillonite clay.

Action/Use

ACTION: A clay of montmorillonite to be used as a drying agent when working with liquid herbicides.

Growth Regulator

A material used primarily for the control of insect or plant growth.

See Insect Growth Regulator; Plant Growth Regulator.

Growth Stages For Cereal Crops

1. Tiller or Tillering. When additional shoots are developing from the crown.
2. Joint or Jointing. When stem internodes begin elongating.
3. Boot or Booting. When the upper leaf sheath swells due to the growth of developing spike or panicle.
4. Head or Heading. When the seed head is emerging from the sheath.

Grub Attack* (milky spore powder) — Discontinued temporarily 1992 by Ringer Corp.**GS 12968** — see Lythidathion.**GS 13005** — see Methidathion.**GS 13529** — see Terbutylazine.**GS 14254** — see Etazine*.**GS 14259** — see Terbumeton.**GS 14260** — see Terbutryn.**GS 16068** — see Sancap*.**GS 19851** — see Acarol*.**GS 29696** — see Erbotan*.**GTA** — see Guazatine.**Guardman***

BP: Sandoz Agro, Inc. (Guardman*)

Chemistry

COMPOSITION: Dimethenamid + atrazine.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

PROPERTIES: Light beige, opaque liquid suspenso-emulsion with a moderate, sweet odor. Specific gravity at 1.12 at 25/25°C.

Action/Use

ACTION: Herbicide.

USE: Field corn, seed corn and popcorn.

Environmental Guidelines

HAZARDS: Fish: Dimethenamid LC₅₀ 2.1 mg/l (trout). Atrazine LC₅₀ 4.5-8.8 mg/l (96 h) (trout), 1600 mg/l (bluegill).

SOLUBILITY: Water solubility: dimethenamid 1174 mg/l at 23°C; atrazine 33 mg/l at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY: (Rat): Oral LD₅₀ 1293 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg. Inhalation LC₅₀ 2.0 mg/l. Mildly irritating to skin, moderate eye irritant.

PROTECTIVE CLOTHING: Long-sleeved shirts and long pants, chemical-resistant gloves, and waterproof boots. Mixers/loaders: heavy-duty chemical-resistant rubber or neoprene gloves and face shield or goggles.

HANDLING AND STORAGE CAUTIONS: Store in original container away from fertilizer, feed or foodstuffs, and separated from other pesticides. Do not store near heat or open flame.

Emergency Guidelines

FLASHPOINT: None detected up to 215°F (Pensky-Martens closed cup).

COMBUSTION PRODUCTS: Oxides of sulfur, oxides of nitrogen, hydrogen chloride.

FIRE EXTINGUISHING MEDIA: Water, foam, CO₂, dry chemical.

FIRST AID: Get medical aid. **Eyes**, flush eyes with plenty of water for 15 minutes. **Skin**, wash thoroughly with soap and water. **Inhalation**, remove to fresh air. **Ingestion**, drink one or two glasses of water and induce vomiting.

EMERGENCY TELEPHONE: 708-699-1616 (Sandoz Agro, Inc.).

Guazatine

BP: Rhone-Poulenc (Kenopel*, Panoctine*)

Identification

COMMON NAMES: Guazatine (ISO draft, BSI).

TRIVIAL NAME: GTA (for guazatine acetates).

EXP. CODE NUMBERS: MC 25 (Murphy Chemical Ltd.).

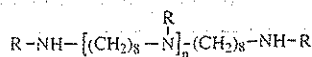
OTHER CODE NUMBERS: CAS 13516-27-3; SHA 498200.

DISCONTINUED NAMES: Radam* (Rhone-Poulenc); Panolil*.

Chemistry

COMPOSITION: A mixture of aminated amines. The main component is 1,1'-iminodi(octamethylene)diguarnidine.

PROPERTIES: Concentrate as solution in water or ethyleneglycol. Stable in neutral or acidic media but instable in alkaline media. Non-volatile. Soluble in methanol. Insoluble in most organic solvents.



R = 77-83% C(=NH)NH₂
17-23% H
n = 0, 1, 2, ...

Guazatine

Action/Use

ACTION: Fungicide, repellent.

USE: Cereal seed dressing to replace mercurials. Fungicide to control rice blast and pineapple disease on sugarcane. Postharvest dip treatment for citrus, pineapple. Panoctine* treated grain has a distinct repellent effect on pheasants and pigeons.

FORMULATIONS: Acetate aqueous solution.

COMBINATIONS: Panoctine Plus* (+ imazalil), Panoctine Super* (+ fenfuram) (both Rhone-Poulenc).

Registration Notes

U.S.: Kenopel* not registered.

OUTSIDE U.S.: Guazatine is a Rhone-Poulenc proprietary product protected by Swedish patents.

Environmental Guidelines

HAZARDS: Bee: Nontoxic. Bird: Treated grain has repellent effect on pigeon, pheasant.

SOLUBILITY: Readily soluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 300 mg/kg. (Rabbit): Dermal LD₅₀ >1000 mg/kg. Irritating to eyes.

PROTECTIVE CLOTHING: Use rubber gloves, also apron and goggles when cleaning equipment.

HANDLING AND STORAGE CAUTIONS: Handle with adequate ventilation.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes**, rinse immediately with plenty of water. **Skin**, wash with soap, water. **Inhalation, Ingestion**, treat symptomatically.

Guazatine Acetates — see Guazatine.

Gusaden* — see Azinphos-Methyl; Propoxur.

Gusano*

BP: InStar Products, Div. of Crop Genetics International (Gusano*)

Chemistry

COMPOSITION: Naturally occurring *Autographa californica multiplex* nuclear polyhedrosis virus.

PROPERTIES: Tan to brown color. Mild chemical odor. Neutral pH.

Action/Use

ACTION: Insecticide.

USE: For control of various caterpillar pests.

FORMULATIONS: Wetttable powder.

Registration Notes

U.S.: Registered.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

TOXICITY: Essentially nontoxic to mammals and non-target insect species.

PROTECTIVE CLOTHING: Safety glasses with side shields for eye and face protection. If potential exists for significant skin contact, wear imperious clothing, such as whole bodysuit, gloves, apron, and/or boots, as appropriate. Material does not have established exposure limits; if not used in chemical fume hood, and there is a potential for significant exposure, wear a NIOSH/MSHA approved positive pressure air supplied respirator.

HANDLING AND STORAGE CAUTIONS: Use with adequate ventilation. Avoid breathing or generating dust. Avoid contact with eyes, skin, or clothing. Compound not likely to be hazardous by skin contact, but advisable to wash thoroughly after handling. Do not consume food, drink or tobacco in an area where contamination with product is possible. Keep container tightly closed, and store in cool, dark, dry area. Stable under normal temperatures and storage conditions. Incompatible with strong acids, bases or chlorinated water; these materials are toxic to virus.

Emergency Guidelines

FLASHPOINT: Not fully investigated; handle as fire and explosion hazard.

FIRE EXTINGUISHING MEDIA: Use media appropriate for surrounding material.

FIRST AID: **Eyes**, immediately flush with plenty of water for at least 15 minutes and call physician. **Inhalation**, remove to fresh air. If not breathing, give artificial respiration. If breathing difficult, give oxygen. Call physician. **Ingestion**, call physician immediately.

EMERGENCY TELEPHONE: Medical: 410-381-3800 (InStar Products, Div. of Crop Genetics International).

Gusathion* — see Azinphos-Methyl.

Gusathion A* — see Azinphos-Ethyl.

Gusathion A-M* — see Azinphos-Ethyl; Azinphos-Methyl.

Gusathion K Forte* — see Azinphos-Ethyl.

Gusathion MS* Insecticide (azinphos-methyl + demeton-S-methyl) — Discontinued 1994 by Bayer AG.

Gustafson 42-S* — see Thiram.

Gustafson Apron* FL — see Metalaxyl.

Gustafson Botran* 30C — see DCNA.

Gustafson LSP* — see Thiabendazole.

Gustol*

(Discontinued 1985 by Zoecon Corp.)

Identification

EXP. CODE NUMBER: SAN 285.

Action/Use

ACTION: Adjuvant.

Guthion* — see Azinphos-Methyl.

Guthion Methyl-Parathion* Insecticide (azinphos-methyl) — Discontinued 1994 by Bayer AG.

Gy-81 — see Enzone*.

Gy-bon* — Discontinued 1994 by Ciba-Geigy Ltd.

Gypchek*

Action/Use

ACTION: Insecticide.

USE: Gypsy moth control.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Gyplure**Chemistry**

COMPOSITION: 12-Acetoxy-9-octadecen-1-ol.

Action/Use

ACTION: Gypsy moth attractant.

USE: Reported in 1962 to be useful in federal and state programs, but found inactive.

Gypsine* — see Lead Arsenate.

Gypsum — see Calcium Sulfate.

Gypsy Moth Caterpillar Control (*Bacillus thuringiensis* var. *kurstaki*) — Discontinued.

Gypsy Moth Spray — see Bag-A-Bug*.

Gypsy Moth Trap — see Bag-A-Bug*.

Gypsy Moth Virus*

(Discontinued 1986 by Reuter Laboratories, Inc.)

Identification

COMMON NAME: Nucleopolyhedrosis Virus. (NPV).

ChemistryCOMPOSITION: Nucleopolyhedrosis inclusion bodies of *Lymantria dispar* L.**Action/Use**

ACTION: Selective insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Nontoxic to humans, animals and useful insects.

Gyptol***Chemistry**

COMPOSITION: 10-acetoxy-7-hexadecen-1-ol.

Action/Use

ACTION: Gypsy moth attractant found to be inactive.

See Disparlure.

Gyron* Insecticide (DDT) — Discontinued by Ciba-Geigy Ltd.

H 133 — see Dichlobenil.

H 321 — see Methiocarb.

H 22234

Chemistry

COMPOSITION: N-Chloroacetyl-N-(2,6-diethylphenyl)glycine ethyl ester.

Action/Use

ACTION: Herbicide.

HA-185 — see Goal*.

HA 527 — see Neptune*.

HA-914 — see Unite*.

HA-935 Surfactant — Discontinued 1987 by Hopkins Agricultural Chemical Co.

HA-1200

(Discontinued 1987 by Hopkins Agricultural Chemical Co.)

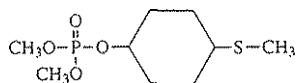
Identification

CODE NUMBER: CAS 3254-63-5.

DISCONTINUED NAME: Allied GC-6506.

Chemistry

COMPOSITION: Dimethyl 4-(methylthio)phenyl phosphate (IUPAC and CAS).



HA-1200

Action/Use

ACTION: Contact insecticide with residual, systemic properties.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 7 + 0.5 mg/kg. (Rabbit): Dermal LD₅₀ 48 + 2 mg/kg.**Emergency Guidelines**

ANTIDOTE: Atropine, 2-PAM.

Hache Uno Super* — see Fluazifop-butyl.

Hadacidin**Chemistry**

COMPOSITION: N-Hydroxy-N-formyl sodium glycinate.

Action/Use

ACTION: Growth regulator.

Haipen* — see Captafol.

Haitin* Fungicide (triphenyltin hydroxide) — Discontinued by Nihon Nohyaku Co., Ltd.

Half-Life

Time required for a pollutant to lose half its effect on the environment.

Halizan* — see Metaldehyde.

Hallmark* — see Sumi-alpha.

Halosulfuron-methyl — see NC-319; Permit*.

Haioxyfop-methyl — see Verdict*.

Halts* — see Bandane*.

Hammer* — see Lindane.

Hanane* — see Dimefox.

Hand Duster

In a hand duster a plunger expels a blast of dust-laden air. The dust chamber may be at the end of the plunger tube itself, or an enlargement at the end, or it may be located below the plunger tube.

Hand Sprayer

Hand sprayers are often called Flit guns, after the trade name Flit*, a popular brand of fly-spray in the pre-DDT decade (1930s). Liquid pesticide is aspirated by a rapid flow of air over the open end of a vertical tube, the other end of which is immersed in the liquid in a container attached to a piston cylinder. The air flow is produced by the hand operated piston with its outlet at a right angle to and in approximate contact with the upper end of the aspirator tube. Because the spray is intermittent, produced only when the piston is pushed forward in this simple sprayer type, a continuous-type hand sprayer has been developed in which air is also forced into a reservoir to maintain pressure while the piston is drawn back for each new stroke.

Hard Water — see Chelating Agents.

Harmony* Extra — see Express*; Pinnacle*.

Harmony* M Herbicide (metsulfuron-methyl + thifensulfuron-methyl) — Discontinued by Du Pont Agricultural Products.

Harness*

(Discontinued 1987 by Rhone-Poulenc)

Identification

COMPOSITION: Bromoxynil + MCPA + mecoprop.

Action/Use

ACTION: Herbicide.

Registration Notes

OUTSIDE U.S.: Formerly registered in Ireland.

Harness* — see Acetochlor.

Harness* Plus Herbicide (acetochlor) — Discontinued 1994 by Monsanto Co., The Agricultural Group.

Harness* Xtra — see Acetochlor; Atrazine.

Harvade*

BP: Uniroyal Chemical Co., Inc.

Identification

COMMON NAME: Dimethipin (ISO, ANSI, BSI).

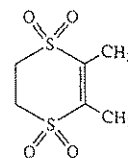
CODE NUMBERS: CAS 55290-64-7; SHA 118901.

Chemistry

COMPOSITION: (2,3-dihydro-5,6-dimethyl-1,4-dithiin 1,1,4,4-tetraoxide) (CAS).

FAMILY: Substituted dithiin.

PROPERTIES: White, crystalline solid, melting range 162-167°C, mild odor.



Dimethipin

Action/Use

ACTION: Defoliant, vine desiccant, maturation growth regulant.

USE: Defoliant for cotton. Enhances maturation process to reduce seed moisture at harvest of rice, rapeseed, flax, sunflower and corn.

FORMULATIONS: Flowable.

Environmental Guidelines

SOLUBILITY: Solubility in water 2500-3000 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION (Harvade* 5F).

TOXICITY CLASS: III (Harvade* 5F).

TOXICITY: (Rat): Oral LD₅₀ 1180 mg/kg. (Rabbit): Dermal LD₅₀ 800 mg/kg.

Harven* — see Dehydroacetic Acid.

Harvest* — see Glufosinate-ammonium.

Harvest Aid

A material used to remove the leaves from cotton plants, kill potato vines, and in any other way facilitate machine harvesting of a crop.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

See Defoliant; Desiccant.

Harvest Aid Liquid — see Sodium Chlorate.

Hasten — see Isopropyl Amine.

Hataclean*

(Discontinued 1993 by Nippon Kayaku Co., Ltd.)

Identification

COMMON NAME: Trichlamide (ISO draft, BSI).

EXP. CODE NUMBER: NK-483

OTHER CODE NUMBER: CAS 70193-21-4.

Chemistry

COMPOSITION: (RS)-N-(1-butoxy-2,2,2-trichloroethyl)salicylamide.

Action/Use

ACTION: Non-systemic fungicide.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 1.7 ppm (48 h) (carp). Bee: Nontoxic. Bird: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III

TOXICITY: (Rat/Mouse) Oral LD₅₀ >5000 mg/kg. Dermal >5000 mg/kg.

Havoc* — see Brodifacoum.

Hay Savor*

(Discontinued 1989 by Kemin Industries)

Chemistry

COMPOSITION: Propionic, phosphoric, and other organic acids + antioxidants + flavors.

Action/Use

ACTION: Preservative.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Hazard

The relative likelihood of ill effects or other danger.

Some highly poisonous material may present less hazard in its use than a less toxic one, depending on the conditions of use.

Hazardous Materials

Official list of hazardous materials in "Code of Federal Regulations 49 Transportation," parts 100 to 199 (revised January 1, 1972), pages 15-41 (Section 172.5). Gives classifications, exemptions, packing, required labels, and maximum quantity that can be shipped in one outside container by rail express (when this differs from rail freight).

Hazodrin* Insecticide/Acaricide (monocrotophos) — Discontinued by Hui Kwang Chemical Co., Ltd.

HBN Herbicides

Cereal weedkillers of the hydroxy-benzo-nitrile type. Examples are bromoxynil and ioxynil. Also formulated mixtures with other chemicals.

HC-1281* — see Trichlorobenzoic Acid.

HCA* — see Hexachloroacetone.

HCB — see Hexachlorobenzene.

HCCH — see BHC.

HCH — see BHC.

HCN — see Hydrocyanic Acid.

Head — see Growth Stages For Cereal Crops.

Heading — see Growth Stages For Cereal Crops.

Heburon 500 BR* — see Diuron.

Hectare

In the metric system, a land measure equal to 100 ares, or 10,000 square meters, or 2.471 acres.

Hectorite

Identification

DISCONTINUED NAME: Geopons*.

Chemistry

PROPERTIES: A clay of the Montmorillonite type derived from the alteration of volcanic ash. Derived primarily from mines in California.

Action/Use

ACTION: Thickening and suspending agent, binder.

USE: Small quantities of hectorite or modified hectorites are used in many organic or aqueous systems to give suspension and/or thickening. Used as a binder in pelletized pesticides to control release.

Hedonal* Herbicide (2,4-D + dichlorprop) — Discontinued 1989 by Bayer AG.

Hedonal* M Herbicide (MCPA) — Discontinued 1989 by Bayer AG.

Hedonal* MCPP Herbicide (mecoprop) — Discontinued 1989 by Bayer AG.

Hel-Fire* (dinoseb) — Discontinued 1989 by Helena Chemical Co.

Heliothis Nuclear Polyhedrosis Virus — see Elcar*.

Heliothox* (toxaphene + DDT) — Discontinued by BFC Chemicals Inc.

Heliotropin Acetate — see Tropital*.

Helix* — see Atabron*.

Hellebore

Identification

COMMON NAME: Hellebore.

CODE NUMBERS: CAS 1399-70-8; SHA 002001.

OTHER NAMES: Botanical: *Veratrum album* (white hellebore) from Europe and northern Asia, and *V. viride* (American or green hellebore).

Chemistry

PROPERTIES: Active principals are a group of several poisonous alkaloids.

Action/Use

ACTION: Insecticide.

USE: Formerly in common garden use, especially against such pests as currant worms after the currants had formed.

FORMULATIONS: Hellebore roots were dried, pulverized, and used as a dust.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Loses potency quickly upon exposure to air and sunlight.

Helminthicide

Usually referred to as an anthelmintic.

See Anthelmintic.

Helothion* — see Bolstar*.

Hemel

Identification

TRIVIAL NAME: HMM.

CODE NUMBERS: CAS 645-05-6; ENT-50852.

TRADE NAME: Hexastat*.

Chemistry

COMPOSITION: Hexamethylmelamine (IUPAC).

Action/Use

ACTION: Insect chemosterilant.

Registration Notes

U.S.: Experimental.

Hempa

Identification

TRIVIAL NAMES: HMPT; hexametapol.

CODE NUMBERS: CAS 680-31-9; EN-50882.

Chemistry

COMPOSITION: Hexamethylphosphoric triamide (IUPAC).

Action/Use

ACTION: Insect chemosterilant.

Registration Notes

U.S.: Experimental.

HEOD — see Dieldrin.

Heptachlor

BP: Velsicol Chemical Corp. (Biabrinex*, Cupincida*, Fennotox*)

Identification

COMMON NAMES: Heptachlor (ISO, BSI, ESA, JMAF), heptachlore (ISO-F).

CODE NUMBERS: CAS 76-44-8; SHA 04480; OMS 193 (WHO); ENT-15152; EINECS 2009623.

ADDITIONAL TRADE NAMES: Drinox* H-34, Heptamul*, Heptox* (All India Medical Corp.); Vegfru Heptox* (Pesticides India).

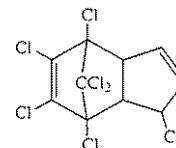
DISCONTINUED NAMES: GoldCrest* H-60.

Chemistry

COMPOSITION: 1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene (IUPAC).

FAMILY: Chlorinated cyclodiene.

PROPERTIES: Chlorinated hydrocarbon (cyclodiene), melting point 95-96°C; vapor pressure 3×10^{-4} mm of Hg at 25°C. Readily soluble in most organic solvents.



Heptachlor

Action/Use

ACTION: Insecticide.

USE: Termite control, seed/seed furrow treatment, wood treatment.

FORMULATIONS: Emulsifiable concentrate, oil solution. Dry formulations were discontinued by Velsicol in mid-1970's.

COMBINATIONS: Termide* (+ chlordane).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Heptachlor Epoxide

PESTICIDE DICTIONARY

Registration Notes

U.S.: Termide® sales halted per Velsicol and EPA agreement pending tests following specific application procedures. Heptachlor 5% granule registered for control of fire ants in cable closures.

OUTSIDE U.S.: Formulations available internationally for termite control, wood treatment, and for several agricultural crops (seed/seed furrow treatment).

Environmental Guidelines

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 147-220 mg/kg. Dermal LD₅₀ 119-320 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: For liquid formulations (not for granule or tech.): If swallowed, do NOT induce emesis. Gastric lavage is indicated. Seek medical attention.

Heptachlor Epoxide

The oxidation product of heptachlor which occurs in soil and in or on crops when treatments with heptachlor have been made.

Heptachlore — see Heptachlor.

Heptamul* — see Heptachlor.

Heptenophos — see Hostaquick*.

Heptox* — see Heptachlor.

Herald* — see Chlorpropham; Fenprophathrin; Fenuron; Propham; Pyramin*.

Herbaceous Plant

A plant with no persistent woody stem above ground.

Herb-Ad* — see Activator; Spreader.

Herbadox* — see Prowl*.

Herbalin* — see Pendimethalin; Propanil.

Herbalin SC* — see 2,4-D; Propanil.

Herb-All*

BP: Luxembourg Industries (Pamol) Ltd.

Chemistry

COMPOSITION: Monosodium methanearsonate + sodium cacodylate + cacodylic acid.

Action/Use

ACTION: Nonselective herbicide.

USE: Postemergence for noncrop areas.

FORMULATIONS: Ready-to-use liquid with herbicidal a.i. and surfactants. No additional wetting agents needed.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀: 800-1800 mg/kg. Skin irritation is essentially non-existent.

HANDLING AND STORAGE CAUTIONS: See label. Mildly corrosive, stable in storage.

Emergency Guidelines

FLASHPOINT: Nonflammable.

Herbalt* Herbicide (neburon) — Discontinued by Rhone-Poulenc.

Herban*

(Discontinued 1994 by Bristol, Ltd.)

Identification

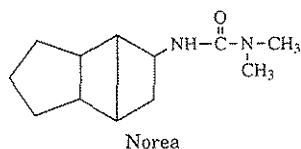
COMMON NAMES: Norea (ANSI, WSSA); noruron (ISO, BSI).

EXP. CODE NUMBER: Hercules 7531.

OTHER CODE NUMBERS: CAS 18530-56-8; SHA 035801.

Chemistry

COMPOSITION: 3-(Hexahydro-4,7-methanoindan-5-yl)-1,1-dimethylurea (IUPAC).



Action/Use

ACTION: Selective preemergence herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2000 mg/kg.

Herban* LPU — see Quizalofop-P-ethyl.

Herbanil 368* — see 2,4-D; Propanil.

Herbatox* Herbicide (dichlorprop + isoproturon) — Discontinued 1989 by BASF AG.

Herbax* — see Propanil.

Herbaxon* Herbicide (diquat dibromide + paraquat) — Discontinued 1993 by AQ Group.

Herbazolin* (benazolin) — Discontinued.

Herbex* Adjuvant — Discontinued 1987 by Hopkins Agricultural Chemical Co.

Herbex*

BP: Goldschmidt Chemical Corporation (Herbex*)

Chemistry

COMPOSITION: Polyether-polymethyl-siloxane copolymer.

FAMILY: Silicones and humic acids.

PROPERTIES: Honey colored, low viscosity, specific gravity 1.02.

Action/Use

ACTION: Non-ionic wetter/spreader/penetrant spray adjuvant.

USE: Improves rapid absorption and spreading of pesticides into plant leaves and stems.

Herbicide

A material used primarily for the control of weeds.

Herbicides are used in five general ways:

1. Preplanting: Applied after the soil has been prepared but before seeding.
2. Preemergence (Contact): Non-residual dosages are used after seeding but before emergence of the crop seedlings.
3. Preemergence (Residual): Applied at time of seeding or just prior to crop emergence; kills weed seeds and germinating seedlings.
4. Postemergence: Application after emergence of a crop.
5. Sterilant (Nonselective): Used to effect a complete kill of all treated plant life.

A classification of herbicides is as follows:

1. Inorganic, as ammonium sulfamate, copper sulfate, sodium arsenite.
2. Petroleum oils.
3. Organic arsenicals, as MSMA, DSMA, cacodylic acid.
4. Phenoxy-aliphatic acids, as 2,4-D, 2,4,5-T, 2,4-DB, MCPA, silvex.
5. Substituted amines, as CDAA, diphenamid, propanil, naptalam, alachlor, cyproimid.
6. Nitroanilines, as benefin, trifluralin.
7. Substituted ureas, as diuron, monuron, linuron, norea, chloroxuron, buturon.
8. Carbamates, as propham, chlorpropham, barban, terbutol.
- 8a. Thiocarbamates, as pebulate, diallate, EPTC, CDEC.
9. Heterocyclic nitrogen, as amitrole, pyrazon, picloram.
- 9a. Triazines, as atrazine, simazine, propazine, prometone, cyanazine.
- 9b. Uracils, as bromacil, terbacil.
10. Aliphatic acids, as dalapon, TCA.
11. Arylaliphatic acids, dicamba, fenac, 2,3,6-TBA, DCPA, chloramben.
12. Phenol derivatives, as DNOC, dinoseb.
13. Substituted nitriles, as dichlobenil, bromoxynil.
14. Bipyridyls, as diquat dibromide, paraquat.
15. Miscellaneous, as endothall, bensulide, acrolein.

Herbicide 273* — see Endothall.

Herbicide 283* — see Endothall.

Herbicide Express*

BP: PureGro Co.

Chemistry

COMPOSITION: Petroleum distillate + alkylphenoxy polyethoxy ethanols.

Action/Use

ACTION: Sticker, activator, penetrant.

USE: Blend of nonionic surfactant and petroleum oil for fast wetting without premature desiccation.

FORMULATION: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Herbi-D 480* — see 2,4-D.

Herbidal* — see 2,4-D.

Herbifen* — see 2,4-D.

Herbiflan* — see Trifluralin.

Herbiflurin* — see Trifluralin.

Herbikill* — see Paraquat.

Herbimax* Adjuvant — Discontinued by Rhone-Poulenc.

Herbinal 368* — see 2,4-D; Propanil.

Herbipak* — see Ametryn.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Herbipropanin* — see Propanil.

Herbisan* #5

(Discontinued 1994 by Atomergic Chemetals Corp.)

Identification

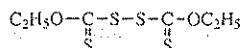
COMMON NAME: EXD (WSSA).

CODE NUMBERS: CAS 502-55-6; SHA 086501.

ADDITIONAL TRADE NAMES: Sulfasan* (Monsanto Co., The Agricultural Group); DEX.

Chemistry

COMPOSITION: Diethyl dithiois (thioformate); or bis(ethylxanthic) disulfide.



EXD

Action/Use

ACTION: Preemergence herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 603 mg/kg.

Herbispray HP-12*

BP: Western Nutrients Corp.

Chemistry

PROPERTIES: Indefinite shelf life.

Action/Use

ACTION: Spray adjuvant for herbicides.

USE: Activant to increase effectiveness of herbicides. Allows less herbicides to be used with increased results.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Temperature variations will not harm product.

See Adjuvant.

Herbit* — see Phenothiol.

Herbitox* Herbicide/Solvent (mineral spirits) — Discontinued by BASF.

Herbixol* Herbicide (amitrol + diuron) — Discontinued 1993 by Rhone-Poulenc.

Herbizole* (amitrole) — Discontinued 1989 by Fair Products, Inc.

Herb-neat* — see Glyphosate.

Herbogil* — see Dinoterb Salts.

Herbolex* — see Glyphosate.

Herboxone* — see Paraquat.

Herbrak* Herbicide (metamitron) — Discontinued by Bayer AG.

Herburon* — see Diuron.

Hercon* Chek/Mate — Discontinued by Hercon Environmental Co.

Hercon* Disrupt*

BP: Hercon Environmental Co.

Identification

CODE NUMBERS: CAS 53939-28-9; SHA 12001.

DISCONTINUED NAME: Hercon* Chek/Mate (Hercon Environmental Co.).

Chemistry

PROPERTIES: Synthetic insect sex pheromone.

Action/Use

ACTION: Controlled-release product used in IPM programs for suppression and control of the target insect by confusion and disruption of mating.

USE: Hercon* Disrupt*/Lure N Kill* PBW, Disrupt* PBW, Disrupt* Plus/PBW for pink bollworm moth. Hercon* Disrupt* II Gypsy Moth Mating Disruptant for gypsy moth *Lymantria dispar*.

FORMULATIONS: Consists of small pieces of laminated multi-layered polymeric dispensers ("flakes" or "confetti") that may be aerially applied over forested or residential areas. The a.i. is in the inner reservoir layer of each dispenser.

COMBINATIONS: Disrupt*/Lure N Kill* PBW (gossypure + permethrin in reservoir layer).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Hercon* Disrupt*/Lure N Kill* PBW (Rat): Oral LD₅₀ >5.0 gm/kg. (Rabbit): Dermal LD₅₀ >2.0 gm/kg. Nontoxic.

HANDLING AND STORAGE CAUTIONS: Store in sealed containers in a cool, dry place. Hercon* Disrupt*/Lure N Kill* PBW: Do not apply directly over water, or near water when drift could occur. Avoid contact with eyes, skin, and clothing. Harmful if chewed or swallowed. Wash hands with soap and water after handling.

Emergency Guidelines

FLASHPOINT: N/A.

FIRE EXTINGUISHING MEDIA: CO₂ foam.

FIRST AID: **Eyes**, wash with water for at least 15 minutes. **Skin**, remove contaminated clothing and wash with soap and water. **Ingestion**, induce vomiting. Get medical aid. **Inhalation**, remove to fresh air. Provide oxygen if breathing is labored.

EMERGENCY TELEPHONE: 717-764-1191 (Hercon Environmental Co.).

Hercon* Floratape — Discontinued 1989 by Hercon Environmental Co.

Hercon* Insectape With Propoxur

BP: Hercon Environmental Co.

Chemistry

PROPERTIES: 10% active, 90% inert ingredients.

Insecticide is present on the active surface and in the inner reservoir of laminated, multi-layered polymeric strips.

Action/Use

ACTION: Propoxur insecticide in controlled release strip formulation. Not a fumigant-type insecticidal strip. Action is by contact. Insects walking across Insectape* pick up the insecticide from the active surface. Inner reservoir automatically replenishes the insecticide to maintain surface potency.

USE: For use in and around the home, schools, theaters, warehouses, motels, hotels, and commercial, industrial, institutional establishments, and nonfood areas of restaurants and food handling establishments. For bees, cockroaches, gypsy moths, spiders, hornets, wasps, waterbugs and yellow jackets.

FORMULATIONS: Multi-layered laminated strip with pressure-sensitive adhesive on one side, designed to control insects in places where they crawl, hide or congregate.

COMBINATIONS: Insectape* may be used alone or in conjunction with approved insecticidal sprays, dusts, or powders.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Finely ground Insectape* with 10% a.i. (by weight) (Rat): Oral LD₅₀ >5000 mg/kg.

Insectape* with propoxur: Oral 790 mg/kg.

HANDLING AND STORAGE CAUTIONS: Do not open protective pouch until ready to use. Harmful if chewed or swallowed. Avoid contact with eyes and clothing. Do not contaminate food, food containers, or cooking utensils. Wash hands with soap and water after handling.

Emergency Guidelines

FLASHPOINT: N/A.

FIRE EXTINGUISHING MEDIA: CO₂ foam.

ANTIDOTE: Atropine sulfate.

FIRST AID: Get medical attention. **Eyes**, wash with water for at least 15 minutes. **Skin**, wash with soap and water. If irritation develops, get medical aid. **Ingestion**, give water freely and induce vomiting by sticking finger down throat. Repeat until vomit is clear.

EMERGENCY TELEPHONE: 717-764-1191 (Hercon Environmental Co.).

Hercon* Lure N Kill Insect Traps

BP: Hercon Environmental Co.

Chemistry

COMPOSITION: Pheromone-baited trap kits for various insects.

Action/Use

ACTION: Selective adult insect traps.

FORMULATIONS: Plastic tri-colored bucket trap with one insect lure and one toxicant strip, two Delta Scout traps with two insect lures, interlocking yellow plastic vanes, escape-proof disposable bag with two attractants.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Store in sealed containers in a cool, dry place until ready to use. Do not contaminate water, food, or feed by storage or disposal. Avoid contact with skin and eyes. Wash hands with soap and water after handling. Do not open pouches until ready to use.

Hercon* Luretape*

BP: Hercon Environmental Co.

Identification

CODE NUMBERS: CAS 59014-03-8; SHA 118001.

Chemistry

PROPERTIES: Synthetic insect pheromone.

Action/Use

ACTION: Target insect attractant. For monitoring target insect population and distribution, mass trapping, "trap-crop", mating disruption, and population suppression.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

USE: Hercon* Luretape products for: Artichoke plume moth, bagworm, black cutworm, boll weevil, cabbage looper, codling moth, corn earworm, elm bark beetle, fall armyworm, gypsy moth, Japanese beetle, lesser peachtree borer, Mediterranean fruit fly, melon fly, Nantucket pine tip moth, omnivorous leafroller, orange tortrix, oriental fruit moth, peachtree borer, peach twig borer, Periplaneta cockroaches, pink bollworm, soybean looper, spruce budworm, tobacco budworm and western grapeleaf skeletonizer, western pinestem borer.

FORMULATIONS: Multi-layered controlled release dispensers.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Hercon* Lure N Kill Japanese Beetle Trap, nontoxic.

HANDLING AND STORAGE CAUTIONS: Do not open protective container until ready to use. Wash hands with soap and water after handling. Store under refrigeration.

Emergency Guidelines

FLASHPOINT: N/A.

FIRE EXTINGUISHING MEDIA: CO₂, dry chemical, foam. Use air-supplied breathing apparatus.

FIRST AID: Eyes, wash with water for at least 15 minutes. Skin, remove contaminated clothing and wash with soap and water. Ingestion, drink plenty of water and get medical aid. Inhalation, remove to fresh air. Give oxygen if breathing is labored.

EMERGENCY TELEPHONE: 717-764-1191 (Hercon Environmental Co.).

Hercon* Luretape* with Grandlure

BP: Hercon Environmental Co.

Chemistry

PROPERTIES: Synthetic insect pheromone on the surface and in inner reservoir of laminated, multi-layered polymeric dispensers.

Action/Use

ACTION: Selective insect trap/lure.

USE: For adult boll weevils. Dispensers attract male and female adults. The trap detects boll weevil presence, pinpoints building infestations, measures overwintering populations, and determines the need and timing of sprays.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place until ready to use. Do not open Luretape pouch until ready to use. Wash hands with soap and water after handling.

Emergency Guidelines

FLASHPOINT: N/A.

FIRE EXTINGUISHING MEDIA: CO₂, dry chemical, foam. Use air-supplied breathing apparatus.

FIRST AID: Eyes, wash with water for 15 minutes. Skin, remove contaminated clothing and wash with soap and water. Ingestion, drink plenty of water. Get medical aid. Inhalation, remove to fresh air. Give oxygen if breathing is labored.

EMERGENCY TELEPHONE: 717-764-1191 (Hercon Environmental Co.).

Hercon* Toxstrip BW

BP: Hercon Environmental Co.

Chemistry

COMPOSITION: Propoxur and inert ingredients. Insecticide is present on the active surface and in the inner reservoir of the laminated polymeric strips.

Action/Use

USE: For use in boll weevil traps. Insects coming in contact with active surface pick up insecticide. Inner reservoir automatically replenishes insecticide to maintain surface potency.

FORMULATIONS: Multi-layered controlled release laminated strip.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Finely ground Insectape* with 10% a.i.: (Rat): Oral LD₅₀ 5000 mg/kg.

Insectape* with propoxur: Oral LD₅₀ 790 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in sealed pouch in cool, dry place until used. Keep out of reach of children. Avoid contact with eyes and clothing. Harmful if chewed or swallowed. Do not contaminate food or food stuffs.

Emergency Guidelines

FLASHPOINT: N/A.

FIRE EXTINGUISHING MEDIA: CO₂, foam. Use self-contained breathing apparatus.

FIRST AID: Eyes, flush with water for 15 minutes. Get medical attention. Skin, wash with soap and water. If irritation develops, get medical attention. Ingestion, give water and induce vomiting by sticking finger down throat. Repeat until vomit is clear. Get immediate medical attention. Inhalation, remove to fresh air. If not breathing, give artificial respiration.

EMERGENCY TELEPHONE: 717-764-1191 (Hercon Environmental Co.).

Hercon* Vaportape II

BP: Hercon Environmental Co.

Identification

COMMON NAMES: DDVP (JMAF); dichlorovos (ISO, BSI, BAN, ESA).

CODE NUMBERS: CAS 62-73-7; OMS 14 (WHO); ENT-20738.

Chemistry

COMPOSITION: A.I.: 2,2-dichlorovinyl dimethyl phosphate (IUPAC).

PROPERTIES: 10% DDVP, .75% related compounds, 89.25% inert ingredients. Insecticide present on the surface and in the inner reservoir of multi-layered, laminated polymeric strips.

Action/Use

ACTION: Residual insecticide in controlled release strip formulation; a fumigant-type insecticidal strip used in traps.

Trapped insects pick up the insecticide from the surrounding atmosphere. Inner reservoir automatically replenishes the insecticide to maintain ambient potency.

USE: For insect monitoring and mass trapping programs for control of gypsy moth, spruce budworm, forest tent caterpillar, Mediterranean fruitfly, Oriental fruitfly, codling moth, southwestern cornborer, boll weevil and sweet potato weevil. Used in conjunction with insect attractants to kill trapped insects. Increases trap and monitoring efficiency by reducing the number of escapees before and during counts; especially effective in "live" (non-sticky) traps. Replace strips after 12 weeks or when effectiveness diminishes.

FORMULATIONS: A multi-layered laminated strip.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bird: Toxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Do not open pouch until ready to use. Keep out of reach of children. Avoid contact with eyes, skin, and clothing. Always wash hands with soap and water after handling.

Emergency Guidelines

FLASHPOINT: N/A.

FIRE EXTINGUISHING MEDIA: CO₂, powder, foam. Use self-contained breathing apparatus.

ANTIDOTE: Atropine sulfate and 2-PAM.

FIRST AID: Eyes, wash with water for at least 15 minutes. Skin, remove contaminated clothing and wash with soap and water. Ingestion, induce vomiting. Get medical attention. Inhalation, remove from exposure. Give oxygen if breathing labored.

EMERGENCY TELEPHONE: 717-764-1191 (Hercon Environmental Co.).

Hercon* Virelure Flakes — see Hercon* Disrupt.

Hercules 7531 — see Herban*.

Hercules 9573 — Discontinued by Hercules Inc.

Hercules 14503 — see Torak*.

Hercules AC 528 — see Dioxathion.

Hercules AC 5727 — see UC 10854.

Herkol* — see DDVP.

HETP

Chemistry

COMPOSITION: Ethyl polyphosphates containing 12 to 20% tetra-ethyl pyrophosphate. Also known as hexa-ethyl tetraphosphate.

Action/Use

ACTION: Insecticide.

USE: TEPP is the insecticidal component of HETP, and is the material now in production.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: HETP acts as a contact poison and hydrolyzes rapidly in aqueous solution. Therefore, sprays should be applied immediately after mixing. Absorbed rapidly through the skin of warm-blooded animals and inhalation of the vapors also may be dangerous. Possesses no phytotoxicity at normal concentrations.

See TEPP.

Hexabianc* Insecticide (BHC) — Discontinued by Rhone-Poulenc.

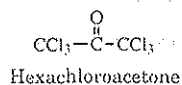
Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Hexachloroacetone**Identification**

COMMON NAMES: Hexachloroacetone (ISO); HCA (WSSA).
CODE NUMBERS: CAS 116-16-5; SHA 04370L.

Chemistry

COMPOSITION: 1,1,1,3,3,3-Hexachloro-2-propanone (CAS 8 and 9CI).

**Action/Use**

ACTION: Nonselective herbicide.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3550 mg/kg.

Hexachlorobenzene**Identification**

COMMON NAME: Hexachlorobenzene (ISO, BSI).

TRIVIAL NAME: HCB.

CODE NUMBERS: CAS 118-74-1; SHA 06100L.

TRADE NAME: No Bunt*.

DISCONTINUED NAMES: Anticarie*, Ceku C.B.* (Cequisa); Granero* (Atanor S.A.); Res-Q* (+ maneb + captan) (PBI/Gordon).

Chemistry

COMPOSITION: Hexachlorobenzene (IUPAC and CAS).

Action/Use

ACTION: Seed protectant.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 40,000 mg/kg. May cause slight irritation to skin.

Emergency Guidelines

FIRST AID: Get immediate medical aid. **Ingestion**, induce vomiting with warm salt water or syrup of Ipecac.

NOTE: Some physicians may discourage use of saline emesis.

Hexachlorophene**Identification**

COMMON NAMES: Hexachlorophene (INN, USP, USAN); hexachlorophane (BAN).

EXP. CODE NUMBER: G-11.

CODE NUMBERS: CAS 70-30-4; SHA 04490L.

ADDITIONAL TRADE NAME: Seribak*.

DISCONTINUED NAMES: Isobac*, Hexalint*, Hexaphene* L.V., Hexide*, Nabac* (Webb Wright Corp.).

Chemistry

COMPOSITION: 2,2'-Methylenebis(3,4,6-trichlorophenol) (IUPAC).

Action/Use

ACTION: Broad spectrum contact soil, foliar fungicide.

Environmental Guidelines

HAZARDS: Bird: 575 mg/kg (bobwhite quail); 1450 mg/kg (mallard, female).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 560 mg/kg.

HANDLING AND STORAGE CAUTIONS: May be fatal if swallowed. Do not get in eyes or on skin. Do not breathe spray mist.

Emergency Guidelines

FIRST AID: Get immediate medical aid. **Eyes**, flush with water. **Skin**, wash with soap and water. **Ingestion**, induce vomiting with warm salt water or syrup of Ipecac. NOTE: Some physicians may discourage use of saline emesis.

Hexaconazole — see Anvil*; Sulfur.

Hexadienyl isobutyrate

BP: Agri-Pharm International Inc.

Identification

CODE NUMBER: CAS 16491-24-0.

Chemistry

COMPOSITION: 2,4-Hexadienyl iso-butyrate (IUPAC).

Action/Use

ACTION: Insect attractant.

USE: For yellow jackets.

Hexadrin — see Endrin.

Hexaethyl Tetraphosphate — see HETP.

Hexaferb* — see Ferbam.

Hexaflurate**Identification**

CODE NUMBERS: CAS 17029-22-0; SHA 599700.

Chemistry

COMPOSITION: Potassium hexafluoroarsenate.

FORMULA: KAsF₆.

Action/Use

ACTION: Herbicide.

Hexafor* Insecticide (BHC) — Discontinued by Rhone-Poulenc.

Hexalint* Fungicide (hexachlorophene) — Discontinued by Webb Wright Corp.

Hexalure*

BP: Agri-Pharm International Inc.

Chemistry

COMPOSITION: (cis-7-Hexadecen-1-ol acetate).

Action/Use

ACTION: Synthetic sex attractant.

USE: For pink bollworm moths.

See Propylure.

Hexametapol — see Hempa.

Hexamul* Insecticide (BHC) — Discontinued by Rhone-Poulenc.

Hexaphene* L.V. Fungicide (hexachlorophene) — Discontinued by Webb Wright Corp.

Hexapoudre* Insecticide (BHC) — Discontinued by Rhone-Poulenc.

Hexasan* — see Ethylmercury chloride.

Hexastat* — see Hemel.

Hexasulfan* — see Endosulfan.

Hexathane* — see Zineb.

Hexavin* — see Carbaryl.

Hexazinone

BP: Du Pont Agricultural Products (Velpar*)

Identification

COMMON NAME: Hexazinone (ISO, ANSI, BSI, WSSA).

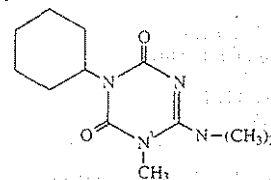
EXP. CODE NUMBER: DPX 3674.

OTHER CODE NUMBERS: CAS 51235-04-2; SHA 107201.

Chemistry

COMPOSITION: 3-Cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4(1H,3H)-dione (CAS).

PROPERTIES: White, crystalline solid, melting point 115-117°C. Soluble in chloroform (388 g/100g); methanol (265 g/100g); benzene (94 g/100g); dimethylformamide (83.6 g/100g); acetone (79.2 g/100g); toluene (38.6 g/100g); sparingly soluble in hexane (0.3 g/100g).



Hexazinone

Action/Use

ACTION: Contact and residual herbicide.

USE: Apply when plants are actively growing for control of many annual, biennial and perennial weeds and woody plants on noncropland areas. Gives contact and residual control. Rainfall is needed for soil activation. Controls woody plants in reforestation areas (site preparation or conifer release); selective weed control in conifers, sugarcane, pineapple, rubber trees, alfalfa.

FORMULATIONS: Granule, water-soluble powder, water soluble liquid, and undiluted liquid applied with exact delivery handgun.

COMBINATIONS: Velpar* K (+ diuron) in some foreign countries.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 320-420 mg/l (96 h) (rainbow trout); 274 mg/l (minnow); 370-420 mg/l (sunfish). Bee: Nontoxic.

SOLUBILITY: Sparingly soluble in water (3.3 f/g/100g).

Safety Guidelines

SIGNAL WORD: DANGER (eye).

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 1690 mg/kg. Dermal LD₅₀ 5278 mg/kg. Corrosive, causes irreversible eye damage. Classified as an eye irritant (FHSR Reg. 191.12 test method).

PROTECTIVE CLOTHING: Wear goggles or face shield and rubber gloves when handling.

HANDLING AND STORAGE CAUTIONS: Velpar L*: Keep away from heat, sparks, and open flame. Store above 32°C in a dry place. Keep container closed. Remove and wash contaminated clothing before re-use. Do not apply directly to water or wetlands. Do not apply where runoff is likely to occur. Do not contaminate water by cleaning of equipment or disposal of wastes.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Emergency GuidelinesFLASHPOINT: Velpar[®] L flammable.FIRST AID: Get medical aid. **Eyes, Skin**, flush with plenty of water. May irritate eyes, nose, throat, and skin. **Inhalation**, avoid breathing dust or spray mist. **Ingestion**, harmful if swallowed.Hexazir[®] — see Ziram.**Hexide[®] Fungicide (hexachlorophene)** — Discontinued by Webb Wright Corp.Hexyclan[®] — see BHC.Hexylthiocarbam — see Cycloate[®].**Hexythiazox**BP: Nippon Soda Co., Ltd. (Nissorun[®])**Identification**

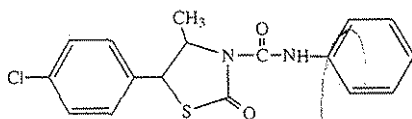
COMMON NAME: Hexythiazox (ISO, ANSI, BSI, WSSA).

EXP. CODE NUMBER: NA-73 (Nippon Soda Co., Ltd.).

OTHER CODE NUMBERS: CAS 78587-05-0; SHA 128849.

ADDITIONAL TRADE NAMES: Savey[®] (Gowan—exclusive U.S. distributor); Acariflor[®] (S.I.P.C.A.M., Italy); Cesar[®] (Procida, France); Zeldox[®] (ZENECA).**Chemistry**

COMPOSITION: (4-RS,5RS)-5-(4-chlorophenyl)-N-cyclohexyl-4-methyl-2-oxothiazolidine-3-carboxamide (IUPAC).

PROPERTIES: White or whitish crystalline powder, slight urethane-like sweet odor. Melting point 108-108.5°C (Nissorun[®]). Solubility: Methanol (Nissorun[®] 20.6 g/l); n-Hexane (Nissorun[®] 3.9 g/l); Acetonitrile (Nissorun[®] 29 g/l); Acetone (Nissorun[®] 160 g/l); Chloroform (Nissorun[®] 1379 g/l). 9 g/100 ml).

Hexythiazox

Action/Use

ACTION: Mite ovicide, larvicide.

USE: Acaricide for eggs and larvae stage of *Panonychus* spp; *Tetranychus* spp. and *Eotetranychus carpini* on top fruit and other crops.

FORMULATIONS: Flowable, wettable powder.

COMBINATIONS: Omite[®] Nissourin (+ propargite) (Uniroyal-Chemical Co., Inc.).**Environmental Guidelines**

SOLUBILITY: Negligible in water (<0.1%).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral and Dermal LD₅₀ >5000 mg/kg. Inhalation LC₅₀ >2.0 mg/l (4 hr.).

HANDLING AND STORAGE CAUTIONS: May irritate eyes, nose, throat and skin. Harmful if inhaled. Avoid breathing dust. Avoid contact with skin, eyes or clothing. Remove and wash contaminated clothes with soap and water before reuse. See label for statement of practical treatment. Store in well ventilated area. Keep container tightly closed. Do not store with other pesticides, fertilizers, food or feed. Do not store or consume food, drink or tobacco in area where they may become contaminated with this product.

HHDN**Identification**

COMMON NAMES: HHDN (ISO for material containing at least 95% aldrin, recognized by ISO-E, BSI, ESA, JMAF); aldrin (ISO, BSI, JMAF); aldrine (ISO-F).

CODE NUMBERS: CAS 309-00-2; SHA 045101; OMS 194 (WHO); ENT-15949.

Chemistry

COMPOSITION: (1R,4S,4aS,5S,8R,8aR)-1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,5-dimethanonaphthalene (IUPAC).

Action/Use

ACTION: Insecticide.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

See Aldrin.

Hi Moly Captan[®] — see Captan.Hi Moly Captan D[®] — see Captan.**Hibor[®] C**

(Discontinued by Occidental Chemical Corp.)

Chemistry

COMPOSITION: Sodium metaborate + sodium chlorate + bromacil.

Action/Use

ACTION: Nonselective herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2700 mg/kg. (Rabbit): Dermal LD₅₀ >10,000 mg/kg of body weight.Hico CCC[®] — see Chlormequat Chloride.**Hico DCPAS[®]**

(Discontinued 1989 by Hico Products Ltd.)

Identification

COMMON NAME: Dichloropropionate.

Chemistry

COMPOSITION: 2,2 Dichloropropionic acid sodium salt.

Action/Use

ACTION: Selected herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: LD₅₀ 6600 mg/kg. May cause skin, eye irritation.**Emergency Guidelines**

ANTIDOTE: Atropine.

Hicombi[®] — see Bayleton[®]; Eradex[®]; Morestan[®].Hi-Dep[®] — see 2,4-D.Hidrocob[®] — see Copper Hydroxide.Hidroflow[®] — see Copper Hydroxide.Higalfon[®] — see Trichlorfon.**High Concentrate Dust**

A dust formulation with a content of active ingredient high enough (50%) to adapt it for low volume dusting.

Highuron[®] Herbicide (chlorotoluron) — Discontinued.**High-volatile Ester**

An ester of 2,4-D for example, in which the alcohol component is such as isopropyl, butyl, or amyl alcohol in contrast to the isooctylester, a low-volatile ester.

Hilbeeck[®] — see BHC.Hilcron[®] — see Monocrotophos.Hilcyperin[®] 25 EC — see Cypermethrin.Hildan[®] — see Endosulfan.Hildit[®] — see DDT.Hilfol[®] — see Dicofof.Hilmala[®] — see Malathion.Hiltaktor[®] — see Butachlor.Hilthion[®] — see Malathion.**Hinder[®]**F: Shield-Brite, Div. Pace International LP (Hinder[®])**Identification**DISCONTINUED NAMES: Spreader-Sticker 268, Repel[®] (California).**Chemistry**

COMPOSITION: Ammonium soaps of higher fatty acids.

FAMILY: Fatty acid salt.

PROPERTIES: Viscous brownish aqueous solution, ammonia odor. Solubility in water, 4 mg/l at 20°C.

Action/Use

ACTION: Repellent, spreader-sticker.

USE: Repels deer, rabbit by odor from fruit trees, vegetables, field crops, ornamentals, nursery stock, forage crops, grain crops, and non-crop areas. Spreader-sticker for use with insecticides, acaricides, minor element sprays, etc.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

Hinochloa[®]BP: Bayer AG (Hinochloa[®], Rancho[®])**Identification**

COMMON NAME: Mefenacet (ISO-E, (m) ISO-F, BSI).

EXP. CODE NUMBERS: BAY FOE 1976 (Bayer AG).

OTHER CODE NUMBERS: CAS 73250-68-7 (mefenacet); EINECS 277-328-8.

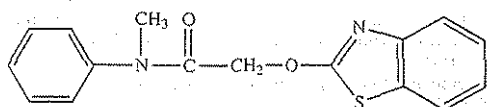
Chemistry

COMPOSITION: 2-(2-benzothiazolyloxy)-N-methyl-N-phenylacetamide (CA).

FAMILY: Benzthiazole, anilide.

PROPERTIES: Colorless crystals. Melting point 134.8°C. Vapor pressure 11 mPa at 100°C.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.



Mefenacet

Action/Use

ACTION: Herbicide.

USE: Control of grass weeds, especially *Echinochloa crus-galli*, and some broadleaved weeds in transplanted rice. Mainly used in combination with other compounds.

FORMULATIONS: Granules, wettable powder.

COMBINATIONS: Wolf Ace* (+ bensulfuron-methyl + thiobencarb), Zark* (+ bensulfuron-methyl), Zark* D (+ bensulfuron-methyl + dymuron) (Bayer AG).

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Marketed in Japan, Korea, Portugal and Spain.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 6.8 mg/l (rainbow trout), 6.0 mg/l (carp). Bird: LC₅₀ (5d) >5000 mg/kg diet (bobwhite quail).

SOLUBILITY: In water, 4 mg/l at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (RAT): Oral/Dermal LD₅₀ >5000 mg/kg b.w.

Hinosan* — see Edifenphos.

Hirsutella thompsonii — see Mycar*.

Hi-Sil* Carrier (silica) — Discontinued by PPG Industries.

Hispor* — see Tilt*.

Hi-Yield Desiccant H-10* — see Arsenic Acid.

Hizarocin* — see Acti-dione*.

HMM — see Hemel.

HMPT — see Hempa.

Hoe 2671 — see Endosulfan.

Hoe 2991 — see Tomilon*.

Hoe 6052 — see Sicarol*.

Hoe 6053 — see Sicarol*.

Hoe 02989 — see Sicarol*.

Hoe 13764 — see Sicarol*.

Hoe 22870 — see Alopex*.

Hoe 002784 — see Morocide*.

Hoe 002810 — see Linuron.

Hoe 002873 — see Afugan*.

Hoe 002904 — see Aretit*.

Hoe 002960 — see Hostathion*.

Hoe 002982 — see Hostaquick*.

Hoe 016410 — see Isoproturon.

Hoe 017411 — see Carbenazim.

Hoe 023408 — see Hoelon* 3EC.

Hoe 026014 — see PCNB.

Hoe 033171 — see Fenoxaprop-Ethyl.

Hoe 035609 — see Joker*.

Hoe 046360 — see Fenoxaprop-P-ethyl.

Hoe 075032 — see Amidosulfuron.

Hoe-Grass* — see Hoelon* 3EC.

Hoelon* 3EC

BP: AgrEvo USA Co. (Hoelon* 3EC)

Identification

COMMON NAME: Diclofop-methyl (ISO, ANSI, BSI, WSSA).

EXP. CODE NUMBER: Hoe-023408 (AgrEvo USA Co.).

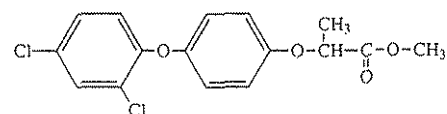
OTHER CODE NUMBERS: CAS 51338-27-3; SHA 110902.

ADDITIONAL TRADE NAMES: Hoe-Grass*, Hoelon*, Illoxan*, Illoxan*.

Chemistry

COMPOSITION: Methyl (RS)-2-[4-(2,4-dichlorophenoxy)phenoxy]propionate (IUPAC).

PROPERTIES: Melting point 39-41°C. Solubility in acetone, 249 g/100 ml; ethanol, 11 g/100 ml; xylene, 253 g/100 ml.



Diclofop methyl

Action/Use

ACTION: Herbicide.

USE: Controls annual grassy weeds. In U.S. for wheat, barley, lentils, flax, dry field peas (including Austrian winter peas) and on fallow land for control of annual grassy weeds. Internationally Illoxan* postemergence in wheat, barley, sugar beets, vegetables, flax, potatoes, etc.

Registration Notes

U.S.: Some or all applications may be classified as RUP.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic. Bird: Dietary: >5620 mg/kg (8 day) (quail, duck).

SOLUBILITY: In water, 0.3 mg/100 ml.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY Tech: (Rat, female): Oral LD₅₀ 512 mg/kg. Dermal LD₅₀ >5000 mg/kg in sesame oil.

PROTECTIVE CLOTHING: Goggles, cartridge-type respirator, rubber gloves, hat, impermeable pants and shirts, waterproof boots.

HANDLING AND STORAGE CAUTIONS: Do not get in eyes or on skin or clothing. Do not take internally. Store where contamination of fertilizer, seed, and foodstuffs will not occur. Avoid contact with flame or sparks.

Emergency Guidelines

FLASHPOINT: 38°C (closed cup).

FIRST AID: Get medical aid. **Eyes, Skin,** immediately flush with plenty of water for at least 15 minutes. If swallowed, do NOT induce vomiting, but seek medical attention immediately.

EMERGENCY TELEPHONE: 302-392-3000 (AgrEvo USA Co.).

Hoestar* — see Amidosulfuron.

Holdem* — see Phorate.

Holdup* — see Chlormequat Chloride.

Homai*

BP: Nippon Soda Co., Ltd.

Chemistry

COMPOSITION: Thiophanate-methyl + thiram.

Action/Use

ACTION: Non-mercury seed disinfectant.

USE: On wheat, barley, rice, cotton, potato, and ornamental bulb and seed dressing.

FORMULATIONS: Wettable powder.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Thiophanate-methyl (Rat): Oral LD₅₀ 7500 mg/kg.

Thiram (Mouse): Oral LD₅₀ 1150 mg/kg.

Honcho* — see Glyphosate.

Hong Nien* — see PMA.

Hopcide* (CPMC) — Discontinued by Kumiai Chemical Industry Co.

Hopcin* — see BPMC.

Hope*

BP: Liyang Chemical Factory (Exclusive Sales Agent - China National Chemicals Import & Export Corp.)

Identification

TYRIVIAL NAME: Dimehypo.

CODE NUMBER: CAS 52207-48-4.

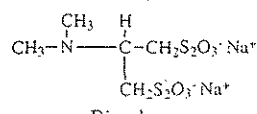
OTHER NAME: Shechongshuang.

Chemistry

COMPOSITION: (IUPAC) Disodium S,S'-[2-(dimethylamino)trimethylene]bis(thiosulfate); 2-N,N-dimethylamino-1,3-disodium thiosulphate propane.

FAMILY: Neristoxin.

PROPERTIES: Pure product is a white crystal, m.p. 142-143°C. Tech is a brown-yellowish or dark brownish liquid, d₄²⁰ 1.30-1.35, easily absorbs moisture. Soluble in hot ethanol (95%), insoluble in benzene, acetone ether, etc. It has unpleasant odor. Stable at normal temperature. easily hydrolyzes in strong alkaline solution.



Dimehypo

Action/Use

ACTION: Stomach, contact, fumigant and systemic insecticide.

USE: Insecticide used to control various pests on rice, vegetable and fruit trees.

FORMULATIONS: 40% WSC. 25% WSC.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Registration Notes

OUTSIDE U.S.: Registration number PD 84104 in China for 25% WSC.

Environmental Guidelines

HAZARDS: Fish: TLM24 78.34 ppm (carp). Bee: Safe. Bird: Safe.
SOIL PARTICLE ADSORPTION: S^{ac}-dimehypo adsorption for 2.3-1.5%.

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 1021 mg/kg (male), 995.9 mg/kg (female).

(Rabbit) LD₅₀ 316 mg/kg.

PROTECTIVE CLOTHING: Rubber gloves, mask or respirator, rubber boots, long-sleeved shirt or jacket, long pants.

HANDLING AND STORAGE CAUTIONS: Avoid contact with mouth, eyes, and skin. Store in original containers in a cool dry place away from foodstuffs and animal feeds.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Carbon dioxide, water spray.

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water for at least 15 minutes. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion**, drink one or two glasses of water and induce vomiting. **Inhalation**, remove to fresh air.

EMERGENCY TELEPHONE: 86-025-202918.

Hopkins Defoamer II*

BP: HACO, Inc.

Chemistry

COMPOSITION: A.I.: Dimethylpolysiloxane (7.5%).

PROPERTIES: Silicone base, aerosol product.

Action/Use

ACTION: Foam control, foam suppressant.

USE: For use in the spray tank of most aqueous agricultural sprays.

Environmental Guidelines

SOLUBILITY: Disperses in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Slight.

HANDLING AND STORAGE CAUTIONS: Contents under pressure. Use with adequate ventilation. Avoid temperatures above 120°F. Avoid freezing.

Emergency Guidelines

FLASHPOINT: Flammable.

Hopper Stopper* insecticide (*Nosema locustae* Canning) — Discontinued 1991 by Sandoz Crop Protection.

Horizon* 2000 — see Fenoxaprop-P-ethyl; Fluazifop-P-butyl.

Horizon* Fungicide — see Folicur*.

Horizon* Herbicide — see Fenoxaprop-Ethyl.

Hormocel* — see Chlormequat Chloride.

Hormodin* Plant Growth Regulator (indole-3-butyric acid) — Discontinued 1994 by Merck & Co., Inc.

Hormone — see Plant Growth Regulator.

Hormotuo* Herbicide (MCPA) — Discontinued by Kemira Oy.

Hormotuo Special* Herbicide (MCPA + dicamba) — Discontinued by Kemira Oy.

Horticultural Spray Oil — see Refined Petroleum Distillate.

Hosdon*

(Discontinued 1984 by Nihon Nohyaku Co., Ltd.)

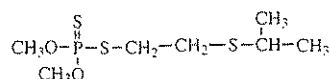
Identification

COMMON NAME: Isothioate (ISO, BSI, JMAF)

CODE NUMBER: CAS 36614-38-7.

Chemistry

COMPOSITION: S-2-isopropylthioethyl O,O-dimethyl phosphorodithioate (IUPAC).



Isothioate

Action/Use

ACTION: Systemic insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 150-170 mg/kg. (Mouse): Oral LD₅₀ 50-80 mg/kg. Dermal 240 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine sulfate.

Host

Any plant or animal attacked by (or harboring) a living parasite and from which the invader is obtaining its nourishment.

Hostaquick*

BP: Hoechst Schering AgrEvo GmbH (Hostaquick*)

Identification

COMMON NAME: Heptenophos (ISO, BSI).

EXP. CODE NUMBER: Hoe 002982.

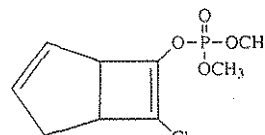
OTHER CODE NUMBERS: CAS 23560-59-0; OMS 1845 (WHO).

Chemistry

COMPOSITION: 7-chlorobicyclo[3.2.0]hepta-2,6-dien-6-yl dimethyl phosphate (IUPAC).

FAMILY: Phosphoric acid ester.

PROPERTIES: Yellowish liquid. Soluble in most organic solvents. Pure active soluble at 22°C. Boiling point 64°C at 10 Pa.



Heptenophos

Action/Use

ACTION: Systemic insecticide of short persistence.

USE: Primarily for aphids in agricultural, horticultural and ornamental crops. For cherry fruit fly, psylla; phorid fly on mushrooms; mealy bugs, whiteflies, thrips in greenhouses.

FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: In water 2.8 g/l at 20°C.

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 96-121 mg/kg. Dermal LD₅₀ >2000 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine followed by toxogonine.

Hostathion*

BP: Hoechst Schering AgrEvo GmbH (Hostathion*)

Identification

COMMON NAME: Triazophos (ISO, BSI).

EXP. CODE NUMBER: Hoe 002960.

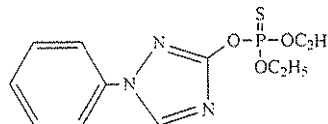
CODE NUMBER: CAS 24017-47-8.

Chemistry

COMPOSITION: O,O-diethyl O-(1-phenyl-1H-1,2,4-triazol-3-yl)thio-phosphate (IUPAC).

FAMILY: Phosphoric acid ester.

PROPERTIES: Yellowish odorless oil. Melting point 2-5°C. Soluble in most organic solvents. Decomposes on distillation.



Triazophos

Action/Use

ACTION: Insecticide, miticide, nematocide.

USE: For aphids, beetles, borers, bugs, foliar feeding larvae, fruitflies, leafhoppers, leafminers, free-living nematodes, scales, soil insects, thrips, mites and whiteflies in agricultural, vegetable, fruit crops and ornamentals.

FORMULATIONS: Emulsifiable concentrate, granules, ULV.

COMBINATIONS: With chlorpyrifos, cyhalothrin, cypermethrin, deltamethrin, dimethoate, endosulfan.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: In water 35 mg/l at 20°C.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 57-59 mg/kg. Dermal LD₅₀ ≥2000 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine followed by toxogonin.

Hot Sauce Animal Repellent

F: Miller Chemical & Fertilizer Corp.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: Capsaicin*.

PROPERTIES: Highly concentrated extract, derived from hot peppers. Dark red viscous liquid, very pungent aroma.

Action/Use

ACTION: Animal repellent.

USE: For use on ornamental trees and shrubs, fruit and nut trees, and nursery stock to repel deer, rabbit, meadow and pine mice. Apply to fruit-bearing trees only during dormant period.

Environmental Guidelines

SOLUBILITY: Water miscible.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ > 5 g/kg.

HANDLING AND STORAGE CAUTIONS: May sting eyes, skin; avoid contact. Keep out of lakes, ponds, or streams. Keep out of reach of children.

Emergency GuidelinesFIRST AID: Get medical aid as necessary. Eyes, flush with plenty of water for at least 15 minutes. Skin, wash thoroughly with soap, water. Remove and wash contaminated clothing before reuse.**Hot Water**

Used to treat seeds, bulbs, and sometimes living plants to kill internal bacteria, fungi, or nematodes.

MOX — see Croneton*.

HPMTS

Discontinued by Buckman Laboratories, Inc.)

Identification

CODE NUMBER: CAS 41206-16-0.

Chemistry

COMPOSITION: 2-Hydroxypropyl methanethiosulfonate (IUPAC).

Action/Use

ACTION: Bactericide, seed treatment.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 926 mg/kg (male); 794 mg/kg (female).

HRS-924 — see Fluorbenzide.

Hubercarb*

BP: J.M. Huber Corp., Calcium Carbonate Div.

Identification

COMMON NAME: Calcium carbonate.

CODE NUMBER: CAS 471-34-1.

Chemistry

PROPERTIES: Bulk density 40-100 lb./cu. ft.

Oil absorption 5-15%; pH 8-9; screen analysis usually 200-325 mesh.

Action/Use:

USE: Precipitated calcium carbonate or ground limestone used to increase the density of dust formulations of pesticides not affected by alkaline diluents.

See Calcium Carbonate; Dusts.

Hubersil* 162

BP: J.M. Huber Corp., Chemicals Div.

Chemistry

COMPOSITION: A precipitated hydrated silicon dioxide.

PROPERTIES: Bulk density 15 pounds/cubic foot. Particle size 2-10 micron. Finely divided and produced by precipitation.

Action/Use

ACTION: Carrier and suspending agent.

USE: Used as highly concentrated wettable powders and dust bases. Stable with sensitive toxicants.

Safety GuidelinesTOXICITY: TLV 10 mg/m³.

Hubersorb* — see Silicates.

Huicacide* Fungicide (ditalimfos + captan) — Discontinued

1985 by Hui Kwang Chemical Co., Ltd.

Humiful* GR

BP: Biochem S.R.L.

Chemistry

COMPOSITION: Granular compound with 5.5% soluble humic substances extracted from leonardite + coformulants.

PROPERTIES: More than 5 year shelf-life.

Action/Use

ACTION: Affects germination speed; growth increase.

USE: For local application during sowing or transplanting.

COMBINATIONS: Compatible with fertilizers, pesticides.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Store in original container in well-aired storehouse.

Humiful L*

BP: Biochem S.R.L.

Chemistry

COMPOSITION: Soluble humic substances extracted from Leonardite water.

Action/Use

ACTION: Activator adjuvant.

USE: Natural organic ameliorating fertilizer.

COMBINATIONS: Humiful L* is compatible with pesticides and fertilizers.

Environmental Guidelines

HANDLING AND STORAGE CAUTIONS: Store in original containers in well aired storehouse. Shelf life is more than five years.

Humix* Adjuvant — Discontinued 1989 by DeSoto, Inc.

Humus R*

BP: Humus Products of America, Inc.

Chemistry

COMPOSITION: Humic Acids (polymeric polyhydroxy acids).

Action/Use

ACTION: Organic adjuvant and root stimulant.

USE: Added to herbicide spray to enhance effectiveness. Chelating agent, base for foliar fertilizer and foliar spray for roses as an effective protection against powdery mildew and black spot.

Hunter* — see Sincocin*.

Hyamine* — see Benzalkonium Chloride.

Hyamine* 1622 — see Hyamine* Compounds.

Hyamine* 2389 Germicide — Discontinued by Lonza Inc.

Hyamine* 3500-NF Germicide — Discontinued by Lonza Inc.

Hyamine* Compounds

BP: Lonza Inc. (Hyamine* 1622)

Identification

CODE NUMBERS: 27213-90-7 (Hyamine* 1622).

DISCONTINUED NAME: Hyamine* 2389, Hyamine* 3500-NF (Lonza Inc.).

Chemistry

COMPOSITION: Quaternary ammonium compounds.

PROPERTIES: Cationic compounds.

Action/Use

ACTION: Germicide.

USE: For a wide variety of microorganisms. Used in germicides, deodorants, and detergent-sanitizers.

FORMULATIONS: Aqueous solution, crystals, ethanol/water solution.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Hyamine* 1622 (Rat): Oral LD₅₀ 420 mg/kg.

Hyamine* 3500-NF: 447 mg/kg.

Emergency GuidelinesFIRE EXTINGUISHING MEDIA: Alcohol foam, CO₂, dry chemical, water fog.FIRST AID: Get medical attention. Eyes, flush with large amounts of running water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eye and lids with water. Skin, wash with large amounts of running water, and soap if available, for 15 minutes. Remove contaminated clothing and shoes. Wash clothing and decontaminate shoes before reuse. Inhalation, remove to fresh air. Ingestion, immediately give several glasses of water. Do NOT induce vomiting. If vomiting occurs, give fluids again.**Hybrex***

(Discontinued by Rohm and Haas Co.)

Identification

COMMON NAME: Fenridazon-potassium (ISO, ANSI, BSD).

EXP. CODE NUMBER: RH-0007.

OTHER CODE NUMBERS: CAS 83588-43-6; SHA 119001.

Chemistry

COMPOSITION: Potassium 1-(4-chlorophenyl)-1,4-dihydro-6-methyl-4-oxopyridazine-3-carboxylate (CAS).

Action/Use

ACTION: Hybridizing Agent.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral >500 ppm (25 mg/kg/day). (Rabbit): Dermal >5 g/kg. Relatively nontoxic.

Hydout* (endothall) — Discontinued by Pennwalt.

Hydram* Herbicide (molinate) — Discontinued.

Hydramethylnon — see Amdro*.

Hydraméthylnone — see Amdro*.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Hydrated Lime**Identification**

COMMON NAME: Hydrated lime.

TRIVIAL NAME: Slaked lime.

CODE NUMBER: CAS 1305-62-0.

ChemistryCOMPOSITION: Calcium hydroxide $\text{Ca}(\text{OH})_2$.

PROPERTIES: White powder, specific gravity about 2.07. Absorbs carbon dioxide from air to form calcium carbonate. Aqueous solution is alkaline. For use as an alkaline additive (as to form Bordeaux mixture or to liberate an organic base) it should be noncarbonated and high in hydroxide content.

Action/Use

ACTION: Alkaline additive, carrier.

USE: As safener with some arsenical insecticides.

See Casein.

Hydraulic

Pertaining to water or other liquid in motion; operated by the resistance offered or the pressure transmitted when a quantity of water, oil, or other liquid is forced through a comparatively small orifice or through a tube.

Hydrazide Maléique — see Maleic Hydrazide.

Hydrocop* — see Copper, Fixed; Copper Hydroxide.

Hydrocyanic Acid**Identification**

COMMON NAMES: Hydrocyanic acid, prussic acid (aqueous solution).

CODE NUMBERS: CAS 74-90-8; SHA 045801.

DISCONTINUED NAME: Cyclon* (American Cyanamid Co.).

Action/Use

ACTION: Fumigant.

Safety Guidelines

TOXICITY: Extremely toxic gas to humans and warm-blooded animals, killing quickly by both inhalation and skin absorption.

Hydrogen Cyanide — see Hydrocyanic Acid.

Hydrogen Phosphide — see Aluminum Phosphide.

Hydrol*

(Discontinued by Bayer AG)

Identification

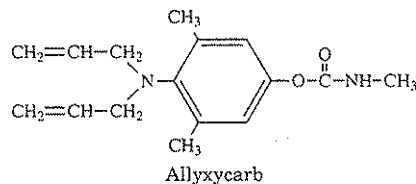
COMMON NAMES: Allyxycarb (ISO-E, BSI); APC (JMAF); allyxycarbo (ISO-F).

EXP. CODE NUMBER: Bay 50282.

OTHER CODE NUMBERS: CAS 6392-46-7; OMS 773 (WHO).

Chemistry

COMPOSITION: 4-Diallylamino-3,5-dimethylphenyl methylcarbamate (CAS).

**Action/Use**

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD_{50} 90-99 mg/kg.**Hydrolyzed Protein**

BP: Tamogan, Ltd.

Identification

OTHER NAMES: Nasiman 73*, Zitan 85*.

Chemistry

COMPOSITION: Hydrolyzed proteins.

Action/Use

ACTION: Fruit fly baits. (Mediterranean fly, olive fly, etc.).

USE: Use with an insecticide such as malathion, phosphamidon.

FORMULATION: Liquid.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

Hydronic* — see Wetting Agent.

Hydrophil

A substance or system which attracts or is attracted to water is hydrophilic in nature.

Hydrophobe

A substance or system which repels or is repelled by water is hydrophobic in nature.

Hydroprene — see GenTrol*.

Hydrothol* — see Endothall.

Hydrothol 191* — see Endothall.

Hydrothol* Turf Herbicide — see Endothall.

Hydro-Wet*

BP: Kalo, Inc. (Hydro-Wet*)

Chemistry

COMPOSITION: Principal functioning agents: Polyoxyethylene: polypropoxypropanol + glycol butyl ether.

PROPERTIES: Water-soluble, nonionic, non-phytotoxic.

Action/Use

ACTION: Soil and turf wetting agent.

USE: For hydrophobic soils. Apply alone or with pesticides, liquid fertilizers.

FORMULATIONS: Liquid, granular, pellets.

Environmental Guidelines

SOLUBILITY: Complete in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Causes eye irritation. Avoid prolonged contact with skin.

Emergency Guidelines

FIRST AID: Eyes, immediately flush with water.

Hydrox* Fungicide (copper hydroxide) — Discontinued 1994 by Cuproquim Corp.

Hydroxy isoxazole — see Tachigaren*.

Hydroxymercurichlorophenols

(Discontinued 1976 by Du Pont Agricultural Products)

Identification

CODE NUMBERS: CAS 538-04-5; SHA 052601.

DISCONTINUED NAME: Semesan*.

Action/Use

ACTION: Turf fungicide.

Hydroxymercurichlorophenols/Hydroxymercurinitrophenols**Identification**

DISCONTINUED NAME: Semesan Bel*.

Chemistry

COMPOSITION: Mixture of these two series of compounds.

Action/Use

ACTION: Fungicide, disinfectant.

USE: For spray or dip treatment of Irish and sweet potatoes (seed pieces or slips) for decay and control surface-borne diseases.

FORMULATION: Seed disinfectant.

Registration Notes

U.S.: Use of mercury compounds for food crop use have been cancelled.

Hydroxyquinoline — see 8-Quinolinol.

Hydroxyquinoline Sulfate — see Chinosol.

Hygroscopic

Substances capable of absorbing water from the atmosphere, under normal conditions of temperature, pressure and humidity, are called hygroscopic substances.

Hylemox* Insecticide (ethion) — Discontinued 1994 by Rhone-Poulenc Ag Co.

Hymexazol — see Tachigaren*.

Hyonic*

BP: Henkel Corp.

Action/Use

ACTION: Wetting agent.

Hypolin***Chemistry**

COMPOSITION: Phenothiazine, di-n-butyltin dilaurate, hexachloroethane.

Hyspray*

BP: Fine Agrochemicals Ltd.

Identification

COMMON NAME: Tallow amine ethoxylate.

ChemistryCOMPOSITION: N,N-bis(15-hydroxyethyl)alkyl(C_{14} - C_{18}) amine.

PROPERTIES: Stable brown viscous liquid at 20°C with pH 10-10.5.

Action/Use

ACTION: Surfactant, herbicide enhancer.

USE: Improves rate and up-take of systemic herbicide.

FORMULATIONS: Water-soluble liquid.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1231 mg/kg.

HANDLING AND STORAGE CAUTIONS: Flammable.

Irritant. Store in cool, dry area away from foodstuffs.

PROTECTIVE CLOTHING: Goggles, gloves, overalls when handling the concentrate.

Emergency Guidelines

FLASHPOINT: Formulation: 41°C.

Hytox* — see MIPC.

Hyvar* — see Bromacil; Isocil.

Hyvertrol* — see Viscosity Adjuvant.

IAA — see Indole-3-Acetic Acid.

IBA — see Indole-3-Butyric Acid.

IBP

BP: Hanwha Corp.

Jin Hung Fine Chemicals Co., Ltd.

Kumiai Chemical Industry Co., Ltd. (Kitazin* P)

Lucky Ltd.

Rallis India Ltd. (Blataf*)

Identification

COMMON NAMES: Iprobenfos (ISO draft, BSD); IBP (JMAF).

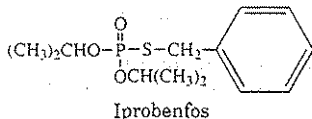
CODE NUMBER: CAS: 26087-47-8.

ADDITIONAL TRADE NAME: Vegfru Kitazin* (Pesticides India).

Chemistry

COMPOSITION: S-benzyl O,O-di-isopropyl phosphorothioate (IUPAC).

PROPERTIES: Yellow oil, boiling point 126°C/0.04 mm Hg. Soluble in most organic solvents.



Action/Use

ACTION: Systemic fungicide.

USE: Controls rice blast, stem rot and rice sheath blight.

FORMULATIONS: Emulsifiable concentrate, granule, dust.

COMBINATIONS: Kumihop* 4% dust (+ malathion) in Japan.

Registration Notes

OUTSIDE U.S.: Kumihop* in Japan for insecticide-resistant rice planthoppers and rice leafhoppers.

Environmental Guidelines

SOLUBILITY: Soluble 430 MG/L in water (20°C).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 490 mg/kg. (Mouse): Oral LD₅₀ 1830 mg/kg (male); 1760 mg/kg (female).

PROTECTIVE CLOTHING: Gloves, gas mask or respirator, goggles, and clothing.

HANDLING AND STORAGE CAUTIONS: Keep container closed. Store in cool, dry area away from feed and foodstuffs. Keep out of reach of children. Avoid contact with mouth, skin and eyes.

Emergency Guidelines

ANTIDOTE: Atropine sulfate.

ICI 29661 — see Diethyl.

Icomeen* Surfactants — see Emulsifier.

Icon* — see Karate*.

Iconol*

BP: BASF Corp. (Iconol*)

Chemistry:

COMPOSITION: Series of ethoxylated decyl, tridecyl, nonyl and octylphenol alcohols.

Action/Use

ACTION: Dispersant and emulsifier.

See Dispersant.

idet*

A series of wetting agents.

Idrorame FL* — see Copper Sulfate. Basic.

IFC — see Propham.

Igepal* — see Rhodacal* Dispersants.

Ignite* — see Glufosinate-ammonium.

Igran* Herbicide (terbutryn) — Discontinued by Ciba-Geigy Ltd.

Igrater* — see Metobromuron.

IKI-1145 — see Fosthiazate.

Ikurin* — see Ammate*.

Ilbex* Fungicide (propiconazole + tridemorph) — Discontinued by Ciba-Geigy Ltd.

IH-7733 — see Fluazifop-butyl.

Illegal Residue

The amount of active ingredient above the tolerance which remains on a crop at harvest. In some cases, any amount of chemical present on the crop is considered illegal.

See Tolerance.

Illoxan* — see Hoelon* 3EC.

Illoxan* — see Hoelon* 3EC.

Imazalil

BP: Janssen Pharmaceutica (Fecundal*, Fungafior*, Fungazil*)

Makhteshim-Agan (Magnate*)

Point Enterprise S.A. (Point* Imazalil)

Sanachem (Pty) Ltd. (Sanazil*)

Identification

COMMON NAMES: Imazalil (ISO, ANSI, BSD); chloramizol (South Africa); enilconazole (INN, BAN, USAN).

EXP. CODE NUMBER: R 23979 (Janssen).

OTHER CODE NUMBERS: CAS 35554-44-0; SHA 111901.

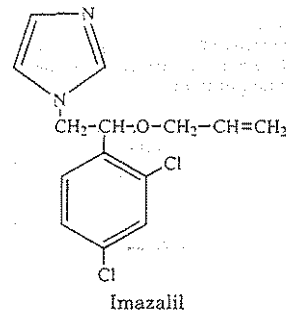
ADDITIONAL TRADE NAMES: Double R* (AGSCO, Inc.); Pacrite* (AMC); Deccoil* (Elf Atochem North America, Decco U.S.); Flo-Pro* (Gustafson Inc.); Nu-Zone 10ME (Wilbur-Ellis).

DISCONTINUED NAMES: Bromazil* (Brogdex Corp.).

Chemistry

COMPOSITION: ±1-[2-(2,4-dichlorophenyl)-2-(2-propenyloxy)ethyl]-1H-imidazole.

PROPERTIES: Slightly yellow to brown crystalline mass. Melting point 50°C. Boiling point 347°C. Vapor pressure 7 × 10³ mm/Hg at 20°C. Chemically stable at 20°C in absence of light; thermally stable to >285°C. Very soluble in methanol, ethanol, 2-propanol, xylene, benzene, toluene, and solutions of mineral and organic acids. Also soluble in n-heptane, hexane and petroleum ether.



Action/Use

ACTION: Systemic fungicide.

USE: As a wheat and barley seed treatment for common (dryland) root rot (Fusarium, Helminthosporium), and associated seedling diseases. For control of seedborne leaf stripe, net blotch and *Septoria nodorum*. Prevents post-harvest decay of citrus, banana and pome fruit. Active against benzimidazole resistant strains of plant pathogenic fungi.

FORMULATIONS: Emulsifiable concentrate, water soluble powder, soluble liquid.

COMBINATIONS: Baytan Universal* (+ fuberidazole + triadimenol) (Bayer AG); Benit Universal* (+ propiconazole + thiabendazole), Beret Special* (+ fenpiclonil), Beret Universal* (+ fenpiclonil + carboxin), Celest Special* (+ fludioxonil), Celest Triple* (+ fludioxonil + tebuconazole) (all Ciba, Ltd.); Freshgard* (+ thiabendazole) (FMC, Food Processing Systems Div.); Vitavax*-Extra (+ carboxin + thiabendazole) (Gustafson Inc.); Panoctine Plus* (+ guazatine) (Rhône-Poulenc); Ferrax* (+ flutriafol + thiabendazole + ethirimol), Vincit* (+ flutriafol + thiabendazole) (ZENECA Agrochemicals).

Registration Notes

U.S.: Registered by Janssen Pharmaceutica for postharvest treatment of citrus; seed treatment of wheat and barley. Registrations pending for postharvest treatment of pome fruit and melons; and seed treatment of sweet corn.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

SOLUBILITY: Water soluble at 293 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: WARNING.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

TOXICITY CLASS: II.

PROTECTIVE CLOTHING: Pesticide respirator, rubber or impermeable gloves, goggles or safety glasses, hat, long sleeve shirt, long pants.
HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes. Use in well-ventilated area. Avoid heat or open flames.

Emergency Guidelines

FLASHPOINT: 34-35°C.

FIRE EXTINGUISHING MEDIA: CO₂, dry chemical, foam, water, water spray.

FIRST AID: Get medical aid. Eyes, flush with plenty of water. Skin, wash with soap and water. Inhalation, remove to fresh air - apply artificial respiration if needed. Ingestion, induce vomiting (pump stomach preferred).

Imazamethabenz-methyl — see Assert*.

Imazapyr — see Arsenal*.

Imazapyr isopropylamine salt — see Chopper*.

Imazaquin — see Scepter*; Squadron*; Tri-Scept*.

Imazaquine — see Scepter*.

Imazethapyr — see Pursuit*.

IMC 3950

Chemistry

COMPOSITION: S-(4-Chlorobenzyl)-N,N-diethylthiocarbamate.

Action/Use

ACTION: Herbicide.

Imibenconazole — see Manage*.

Imidacloprid

BP: Bayer AG (Admire*, Confidor*, Gaucho*, Premier*)

Identification

COMMON NAME: Imidacloprid (ISO-draft, BSI).

EXP. CODE NUMBER: BAY NTN 33893 (Bayer AG).

OTHER CODE NUMBERS: CAS 138261-41-3.

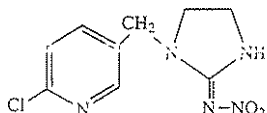
ADDITIONAL TRADE NAMES: Admire*, Gaucho*, Merit*, Premise*, Provado* 75 WP (Miles Inc.); Marathon* (Olympic Horticultural Products Co.).

Chemistry

COMPOSITION: 1-[(6-chloro-3-pyridinyl)methyl]-N-nitro-2-imidazolidinimine.

FAMILY: Chloronicotinyne.

PROPERTIES: Colorless crystals. Vapor pressure 0.2 µPa at 20°C. Rel. density 1.543 g/cm³ at 20°C. Miscible in n-hexane, dichloromethane, 2-propanol, toluene.



Imidacloprid

Action/Use

ACTION: Insecticide.

USE: Soil, seed or foliar treatment in rice, cereal, maize, potatoes, vegetables, sugar beet, fruit, cotton, and turf. Highly systemic, particularly from the seed or soil treatment. Controls sucking insects including ricehoppers, aphids, thrips, white flies, termites, turf insects, soil insects, and some beetle species, such as rice water weevil and Colorado beetle.
FORMULATIONS: Dustable powder, granules, seed dressing (flowable concentrate, slurry), soluble concentrate, suspension concentrate, wettable powder.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 211 mg/l (rainbow trout). Bird: LD₅₀ 152 mg/kg (bobwhite quail). Bee: Harmful as foliar application during flowering.
SOLUBILITY: In water 0.51 g/l at 20°C.

Safety Guidelines

SIGNAL WORD: WARNING (a.i.), CAUTION (formulations).

TOXICITY CLASS: II (a.i.), III (formulations).

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 450 mg/kg b.w. (Rat): Dermal LD₅₀ >5000 mg/kg b.w.

PROTECTIVE CLOTHING: Gloves.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin. Due to clay content some granular formulations may cause eye irritation.

Emergency Guidelines

EMERGENCY TELEPHONE: 49-2173-38-3030 (Bayer AG); 816-242-2582 (Miles Inc.).

Imidan* — see Phosmet.

Imidazole — see Imutex*.

Imidazolinone Herbicides

Herbicides in the imidazolinone family appear to inhibit the action of acetohydroxyacid synthase (AHAS), necessary for the production

of several essential amino acids. Because AHAS is produced only in plants, the imidazolinones have a low toxicity rating for mammals, birds, fish, and insects. Imidazolinone resistance is being bred into corn lines used in production of commercial seed corn. These American Cyanamid compounds include: imazamethabenz-methyl (Assert*), imazapyr (Arsenal*), imazaquin (Scepter*), and imazethapyr (Pursuit*).

Imidoxon

Action/Use

ACTION: Insecticide.

USE: Thiol analog or oxygen metabolite of Imidan*.

See Phosmet.

Impact*

BP: ZENECA Agrochemicals (Armour*, Impact*, Vaspact*)

Identification

COMMON NAME: Flutriafol (ISO draft, ANSI, BSI).

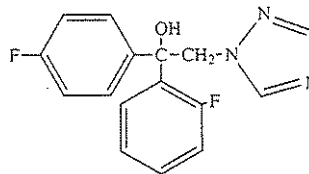
EXP. CODE NUMBER: PP140, PP450 (ZENECA Agrochemicals).

OTHER CODE NUMBER: CAS 76674-21-0.

Chemistry

COMPOSITION: (RS)-2,4'-difluoro-α-(1H-1,2,4-triazol-1-ylmethyl) benzhydryl alcohol (IUPAC).

PROPERTIES: White crystalline solid, melting point 130°C. Soluble in a range of organic solvents.



Flutriafol

Action/Use

ACTION: A range of systemic fungicides.

USE: Controls all major small grain cereal diseases, and diseases of other crops.

FORMULATIONS: Suspension concentrates.

COMBINATIONS: Vincit* (+ thiabendazole ± imazalil), premixes with carbendazim, chlorothalonil, and carbendazim + pyrazophos marketed under various trades names (ZENECA Agrochemicals).

Environmental Guidelines

SOLUBILITY: Low solubility in water.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1480 mg/kg.

PROTECTIVE CLOTHING: Protective gloves, eye protection when handling concentrate.

HANDLING AND STORAGE CAUTIONS: See individual formulation labels.

Imperator* — see Permethrin.

Imugan*

(Discontinued by Bayer AG)

Identification

COMMON NAMES: Chloraniformethane (ISO-E, BSI); chloraniforméthane (ISO-F).

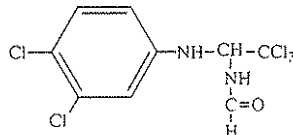
EXP. CODE NUMBER: Bay 79770.

OTHER CODE NUMBER: CAS (chloraniformethane) 20856-57-9.

ADDITIONAL TRADE NAME: Milfaron* (Bayer AG).

Chemistry

COMPOSITION: 1-(3,4-Dichloroanilino)-1-formylamino-2,2,2-trichloroethane (IUPAC).



Chloraniformethane

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >2500 mg/kg. (Rat): Dermal LD₅₀ >1000 mg/kg.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Imutex*

Identification

TRIVIAL NAMES: Glyoxaline, imidazole.
 CODE NUMBER: CAS 288-32-4.

Chemistry

COMPOSITION: Imidazole.

Action/Use

ACTION: Synergist.

In Vitro

"In glass"; test-tube culture. Any laboratory test using living cells taken from an organism.

In Vivo

In the living body of a plant or animal. In vivo tests are those laboratory experiments carried out on whole animals or human volunteers.

Inabenfide — see Seritard*.

Inactive

Not capable of reacting chemically; or, a material present in a pesticide product which has no effect on living organisms.

Incorporate

To mix or blend a herbicide into the soil.

increcel* — see Chlormequat Chloride.

Indalone*

(Discontinued by FMC Corp.)

Identification

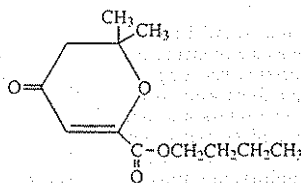
COMMON NAME: Butopyrroxyl (USP).

TRIVIAL NAME: Dihydropyrone.

CODE NUMBERS: CAS 532-34-3; SHA 046801; ENT-9.

Chemistry

COMPOSITION: Butyl 3,4-dihydro-2,2-dimethyl-4-oxo-2H-pyran-6-carboxylate (IUPAC).



Dihydropyrone

Action/Use

ACTION: Insect repellent.

Indar*

BP: Rohm and Haas Co. (Enable*, Indar*, Govern*)

Identification

COMMON NAME: Fenbuconazole.

EXP. CODE NUMBER: RH-7592 (Rohm and Haas).

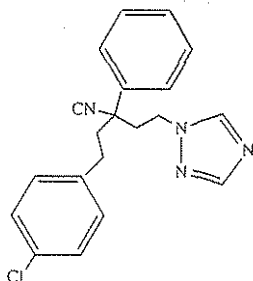
OTHER CODE NUMBER: CAS 114369-43-6.

Chemistry

COMPOSITION: α -(3-(4-chlorophenyl)ethyl)- α -phenyl-(1H-1,2,4-triazol-1-yl)propanenitrile (CA). 4-(4-chlorophenyl)-2-phenyl-2-((1H-1,2,4-triazol-1-yl)methyl)butanenitrile (IUPAC).

FAMILY: Aralkyl triazole.

PROPERTIES: Off-white. Melting point 124-126°C; vapor pressure 0.37×10^{-7} Torr. Soluble in common organic solvents such as ketones, esters, alcohols and aromatic hydrocarbons. Insoluble in aliphatic hydrocarbon solvents.



Fenbuconazole

Action/Use

ACTION: Systemic fungicide.

USE: Protective, curative and eradicator properties against a wide range of fungal diseases attacking the blossom, foliage, fruit and seed portions of many food and ornamental crops. Effective against many Ascomycetes, Deuteromycetes and Basidiomycetes.

FORMULATIONS: 2F, 75% WSP.

Registration Notes

U.S.: EUP. Indar* formerly used as trade name of butrizol, a fungicide discontinued by Rohm and Haas.

Environmental Guidelines

SOLUBILITY: In water 2ppm (25°C).

Safety Guidelines

SIGNAL WORD: Tech, 2F: CAUTION.

TOXICITY CLASS: Tech, 2F: III.

TOXICITY: Tech: (Rat): Oral LD₅₀ >2000. (Rabbit): Dermal >5000. Practically non-irritating to skin.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRST AID: Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water and call physician. (Note to physician: Emesis is recommended for technical or flowable formulation.)

EMERGENCY TELEPHONE: 215-592-3000 (Rohm and Haas).

Indole-3-acetic Acid

BP: Agri-Pharm International Inc.

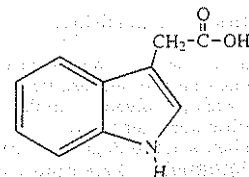
Identification

CODE NUMBER: CAS 87-51-4.

TRIVIAL NAME: IAA.

Chemistry

COMPOSITION: Indol-3-ylacetic acid (IUPAC).



Indole-3-acetic Acid

Action/Use

ACTION: Plant growth regulator (an auxin).

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

Indole-3-butyric Acid

BP: Agri-Pharm International Inc.

Merck & Co., Inc.

Rhone-Poulenc (Seradix*)

Identification

TRIVIAL NAME: IBA.

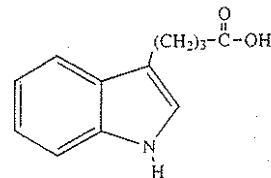
CODE NUMBERS: CAS 133-32-4; SHA 046701.

DISCONTINUED NAME: Hormodin* (Merck & Co., Inc.).

Chemistry

COMPOSITION: Indole-3-butyric acid (CAS 8CI).

PROPERTIES: White to tan powder or crystalline solid which exhibits the reactions characteristic of an organic acid. Melts at 119°C minimum. Soluble in alkali metal hydroxides and carbonates, and in common organic solvents.



Indole-3-butyric Acid

Action/Use

ACTION: Plant growth regulator.

USE: Used in establishment of root cuttings.

FORMULATION: Dust (3 strengths due to wood-type of cutting).

COMBINATIONS: Rootone* (+ NAA) (Rhone-Poulenc).

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

SOIL PARTICLE ADSORPTION: Rapid degradation.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Indothrin

PESTICIDE DICTIONARY

TOXICITY CLASS: III.
PROTECTIVE CLOTHING: Not required.
HANDLING AND STORAGE CAUTIONS: Exercise care in handling as chemical, physical, and toxicological characteristics have not been subjected to exhaustive study and may be hazardous.

Indothrin* — see Permethrin.

Induce*

BP: Helena Chemical Co.

Chemistry

COMPOSITION: Alkyl aryl polyoxyalkane ether, free fatty acids and IPA.

Action/Use

ACTION: Low foam wetter, spreader adjuvant.
USE: For all pesticides, nutritional requiring nonionic surfactant.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

See Penetrant; Wetting Agent.

Induce* pH

BP: Helena Chemical Co.

Chemistry

COMPOSITION: Alkylaryl polyethoxyethanol phosphates, 90% free fatty acids and IPA.

Action/Use

ACTION: Low foam nonionic surfactants and buffering agents.
USE: For most pesticides which are to be used with wetter/spreader type adjuvants, and with pesticides that are susceptible to alkaline hydrolysis.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

See Wetting Agent.

Industrol* Surfactants — see Emulsifier.

Inert Ingredient

A substance contained in a preparation which will by itself not add materially to effectiveness for the purpose for which the preparation is intended. Materials such as solvents, emulsifiers, wetting agents, carriers, diluents, conditioning agents, etc.

See List of Inert Ingredients in the Regulatory File (Section D).

Inexit* insecticide (lindane) — Discontinued by Shell International Chemical Co.

Inezin*

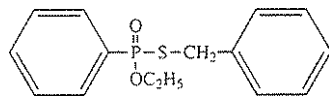
(Discontinued by Nissan Chemical Industries, Ltd.)

Identification

CODE NUMBER: CAS 21722-95-0.

Chemistry

COMPOSITION: O-ethyl S-benzyl phenylphosphonothioate (IUPAC).



Active Ingredient of Inezin*

Action/Use

ACTION: Organophosphorus fungicide.

Infect

To contaminate with disease organisms (bacteria, fungi, viruses, etc.) or cause to become diseased.

Infest

To inhabit by insects, rodents, weeds, etc., in contrast to infection by microscopic organisms.

Infusorial Earth — see Diatomaceous Earth.

Ingest

To eat or swallow.

Ingrater* — see Metobromuron.

Ingredient Statement

The AAPCO has adopted these regulatory principles relating to pesticide ingredient statements:

"Ingredient Statement: A label shall state: The name and percentage by weight of each active ingredient, together with the total percentage by weight of the inert ingredients. In the ingredient statement all names shall be printed in type of the same size, and in such terms as to render them likely to be read and understood under customary conditions of purchase.

"Name of ingredients: The well-known common names of the ingredients must be given, or, if the ingredient has no common name, the correct chemical name. If there is no common name and the chemical composition is unknown or complex, the enforcement official may permit the use of a new or coined name which he finds to be appropriate

for the information and protection of the user. If the use of a new or coined name is permitted, the enforcement official may prescribe the terms under which it may be used. A trademark or trade name may not be used as the name of an ingredient except when it has become a common name.

"Sliding Scale Percentages: The 'sliding scale' method of expressing percentages shall not be used. (Example: 'pyrethrins, 2-3%'.) This is not to be construed as forbidding the use of qualifying statements descriptive of the basic active material or materials, providing such statements do not constitute an integral part of the percentage of total active ingredient. (Example: 'Technical Chlorinated Camphene 100 percent, Combined Chlorine 67-69 percent'.)

Inhalation Toxicity

Refers to poisoning of man or animals when breathed into the lungs. See Toxicity, Human.

Inhibitor, Bacterial

The AAPCO has adopted this definition: "A bacterial inhibitor is a substance which will prevent the growth and multiplication of bacteria."

Inhibitors, Plant Hormones

Assorted substances that inhibit a physiological process in plants. Naturally-occurring inhibitors are benzoin and cinamic acid, and gallic acid. Maleic hydrazide is a synthetic inhibitor.

INN

Designates a recommended non-proprietary name. Such names are agreed upon by World Health Organization (WHO) for pharmaceuticals in the same way that ISO names are agreed upon for pesticides. See Common Name.

Inovat* — see Phosmet.

Inquiport-Propanil — see Propanil.

Insect

The AAPCO has adopted this definition for purposes of legal convenience:

"Any of the numerous small invertebrate animals generally having the body more or less segmented, for the most part belonging to the class Insecta, comprising six-legged, usually winged forms, e.g. beetles, bugs, bees and flies; and to other allied masses of arthropods whose members are wingless and usually have more than six legs, as for example, spiders, mites, ticks, centipedes, and wood lice, also nematodes and other worms, or any other invertebrates which are destructive, constitute a liability, and may be classed as pests." Insects in the strict sense, are limited to those six-legged forms, usually winged, which belong to the class Insecta (or Hexapoda).

Insect Growth Regulator (IGR)

Chemical substance which disrupts the action of insect hormones controlling molting, maturity from pupal stage to adult, and others.

Insect Powder — see Pyrethrum.

Insectape — see Hercon* Insectape.

Insecticide(s)

A material used primarily for the control of insects. The various insecticides fall into six general categories according to the way in which they affect insects:

- Stomach:** Toxic quantities are ingested by the insect.
- Contact:** Kills upon contact with an external portion of the body.
- Residual contact:** Remains toxic to insects for long periods after application.
- Fumigant:** Possesses sufficient natural or induced vapor pressure to produce lethal concentrations.
- Repellent:** Does not kill but is distasteful enough to insects to keep them away from treated areas.
- Systemic:** Capable of being absorbed into the plant system where they make their parts insecticidal.

The AAPCO has adopted this definition:

"A substance or mixture of substances intended to prevent, destroy, repel or mitigate any insects which may be present in any environment whatsoever." Insecticides and acaricides have been classified as follows: Organochlorines, Organophosphates, Organosulfurs, Carbamates, Formamidines, Thiocyanates, Dithiocarbamates, Organotin, Botanicals, Synthetic Pyrethroids, Inorganic, Fumigants, Microbials.

Insectophene* — see Endosulfan.

Insegar* — see Fenoxycarb.

Insyst-D* — see Disulfoton.

Intake*

BP: Custom Chemicides

Action/Use

ACTION: Spreader activator.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

USE: For more uniform coverage of agricultural sprays. Increases wetting and absorption. Aids in translocation of certain insecticides, herbicides, miticides and defoliants.

FORMULATIONS: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Keep away from children.

Avoid skin, eye contact.

Integralure* — see Bag-A-Bug*.

Integrated Control

The use of two or more methods of control to prevent damage by a pest or pests. These include cultural practices, use of biological control agents, and the use of selective pesticides.

Integrated Pest Management — see Integrated Control.

Intensify*

(Discontinued 1987 by J.T. Baker Chemical Co.)

Identification

OTHER NAME: JB-1140.

Chemistry

COMPOSITION: Ammonium thiocyanate, aluminum hydroxide constituents effective as spray adjuvants 49%.

Action/Use

ACTION: Environmentally compatible spray adjuvant.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3080 mg/kg. (Rabbit): Dermal LD₅₀ 960 mg/kg.

Invert Emulsion

A dispersion of droplets of water in oil; a WO type of emulsion adapted to special uses in pest control. Viscous liquids adapted to application from the air to reduce drift hazards (Visko-Rhap*).

See Emulsion.

Inverton 245* Herbicide (2,4,5-T) — Discontinued.

Iodofenphos — see Nuvanol* N.

Iodophor* Disinfectants (iodine-based) — Discontinued 1984 by

Ciba-Geigy Ltd.

Ion

Adapted from the Condensed Chemical Dictionary: "An electrically charged atom or group of atoms. Ions may be either positively or negatively charged, indicating that one electron has been either gained or lost."

Ioniz* — see Isoproturon.

Ioniz* VR — see Diflufenican; Ioxynil; Isoproturon; Mecoprop.

Iota* — see Moncut*.

Iotox* — see Ioxynil; MCPP.

Iotril* — see Ioxynil.

Iotrillex* — see Ioxynil.

Ioxynil

BP: CFPI (Auroch*, Aurigal*, Certrol*)

Makhteshim-Agan (Iotril*, Iotrillex*)

Rhone-Poulenc (Actril*, Actrilawn*, Bantrol*, Mate*,

Oxytril*, Totril*)

Sanachem (Pty) Ltd. (Sanoxynil*)

Identification

COMMON NAME: Ioxynil (ISO, BSI, WSSA).

OTHER NAMES: Certrol H*.

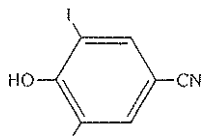
CODE NUMBERS: CAS 1689-83-4; SHA 353200; EINECS 216-981-1.

DISCONTINUED NAME: Basagran* Ultra (+ bentazone + dichlorprop), Vega* Plus (+ bentazone + dichlorprop-P) (BASF AG); Tetroxone* M (+ bromoxynil + dichlorprop + MCPA) (ICI Agrochemicals).

Chemistry

COMPOSITION: 4-Hydroxy-3,5-diodobenzonitrile (IUPAC and CAS).

PROPERTIES: Tech. cream colored. Colorless solid, melting point 212-213.5°C (phenol), 59-60°C (octanoate). Solubility: Ioxynil sodium salt (% w/v at 20-25°C), acetone 12, tetrahydrofurfuryl alcohol 65; ioxynil octanoate (%w/v at 20-25° C), methanol 9, ethanol 8, N-propanol 15, acetone 10, cyclohexanone 50, benzene 65, methylene chloride 70, chloroform 65, carbon tetrachloride 60, naphtha 70.



Ioxynil

Action/Use

ACTION: Herbicide (HBN type).

USE: Postemergence for seedling weeds (bindweed, smartweed, butternuts, chickweed, cornflower, dandelion, fat hen, groundsel, mayweeds, mustards, plantains, shepherdspurse, speedwells, etc.) in cereals. Belgran*, Certrol* DS for sugar cane. Actril DS* for sugarcane, citrus, rice, and oil palm. Iotox* for sports turf.

FORMULATION: Aqueous concentrates, water-soluble amines, oil-soluble amines, emulsifiable concentrates of the octanoic ester.

COMBINATIONS: Basagran* Ultra-P (+ bentazone + dichlorprop-P) (BASF AG); Certrol* DS (+ 2,4-D esters), Certrol* H and Maestro* (+ MCPP esters), Mextrol* (+ mecoprop) (CFPI); Post-Kite* (+ isoproturon + mecoprop) (Hoechst Schering AgrEvo GmbH); Briotril* (+ bromoxynil) (Makhteshim-Agan); Actril* 3 (+ MCPA + dichlorprop salts), Actril* DS (+ 2,4-D esters), Actril* S (+ bromoxynil + dichlorprop + MCPA), Axall*, Brittox* and Maytril* (+ bromoxynil + mecoprop), Belgran* (+ isoproturon), Doublet*, Tromb*, and Twin-Tak* (all + isoproturon + bromoxynil), Foxpro* D (+ bifenoX + D-MCPP), Foxtar* D (+ D-MCPP), Galop* (+ bifenoX + isoproturon + MCPP), Ioniz* VR (+ diflufenican + isoproturon + MCPP), Iotox* (+ MCPP salts), Isotril* (+ MCPP), Mylone* (+ mecoprop), Oxytril* CM (+ bromoxynil esters), Oxytril* M (+ bromoxynil + MCPP esters), Stexal* (+ fluroxypr mep-tyl), Terset* (+ isoproturon + bromoxynil + mecoprop) (Rhone-Poulenc); Nortron* Leyclene (+ bromoxynil + ethofumesate).

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Axall* in New Zealand, Brittox* in Ireland, Maytril* in Ethiopia and Kenya.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (48 h) (soft water) 3-4 mg/l (harlequin). Bee: Only slightly toxic.

SOLUBILITY: Ioxynil sodium salt (% w/v at 20-25°C), water 14; ioxynil octanoate (% w/v at 20-25° C), water insoluble.

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ phenol 110 mg/kg, octanoate 390 mg/kg.

PROTECTIVE CLOTHING: Wear protective gloves when handling concentrate.

See HBN Herbicides.

IP 50* — see Isoproturon.

IP Flo* — see Isoproturon.

Ipatoxone

Identification

EXP. CODE NUMBER: G-31717.

OTHER CODE NUMBERS: CAS 3004-70-4; SHA 080812.

Chemistry

COMPOSITION: 2-Methoxy-4-isopropylamino-6-diethylamino-s-triazine (IUPAC).

Action/Use

ACTION: Herbicide.

Ipazin

(Discontinued by Ciba-Geigy Ltd.)

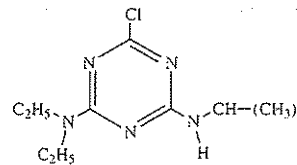
Identification

COMMON NAME: Ipazine (ISO, BSI, WSSA).

EXP. CODE NUMBER: G-30031.

OTHER CODE NUMBER: CAS 1912-25-0.

DISCONTINUED NAME: Gesabal* (Ciba-Geigy Ltd.).



Ipazin

Action/Use

ACTION: Herbicide.

I.P.B.C. — see Sta Brite P*.

IPC — see Propham.

Ipersan* — see Trifluralin.

Ipobenefos — see IBP.

Iprodione

BP: Rhone-Poulenc Ag Co. (Chipco* 26019, Rovral*, Rovral* R)

Identification

COMMON NAME: Iprodione (ISO, ANSI, BSD).

EXP. CODE NUMBERS: 26019 RP (Rhone-Poulenc Ag Co.).

CODE NUMBERS: CAS 36734-19-7; SHA 109801.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

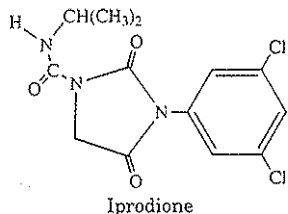
Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

ADDITIONAL TRADE NAME: Kidan* (Rhône-Poulenc Ag Co.)

Chemistry

COMPOSITION: 3-(3,5-dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-1-imidazolidinecarboxamide (CAS).

PROPERTIES: White, odorless, non-hygroscopic crystals. Stable under normal storage conditions. Soluble in acetone (300 g/l) and benzene (200 g/l).



Iprodione

Action/Use

ACTION: Contact/locally systemic fungicide.

USE: Active on a broad spectrum of diseases, Botrytis, Sclerotinia, Septoria, Monilinia, Alternaria, Helminthosporium, Fusarium, Rhizoctonia, etc. Developed in many countries on vine, table grapes, top fruit, stone fruit, almonds, berries, vegetables, ornamentals, flowers, turf, potatoes, oilseed rape, cereals, seed treatment of cereals and vegetables; crops like sugar beets, sunflower, rapeseed, and rice.

FORMULATION: Wettable powder. Flowable.

COMBINATION: Dirac Express* (thiram).

Registration Notes

U.S.: Chipco* 26019 for spring, summer diseases on turf and diseases of ornamentals. Rovral* for various diseases on fruit, vegetables, and some row crops.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 6.7 mg/l (4 days) (rainbow trout), 2.25 mg/l (bluegill). Bee: Nontoxic.

SOIL PARTICLE ADSORPTION: Low order of mobility in soil. Not persistent in soil.

SOLUBILITY: Almost insoluble in water (13 mg/l).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >4400 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Do not contaminate water, food, or feed by storage or disposal of this chemical.

Emergency Guidelines

FLASHPOINT: >100°C.

IPSP — see Aphidan*.

IPT — see Isoprothiolane.

IPU — see Isoproturon.

IPX

(Discontinued by Dow Chemical Co.)

Identification

COMMON NAMES: IPX (WSSA); proxan (ISO-E, BSI); proxane (ISO-F).

CODE NUMBERS: CAS 2634-33-5; SHA 098901.

DISCONTINUED NAME: Goodrite n.i.x (B.F. Goodrich Chemical Co.).

Chemistry

COMPOSITION: Isopropylxanthic acid; O-isopropyl hydrogen dithiocarbonate (IUPAC).



Proxan

Action/Use

ACTION: Herbicide.

Iron Sulfate — see Ferrous Sulfate.

Irrigation Aid*

BP: PureGro Co.

Chemistry

COMPOSITION: Alkylphenoxy polyethoxyethanol and isopropanol.

Action/Use

ACTION: Soil infiltration enhancer.

USE: Aid to increase water penetration in hard to wet soils.

FORMULATIONS: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Isazofos

BP: Ciba (Brace*, Triumph*)

Ciba, Ltd. (Miral*)

Identification

COMMON NAMES: Isazofos (ISO, ANSI, BSI).

EXP. CODE NUMBER: CGA 12223 (Ciba, Ltd.).

CODE NUMBERS: CAS 42509-80-8; SHA 124101.

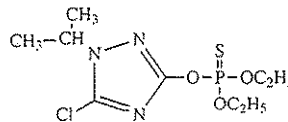
Chemistry

COMPOSITION: O-5-chloro-1-isopropyl-1H-1,2,4-triazol-3-yl O,O-diethyl phosphorothioate.

FAMILY: Organophosphate.

PROPERTIES: Yellowish liquid, boiling point 100°C at 0.001 mm/Hg.

Miscible with organic solvents, e.g., methanol, chloroform.



Isazofos

Action/Use

ACTION: Insecticide.

USE: For turf, maize, rice and other crops.

FORMULATIONS: Emulsifiable concentrates, granules.

Environmental Guidelines

HAZARDS: Bird: (Oral) 61 mg/kg (mallard); (Dietary) 244 ppm (mallard), 81 ppm (bobwhite).

SOIL PARTICLE ADSORPTION: Do not use on sandy soil.

SOLUBILITY: In water, 150 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 40-60 mg/kg. Dermal 118 mg/kg (female); >3100 mg/kg (male).

Miral* moderately to lightly toxic for mammals depending on formulation.

Emergency Guidelines

ANTIDOTE: Atropine, oxime preparations such as PAM or Toxogonin under medical supervision.

ISO

International Organization for Standardization.

See Common Name.

isobac* Fungicide (hexachlorophene) — Discontinued by Webb Wright Corp.

Isobenzan — see Telodrin*.

Isobutyric acid — see Tenox* IBP-2.

isocarbamid

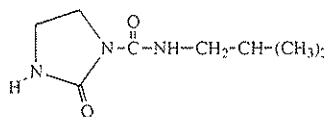
Identification

COMMON NAMES: Isocarbamid (ISO-E, BSI); isocarbamide (ISO-F).

EXP. CODE NUMBERS: BAY-MNF-0166 (Bayer AG).

OTHER CODE NUMBER: CAS 30979-48-7.

DISCONTINUED NAME: Merpelan AZ* (Bayer AG).



Isocarbamid

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3500 mg/kg. Dermal >2500 mg/kg.

Isochlorthion*

(Discontinued by Bayer AG)

Chemistry

COMPOSITION: O,O-Dimethyl O-(4-chloro-3-nitrophenyl) phosphorothioate; (isomer of Chlorthion*).

Action/Use

ACTION: Insecticide.

Isocil

Identification

COMMON NAMES: Isocil (ISO), isoprocil (France, So. Africa).

CODE NUMBERS: CAS 314-42-1; SHA 011801.

DISCONTINUED NAME: Hyvar* General Weed Killer (Du Pont Co.).

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: 5-Bromo-3-isopropyl-6-methyluracil.

Action/Use

ACTION: Nonselective herbicide.

iso-Cornox* — see Mecoprop.

Isodrin

(Discontinued)

Identification

COMMON NAME: Isomer of aldrin.

CODE NUMBER: CAS 465736.

Action/Use

ACTION: Insecticide.

Isufenphos

BP: Bayer AG (Oftanol*)

Identification

COMMON NAMES: Isufenphos (ISO-E, BSD); isophenphos (ISO-F).

EXP. CODE NUMBERS: Bay 92114, Bay SRA 12869.

OTHER CODE NUMBERS: CAS 25311-71-1; SHA 109401; EINECS 246-814-1.

ADDITIONAL TRADE NAMES: Oftanol* (Miles Inc.).

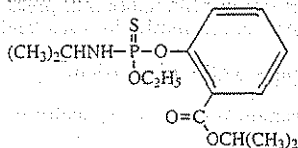
DISCONTINUED NAMES: Amaze* (Bayer AG); Pryfon 6* (Miles Inc.); Discus* (Olympic Horticultural Products).

Chemistry

COMPOSITION: 1-Methylethyl 2-[[ethoxy[(1-methylethyl)amino]phosphinothioyl]oxy]benzoate.

FAMILY: Organophosphorus.

PROPERTIES: Colorless oil. Vapor pressure 0.22 mPa at 20°C. Readily soluble in n-hexane, dichloromethane, 2-propanol, toluene.



Isufenphos

Action/Use

ACTION: Insecticide.

USE: Controls chinch bugs, corn rootworms, flea beetles, mole crickets, rootflies, sod webworms, white grubs, wireworms, and other soil insects in bananas, maize, oil seed rape, sugarcane, turf, vegetables, and other crops. Also aphids and thrips in citrus fruit and onions.

FORMULATIONS: Emulsifiable concentrate, dry seed treatment, flowable, granules, wettable powder.

COMBINATIONS: Nemacur* O (+ fenamiphos), Oftanol* T (+ thiram) (Bayer AG).

Registration Notes

U.S.: Nonfood uses only.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 3.3 mg/l (96 h) (rainbow trout). Bird: LD₅₀ 8.7 mg/kg (bobwhite quail). Bee: Depends on application mode.

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 20 mg/kg b.w.; Dermal approx. 70 mg/kg b.w.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, food, feed.

Emergency Guidelines

FLASHPOINT: <200F (Set-A-Flash), <93°C.

ANTIDOTE: Administer atropine sulfate in large therapeutic doses. Repeat as necessary to the point of tolerance. 2-PAM is also antidotal and may be administered in conjunction with atropine.

EMERGENCY TELEPHONE: 49-2173-38-3030 (Bayer AG); 816-242-2582 (Miles Inc.).

Isoguard* — see Isoproturon.

Isolan

Identification

COMMON NAME: Isolan.

EXP. CODE NUMBER: G 23611 (Ciba-Geigy).

OTHER CODE NUMBERS: CAS 119-38-0; SHA 511500.

DISCONTINUED NAME: Primin* (Ciba-Geigy Ltd.).

Chemistry

COMPOSITION: 1-Isopropyl-3-methyl-5-pyrazolyl dimethylcarbamate (IUPAC).

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 11-50 mg/kg (in aqueous solution).

Isomate-M* — see Pheromone.

Isomer

A chemical, the molecules of which contain the same number and kind of atoms as another chemical but arranged differently, i.e., normal (straight chain) octyl alcohol and its isomer, isoctyl alcohol.

Stereoisomers are those isomers in which the same number and kind of atoms are arranged in an identical manner except for their relative positions in space, i.e., endrin is a stereoisomer of dieldrin.

Isomethiozin — see Tantizon*.

Isomethiozine — see Tantizon*.

Isonoruron

Identification

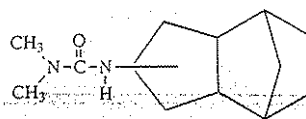
COMMON NAME: Isonoruron (ISO, BSI).

CODE NUMBER: CAS 28805-78-9.

DISCONTINUED NAMES: Basfitox* (+ buturon), Tricuron* (BASF AG).

Chemistry

COMPOSITION: 3-(1 & 2-Hexahydro-4,7-methanoindan-1-yl)-1,1-dimethylurea (IUPAC).



Isonoruron

Action/Use

ACTION: Herbicide.

Isopestox* Insecticide (mipafox) — Discontinued by Fisons Ltd.

Isophenfos — see Isufenphos.

Isoprocarb — see MIPC.

Isoprocarbe — see MIPC.

Isoprocil — see Isocil.

Isopropalin — see Paarlant*.

Isopropaline — see Paarlant*.

Isopropyl Amine

Identification

COMMON NAME: Isopropyl Amine.

TRADE NAMES: Ad-It, Hasten (both Wilbur-Ellis Co.).

Chemistry

COMPOSITION: Adjuvant; esterified vegetable oil.

PROPERTIES: Amber liquid with a fatty odor.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

PROTECTIVE CLOTHING: Neoprene or rubber gloves and safety goggles.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: CO₂, dry chemical, foam.

FIRST AID: In all cases, get prompt medical attention. **Ingested**, give several glasses of water and induce vomiting. Do NOT induce vomiting if person is unconscious. **Skin**, remove contaminated clothing and wash with soap and water. **Eyes**, irrigate eyes for a minimum of 15 minutes with water. **Inhalation**, remove victim to fresh air and administer CPR if necessary.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Isopropyl Ester of 2,4-D — see Citrus Fix*.

Isopropyl Formate

Identification

CODE NUMBER: CAS 625558.

Action/Use

ACTION: Fumigant (Fumigant-like ethyl formate).

USE: For packaged dried fruits, nuts.

Isoprothiolane — see Fuji-One*.

Isoproturon

BP: Chimac-Agriphar S.A. (Rivonex*, Turonex*)

Ciba, Ltd. (Graminon*)

Gharda Chemicals Ltd. (Tech., Avanon*, Isoguard*,

Nocilon*)

HELM AG

Hoechst Schering AgrEvo GmbH (Alon*, Arelon Flüssig*)

Hubei Sanonda Co., Ltd. (Panron*)

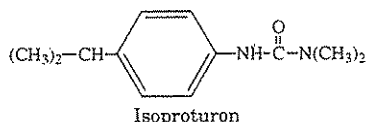
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Chemicals are cross-referenced by common and trade name
Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Makhteshim-Agan (Protugan*)
Paushak Ltd. (Kanak*)
Rallis India Ltd. (Dhar*)
Rhône-Poulenc (Augur*, Foxpro*, Foxta*, Ioniz*,
IP 50*, IP Flo*, Quartz*, Strong*)
Sanachem (Pty) Ltd. (Protosan*)

Identification

COMMON NAME: Isoproturon (ISO, BSI).
TRIVIAL NAME: IPU.
EXP. CODE NUMBERS: CGA 18731 (Ciba-Geigy); Hoe 016410 (Hoechst); 35689 R.P. (Rhône-Poulenc).
OTHER CODE NUMBERS: CAS 34123-59-6; EINECS 251-835-4.
ADDITIONAL TRADE NAMES: Aciron* 50F (Agro Chemicals Industries Ltd.); Vegfru Taurus* (Pesticides India); Proton* (Sulphur Mills Ltd.).
DISCONTINUED TRADE NAMES: Graminon*-Plus and Herbatox* (+ dichlorprop) (BASF AG); Khatau Iso* (Khatau Junker Ltd.).
Chemistry
COMPOSITION: 3-(4-isopropylphenyl)-N',N'-dimethylurea (IUPAC).
PROPERTIES: Pure a.i.: Solid crystalline, melting point 155-156°C.

**Action/Use**

ACTION: Selective herbicide.
USE: Pre and postemergence control of blackgrass, silky bent grass, wild oats, annual meadow grass, rye grass, and many broadleaf weeds in spring and winter wheat, spring and winter barley, and winter rye.
FORMULATIONS: Dispersion, flowable, water dispersible granules, wettable powder.
COMBINATIONS: Aciron* L (+ orbencarb) (Agro Chemicals Industries Ltd.); Sencuron* (+ metribuzin) (Bayer AG); Graminon* Forte (+ triasulfuron) (Ciba Ltd.); Arelon P Flüssig* (+ MCPP), Competitor* (+ fluoroglycofen), Djinn* (+ fenoxaprop-P-ethyl), Dizan*, Post-Kite* (+ ioxynil + mecoprop) (Hoechst Schering AgrEvo GmbH); Trigger* (+ triallate) (May & Baker Ltd.); Astrol*, Belgran* (+ ioxynil), Bifenix*, Tolkan Fox* (+ bifenoxy), Cougar*, Javelin*, Panther* and Quartz* GT (+ diflufenican), Doublet*, Tromb* and Twin-Tak* (+ ioxynil + bromoxynil), Foxtar* (+ bifenoxy + MCPP), Foxtar* D (+ bifenoxy + D-MCPP), Foxta* (+ bifenoxy + neburon), Galop* (+ bifenoxy + ioxynil + MCPP), Ioniz* VR (+ diflufenican + ioxynil + MCPP), Isotril* (+ ioxynil + MCPP), Predix* (+ neburon), Terset* (+ bromoxynil + mecoprop + ioxynil), Zodiac* TX (+ diflufenican) (all Rhône-Poulenc Ag Co.); Tolkan S* (+ dinoterb salts) (Rhône-Poulenc Agrochimie S.A.); Fox DP* (+ bifenoxy + 2,4 DP); Caresine* 2000 (+ bentazone + dichlorprop).

Registration Notes

U.S.: Not marketed.
OUTSIDE U.S.: Zodiac* TX in France.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96 h) (goldfish) 100 mg/l. 90 mg/l (guppy). Slightly toxic. Bee: Nontoxic.
SOLUBILITY: Solubility in water 70 mg/100 ml (20°C).

Safety Guidelines

SIGNAL WORD: CAUTION. (Outside U.S.).

Toxicity Class: III.

TOXICITY: Tech in sesame oil (Rat): Oral LD₅₀ 1826 mg/kg.

Isoran* — see isoproturon.

Isathan*

(Discontinued by Onyx Chemical Co.)

Identification

CODE NUMBERS: CAS 93-23-2; SHA 069130.
ADDITIONAL TRADE NAMES: Isothan Q-15*, Isothan Q-75*.

Chemistry

COMPOSITION: Lauryl isoquinolinium bromide (IUPAC); 2-dodecyl-isoquinolinium bromide (CAS).

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): LD₅₀ 230 mg/kg.

Isoran* — see Fuji-One*.

Isothan Q-15* — see Isothan.

Isothan Q-75* — see Isothan.

isothioate — see Hosdon*.

isothiocyanate de méthyle — see Trapex*.

Isotox* — see Lindane.

Isotril* — see Ioxynil; Isoproturon; MCPP.

Isoxaben — see Gallery*; Snapshot*.

isoxathion — see Karphos*.

IT-3233 — see Amiten*.

IT-3456 — see Chlorfluoreol.

IUPAC

International Union of Pure and Applied Chemistry.

Ivosit* Herbicide (dinoseb acetate) — see Aretit*.

Ixdex* (DDT) — Discontinued by Ciba-Geigy Ltd.

J-455 — see Figaron*.

Jaguar* — see Anvil*; Sulfur.

Japanese Beetle Trap — Discontinued by J.T. Baker Chemical Co.

Japidemic* — see Milky Disease Spores.

Japonilure — see Bag-A-Bug*; Hercon* Disrupt; Hercon* Lure-tape*.

JARA

Japanese Antibiotics Research Association.

See Common Name.

Jasmolins**Chemistry**

PROPERTIES: Pyrethrum extractives comparable to pyrethrins I and II, in this case the terminal double bond of the alcohol side chain being saturated.

Environmental Guidelines

HAZARDS: Fish: Toxic (EC). Nontoxic (Sprays have repellent effect).

See Pyrethrum.

Javelin* Herbicide — see Diflufenican; Isoproturon.

Javelin* WG Biological Insecticide — see *Bacillus thuringiensis* var. *kurstaki*.

JB-1140 — see Intensify* Spray Adjuvant.

JMAF

Designates the Japanese Ministry for Agriculture, Forestry, and Fisheries.

See Common Name; MAF.

Jodfenphos — see Nuvanol* N.

Joint — see Growth Stages For Cereal Crops.

Jointing — see Growth Stages For Cereal Crops.

Joker*

(Discontinued 1985 by Hoechst AG).

Identification

COMMON NAMES: Fenthianprop ethyl (ISO-E draft, BSI); fentianprop (ISO-F draft).

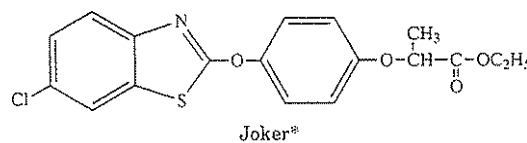
EXP. CODE NUMBER: Hoe 035609.

OTHER CODE NUMBER: CAS 93921-16-5.

ADDITIONAL TRADE NAME: Taifun*.

Chemistry

COMPOSITION: (±)-2-[4-(6-chlorobenzothiazol-2-yloxy)phenoxy]propionate (IUPAC).

**Action/Use**

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 977 mg/kg (male); 919 mg/kg (female).

Jolt* Insecticide (ethoprop) — Discontinued by Velsicol Chemical Corp.

Jonnix* Herbicide (asuiam) — Discontinued by Union Carbide Corp.

Joseol* — see Malathion.

Joust* — see Morestan*.

Jury* — see Glyphosate.

Juvabione**Identification**

CODE NUMBER: CAS 17904-27-7.

Chemistry

COMPOSITION: Methyl [R-(R*,R*)]-4-(1,5-dimethyl-3-oxohexyl)-1-cyclohexene-1-carboxylate (CAS).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: A hormone-like compound in the wood of balsam fir which prevents insects from developing to the adult stage.
See Juvenile Hormone.

Juvenile Hormone

A hormone produced by an insect in the process of its immature development which maintains its nymphal or larval form. Experimental work is underway attempting to utilize the hormone (now synthesized) or some similar synthetic chemical as an insecticide to control insects by preventing their maturity. MTDD is such a synthetic analog of the hormone. Its formula is methyl-3, 7,11-trimethyl-7, 11-dichloro-2-dodecanoate.

See Juvabione.

K-27

F: Knapp Manufacturing

Chemistry

FAMILY: Adjuvant.

PROPERTIES: Nonionic surfactant and phthalic glycerol alkyl resin blend.

Action/Use

ACTION: Wetting agent, spreader, sticker.

USE: With herbicides, insecticides, fungicides, and miticides.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Nontoxic.

K-90

F: Knapp Manufacturing

Chemistry

FAMILY: Adjuvant.

PROPERTIES: Nonionic surfactant.

Action/Use

ACTION: Wetting agent, spreader.

USE: With herbicides, defoliants, desiccants, insecticides, and fungicides.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Nontoxic.

K 1441 — see Methylidymron.

Kabat* Tobacco Protector — see Methoprene.

Kack* Herbicide (cacodylic acid + sodium cacodylate) — Discontinued by Drexel Chemical.

Kafil* — see Permethrin.

Kafil Super* — see Cypermethrin.

Kairomone

A chemical or mixture of chemicals produced by one organism that induces a response in an individual of another species that is unfavorable to the emitter. For example, secondary substances from plants may attract some species that are able to tolerate or even detoxify the compounds within them. Kairomones, like pheromones, could be used to attract pest insects to traps. Allomones might be useful as traps in pest control, but the insect repellents used by man on his skin have been developed so far through extensive screening programs and not from a knowledge of natural products.

Kaisiantuho* Herbicide (dalapon + 2,4-D + 2,4,5-T) — Discontinued by Kemira Oy.

Kalcorn* Herbicide (dithiopyr + pyrazosulfuron-ethyl) — Discontinued 1993 by Monsanto Co., The Agricultural Group.

Kammo*

BP: Helena Chemical Co. (Kammo*)

Chemistry

COMPOSITION: Proprietary blend of dilimonene + paraffin base petroleum oil and nonionic surfactants.

Action/Use

ACTION: Adjuvant.

USE: Provides oil/surfactant effects with a pleasant scent.

Environmental Guidelines

SOLUBILITY: Dispersible.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY: Skin and eye irritant.

Emergency Guidelines

FLASHPOINT: 131°F.

Kanak* — see Isoproturon.

Kaolin

BP: J.M. Huber Corp., Chemicals Div. (Barden*, Nuflo*, Suprex*)
Southeastern Clay Co. (Type 41 Clay*)

Identification

COMMON NAME: Kaolin Clay.

CODE NUMBER: CAS 1332-58-7.

ADDITIONAL TRADE NAMES: Afton*, Suprex*.

Chemistry

COMPOSITION: Kaolinite: Al₂O₃·2 SiO₂·2H₂O.

PROPERTIES: Inert, releases water of hydration at 530°C. Most kaolin clays have medium bulk density, low abrasion, and compatibility with majority of toxicants. Some grades have unusually fine particle size, high adsorption, and suspension properties. Grindability is good if the a.i. is a high melting-point solid and other characteristics include: oil adsorption, 30-35 grams/100 grams oil; bulk density, 20-40 pounds/cubic foot; and pH, 5-6. (Type 41 Clay, 4.5-5.5).

Action/Use

ACTION: Pesticide diluent, carrier.

USE: Hydrous aluminum silicate widely used as a pesticide diluent and carrier in formulating dust concentrates and wettable powders.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic nuisance dust.

HANDLING AND STORAGE CAUTIONS: Use with adequate ventilation. Bulk handling as for any fine powder.

PROTECTIVE CLOTHING: None required, but eye protection recommended. NIOSH-approved dust mask if exposure exceeds TLV.

Emergency Guidelines

FLASHPOINT: Nonflammable.

See Carrier, Clay, Diluent, Dusts.

Kaolinite — see Kaolin; Type 41 Clay*.

Kap* — see Phenthoate.

Karamate* — see Mancozeb; Zineb.

Karate* — see Lambda-cyhalothrin.

Karbaspray* — see Carbaryl.

Karbation* — see Metam-sodium.

Karbofos* — see Malathion.

Karbutilate

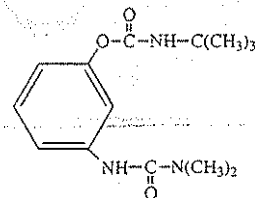
Identification

COMMON NAME: Karbutilate (ISO, ANSI, BSI, WSSA).

EXP. CODE NUMBERS: FMC 11092; NIA 11092 (both FMC Corp.); CGA-61837.

OTHER CODE NUMBERS: CAS 4849-32-5; SHA 097401.

DISCONTINUED NAMES: Tandex* (FMC Corp.); Tanzene* (+ simazine) (Ciba-Geigy).



Karbutilate

Action/Use

ACTION: Broad spectrum herbicide.

Safety Guidelines

TOXICITY: Tech in propylene glycol suspension (Rat): Oral LD₅₀ 3000 mg/kg.

Karmex* — see Diuron.

Karphos*

BP: Sankyo Co., Ltd. (Karphos*)

Identification

COMMON NAME: Isoxathion (ISO, BSI, JMAF).

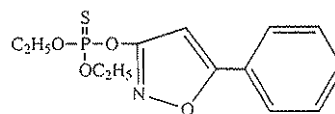
EXP. CODE NUMBER: E-48 (Sankyo Co., Ltd.); SI-6711.

OTHER CODE NUMBER: CAS 18854-01-8.

Chemistry

COMPOSITION: O,O-Diethyl O-(5-phenyl-3-isoxazolyl) phosphorothioate (IUPAC).

PROPERTIES: Slightly yellowish liquid, boiling point at 160°C at 0.15 mm Hg. Vapor pressure 1.2 × 10⁻⁶ mm Hg (25°C). Readily soluble in most organic solvents.



Isoxathion

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Insecticide.

USE: Broad spectrum contact insecticide, stomach poison.

FORMULATIONS: Bait, dust, emulsifiable concentrate, microgranule.

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: In Japan as spray for citrus, tea, tobacco, turf, garden trees, and ornamentals; dusting on paddy rice; soil incorporation of dust or microgranules on vegetables, tobacco, and apples.

Environmental Guidelines

SOLUBILITY: Nearly insoluble in water 1.9 ppm (25°C).

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 242 mg/kg (male); 180 mg/kg (female). Dermal LD₅₀ >2000 mg/kg. (Mouse): Oral LD₅₀ 112 mg/kg (male); 137 mg/kg (female).**Emergency Guidelines**

ANTIDOTE: Atropine.

Karsil*

(Discontinued)

Identification

CODE NUMBER: CAS 2533-89-3.

Chemistry

COMPOSITION: N-(3,4-Dichlorophenyl)-2-methylpentanamide.

Action/Use

ACTION: Herbicide.

Kartril T* Herbicide (diuron + aminotriazole + sodium thiocyanate) — Discontinued 1972 by Pechiney Progil.**Kasugamycin**

BP: Hokko Chemical Industry Co., Ltd. (Kasumin*)

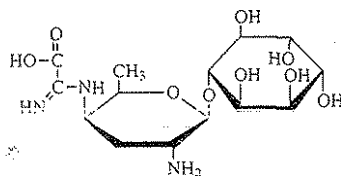
Identification

COMMON NAME: Kasugamycin (JMAF).

CODE NUMBER: CAS 6980-18-3.

ChemistryCOMPOSITION: [5-amino-2-methyl-6-(2,3,4,5,6-pentahydroxycyclohexyloxy)tetrahydropyran-3-yl]amino- α -iminoacetic acid (IUPAC).

PROPERTIES: White needle crystal (standard material), melting point 202-204°C (decomposed).



Kasugamycin

Action/Use

ACTION: Fungicide.

USE: Controls rice blast, tomato leaf mold, bean halo blight, sugar beet cercospora leaf spot, etc.

FORMULATIONS: Dust, liquid, ULV, wettable powder.

COMBINATIONS: Kasumin*-Bordeaux (+ copper oxychloride), Kasurabicide* (+ fthalide) (Hokko Chemical Industry Co., Ltd.).

Environmental Guidelines

SOLUBILITY: Soluble in water (about 1 g/8 ml at room temperature).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 22,000 mg/kg. (Mouse): Oral LD₅₀ 20,500 mg/kg. (Rat): Dermal LD₅₀ >4000 mg/kg. (Mouse): Dermal LD₅₀ >10,000 mg/kg. (Rabbit): Non irritating to eyes and skin.

PROTECTIVE CLOTHING: None. Observe ordinary precautions for pesticide use.

HANDLING AND STORAGE CAUTIONS: Keep cool and dry.

Emergency Guidelines

FIRST AID: Ingestion, induce vomiting by giving salted water. NOTE: Some physicians may discourage use of saline emesis.

Kasumin* — see Kasugamycin.

Kasumin*-Bordeaux — see Copper Oxychloride; Kasugamycin.

Kasurabicide* — see Kasugamycin; Rabicide*.

Kauritil* Fungicide (copper oxychloride) — Discontinued 1989 by BASF AG.

Kayabest*

BP: Nippon Kayaku Co., Ltd.

Identification

COMMON NAME: Methasulfocarb (ISO, BSI).

CODE NUMBER: CAS 66952-49-6.

Chemistry

COMPOSITION: S-4-methylsulfonyloxyphenyl methylthiocarbamate (IUPAC).

PROPERTIES: Pale yellow crystal. Melting point 137.5-138.5°C.

Action/Use

ACTION: Soil fungicide.

USE: Control of seedling blight on rice.

FORMULATIONS: 10% dust.

Registration Notes

OUTSIDE U.S.: Registered in Japan and Taiwan.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ 1.95 ppm (48 h) (carp).

SOLUBILITY: In water 480 ppm.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Mouse) Oral LD₅₀ 342 mg/kg. (Rat) Dermal LD₅₀ >5000 mg/kg.

EMERGENCY TELEPHONE: 03-3212-4360 (Nippon Kayaku Co., Ltd.).

Kayafume* — see Methyl Bromide.

Kayaphos*

BP: Nippon Kayaku Co., Ltd.

Identification

COMMON NAMES: Propaphos (ISO-E draft, BSI, JMAF); propafos (ISO-F draft).

CODE NUMBER: CAS 7292-16-2.

Chemistry

COMPOSITION: 4-(methylthio)phenyl dipropyl phosphate (IUPAC).

PROPERTIES: Colorless liquid.

Boiling point 175-177°C at 0.85 mmHg. Vapor pressure 4.9 × 10⁻⁶ mmHg (at 25°C).**Action/Use**

ACTION: Systemic insecticide with contact and stomach actions.

USE: Control of rice hoppers, rice leaf beetle, rice water weevil.

FORMULATIONS: 5% granule and dust.

Registration Notes

OUTSIDE U.S.: Registered in Japan and Taiwan.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ 4.8 ppm (48 hr) (carp). Bees: Toxic.Bird: LD₅₀ 2.5-5.0 mg/kg (hen).

SOLUBILITY: In water 130 mg/l.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat) Oral LD₅₀ 61.0 mg/kg. Dermal LD₅₀ 88.5 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

ANTIDOTE: Atropine sulfate.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Ingestion, drink one or two glasses of water and induce vomiting.

Kayazinon* — see Diazinon.

Kayazol* — see Diazinon.

Kazoe*

(Discontinued by PPG Industries, Inc.)

Identification

CODE NUMBERS: CAS 26628-22-3; SHA 107701.

DISCONTINUED NAMES: Smite* (PPG Industries, Inc.).

ChemistryCOMPOSITION: Sodium azide (NaN₃).**Action/Use**

ACTION: Herbicide, fungicide, nematicide, soil fumigant.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

K-Cop*

(Discontinued by Griffin Corp.)

Chemistry

COMPOSITION: Copper (8%) as copper ammonia complex.

FAMILY: Transition metal ammonium acetate complex.

Action/Use

ACTION: Fungicide.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

Emergency Guidelines

FIRST AID: Eyes, wash with plenty of water. Get medical attention if irritation persists. Skin, wash thoroughly with water. Get medical attention if irritation persists. Ingestion, drink 1 or 2 glasses of water and induce vomiting by touching the back of throat with finger. Contact physician or poison control center. Inhalation, remove to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. Get medical attention.

Keeper* — see Ethofumesate.

Kelthane* — see Dicofol.

Kelzan* — see Xanthan Gum.

Kelzan* S — see Xanthan Gum.

Kem Prop*

BP: Kem Industries Inc. (Kem Prop*)

Chemistry

COMPOSITION: Propionic acid.

PROPERTIES: Colorless oily liquid with pungent acid odor, specific gravity 0.991 at 75°F. Boiling point is 286°F, vapor pressure 20mm at 125°F, 100% volatile.

Action/Use

ACTION: Fungicide.

USE: High moisture grain.

Environmental Guidelines

SOLUBILITY: Miscible in water.

Safety Guidelines

SIGNAL WORD: DANGER-CORROSIVE.

TOXICITY CLASS: I.

PROTECTIVE CLOTHING: Goggles, air-supplied mask, rubber gloves and local exhaust.

HANDLING AND STORAGE CAUTIONS: Keep container closed when not in use. Store product in a cool, dry place.

SPILL CONTROL/CLEANUP: Small spills should be neutralized with alkali (baking soda), and flushed down the drain with large quantities of water. Large spills should be contained and collected for disposal.

PRODUCT/WASTE DISPOSAL: Use an approved landfill. Consult supplier for additional information.

Emergency Guidelines

FLASHPOINT: 126°F.

FIRE EXTINGUISHING MEDIA: Water spray, dry chemical, carbon dioxide.

FIRST AID: Eyes, immediately flush with plenty of water for at least 15 minutes. Call a physician. Skin, wash with plenty of soap and water. Get medical attention. Remove contaminated clothing and shoes at once; wash thoroughly before reuse. Ingestion, Consult a physician. Inhalation, remove to fresh air.

Kemate* — see Dyrene*.

Kemdazin* — see Carbendazim.

Kemifam* D — see Desmedipham.

Kemifam* Duo — see Ethofumesate; Phenmedipham.

Kemifam* Pro FL — see Desmedipham; Ethofumesate; Phenmedipham.

Kemifam* S — see Desmedipham; Phenmedipham.

Kemikar* — see Carboxin.

Kemiron* — see Ethofumisate.

Kemolate* — see Phosmet.

Kenapon*

(Discontinued by Dow Chemical Co.)

Chemistry

COMPOSITION: Diethylene glycol ester of dalapon + related esters.

Action/Use

ACTION: Systemic grass killer.

Kendo* — see Fenpyroximate.

Kenite* — see Diatomaceous Earth; Dust (s).

Kenopel* — see Guazatine.

Kepone*

Discontinued 1977 by Allied Chemical Corp.)

Identification

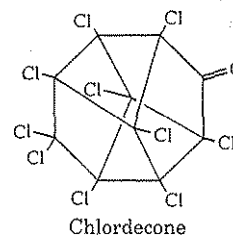
COMMON NAME: Chlordecone (ISO, BSI).

EXP. CODE NUMBER: GC 1189 (Allied Chemical).

OTHER CODE NUMBERS: CAS 143-50-0; SHA 027701; ENT-16391.

Chemistry

COMPOSITION: Perchloropentacyclo[5.3.0.0^{2,6}.0^{3,9}.0^{4,8}]decan-5-one (IUPAC).



Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 114-140 mg/kg (in corn oil solution).

Kerb*

BP: Rohm and Haas Co.

Identification

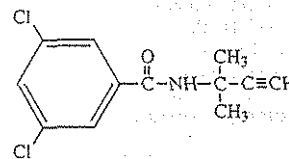
COMMON NAMES: Pronamide (WSSA); propyzamide (ISO, BSI JMAF).

CODE NUMBERS: CAS 23950-58-5; SHA 101701.

Chemistry

COMPOSITION: 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)benzamide (CAS).

FAMILY: Amide.



Action/Use

ACTION: Pre or postemergence selective herbicide.

USE: For a wide range of grasses and certain broadleaf weeds. Tolerant crops include: lettuce, artichoke, legume, bermuda turf, woody ornamentals, nursery stock, Christmas trees, tree fruit, blueberries, raspberry, blackberry and sugar beets (grown for seed), fallow land, endive, escarole, boysenberry, gladiolus and rhubarb.

FORMULATIONS: Wettable powder and inert or granular formulations.

Registration Notes

U.S.: RUP.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96 h) 350 mg/l (goldfish), 150 mg/l (guppy), 72 mg/l (rainbow trout). Bee: Nontoxic. Bird: Oral LD₅₀ >14,000 mg/kg (duck).

DEGRADATION: Half-life in soil generally 1-3 months.

SOIL PARTICLE ADSORPTION: Moderate.

SOLUBILITY: In water, 1.5 x 10⁻³ (g/100 g) at 24°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 8350 mg/kg (male); 5620 mg/kg (female). (Dog): Oral 10,000 mg/kg. (Rabbit): Dermal >3160 mg/kg.

CARCINOGENICITY CATEGORY: B.

PROTECTIVE CLOTHING: Safety glasses, butyl rubber gloves, chemical resistant apron or other impervious clothing to avoid prolonged and repeated skin contact. Respirator must be used whenever workplace conditions warrant. Rinse and remove gloves immediately after use. Wash hands with soap and water.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place but not <32°F (0°C). Do not remove package from container except for immediate use.

Emergency Guidelines

FLASHPOINT: NA.

FIRST AID: Eyes, flush with large amounts of water for at least 15 minutes. Skin, wash affected areas with soap, water. Get medical aid if irritation persists. Inhalation, remove to fresh air. Ingestion, drink 2 glasses of water. Get medical aid. Inhalation, move to fresh air.

EMERGENCY TELEPHONE: Health: 215-592-3000 (Rohm and Haas); Spill: 215-592-3000 or 800-424-9300 (CHEMTREC).

Kernel Guard* — see Captan; Diazinon; Lindane.

Kerapur* — see Benazolin; Galtak*.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Kerosene

Kerosene (Kerosine)

Apparently the first petroleum oil to be used for insect control. Applied by 1877 in a kerosene soap emulsion for control of aphids and scale insects. This use continued until the early years of this century.

Identification

CODE NUMBERS: CAS 8008-20-6; SHA 063501.

Action/Use

ACTION: Solvent.

USE: Used widely as a solvent for household and industrial sprays. The kerosene may be sulfonated to provide an odorless oil or deodorants may be added.

See Petroleum Oils.

Kerosine — see Kerosene.

Ketohexamethylene — see Cyclohexanone.

Ketothion

Identification

CODE NUMBER: CAS 995-30-2.

Chemistry

COMPOSITION: O,O-Diethyl S-acetyl phosphorodithioate.

Action/Use

ACTION: Insecticide.

KF-32 — see Rabdicide.

Khatau Acephate* — see Acephate.

Khatau Chakra* Herbicide (anilofos) — Discontinued 1993 by Khatau Junker Ltd.

Khatau Chlorifos* — see Chlorpyrifos.

Khatau Cyp* — see Cypermethrin.

Khatau Digor* — see Dimethoate.

Khatau Divos* — see DDVP.

Khatau Endo* — see Endosulfan.

Khatau Ethion* — see Ethion.

Khatau Fen* — see Fenvalerate.

Khatau Iso* Herbicide (isoproturon) — Discontinued by Khatau Junker Ltd.

Khatau Malathion* — see Malathion.

Khatau Manzeb* — see Mancozeb.

Khatau Midon* — see Phosphamidon.

Khatau Mono* — see Monocrotophos.

Khatau Quin* — see Quinalphos.

KHE 0145 — see MIPC.

Kick-Start*

BP: Helena Chemical Co. (Kick-Start*)

Chemistry

COMPOSITION: Carboxin + diazinon + lindane.

Action/Use

ACTION: Seed treatment.

USE: For use in beans, field corn, and sweet corn against corn beetles, corn maggots, wireworms and seedling diseases.

PROPERTIES: Gray powder.

Safety Guidelines

SIGNAL WORD: CAUTION.

Kidan* — see Iprodione.

Kieselguhr — see Diatomaceous Earth.

KIK

Identification

OTHER NAME: G-18359.

Chemistry

COMPOSITION: o-Chloro-N,N-diethylbenzamide.

Kilcop 53D* Fungicide (copper sulfate, basic) — Discontinued by Asgrow Florida.

Kildip* — see Dichlorprop.

Kilex* Carbaryl — see Carbaryl.

Kilex* Chlordane Insecticide (chlordane) — Discontinued by Paushak Ltd.

Kilex* Parathion — see Methyl Parathion.

Kill-All* Fungicide/Herbicide/Insecticide (sodium arsenite) — Discontinued by Pennwalt.

Killex — see Trimec*.

Kill-Ko Rat and Mouse Blues* Rodenticide (coumafuryl) — Discontinued 1983 by Rigo Co.

Kill-Ko Rat Killer* — see Diphacinone.

Kill-Net* — see Amitrole; Diuron.

Kilmit 40* Insecticide (TEPP) — Discontinued 1981 by Miller Chemical & Fertilizer Corp.

Kilmor* — see Trimec*.

Kiloseb* Herbicide (dinoseb) — Discontinued by FMC Corp.

Kilprop* — see Mecoprop.

Kilsem* — see MCPA.

Kilval*

BP: Rhone-Poulenc Agrochimie S.A. (Kilval*, Trucidor*)

Identification

COMMON NAME: Vamidothion (ISO, BSI, JMAF).

EXP. CODE NUMBER: 10465 RP (Rhone-Poulenc).

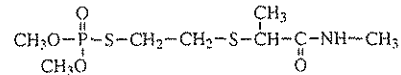
OTHER CODE NUMBERS: CAS 2275-23-2; SHA 379200; ENT: 26613.

DISCONTINUED NAMES: Vamidoate* (Rhone-Poulenc).

Chemistry

COMPOSITION: O,O-dimethyl S-2-(1-methylcarbamoylthio)ethyl phosphorothioate (IUPAC).

PROPERTIES: White crystalline, melting point 40°C. Very soluble in most organic solvents.



Vamidothion

Action/Use

ACTION: Long-lasting systemic aphicide and miticide.

FORMULATIONS: Emulsifiable solution.

Registration Notes

U.S.: Not registered.

OUTSIDE U.S.: Registered in many countries for treatment of orchard trees, hops, rice, sugarcane, vegetables, cotton and ornamentals for use against aphids, sap-feeding insects (leafhoppers) on rice, and mites.

Environmental Guidelines

HAZARDS: Fish: 10 mg/l (14 day) (goldfish). Bee: Nontoxic.

SOLUBILITY: Soluble in water about 4 kg/l.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 100 mg/kg.

Kinalux* — see Quinalphos.

Kinetic*

BP: Helena Chemical Co. (Kinetic*, Kinetic* HV)

Chemistry

COMPOSITION: Proprietary blend of polyalkyleneoxide modified polydimethylsiloxane and nonionic surfactants.

Action/Use

ACTION: Organosilicone based, nonionic wetter/spreader/penetrant spray adjuvant.

USE: Allows rapid spreading and adsorption of pesticide and nutrient sprays into plant leaves and stems.

Safety Guidelines

SIGNAL WORD: CAUTION (Kinetic* HV).

Emergency Guidelines

FLASHPOINT: Greater than 150°F (Kinetic* HV).

Kinetin

Chemistry

COMPOSITION: 6-Furfurylaminopurine.

Action/Use

ACTION: Synthetic plant growth regulator.

Kinoprene — see Enstar* II.

S-kinoprene — see Enstar* II.

Kinubon*

(Discontinued by Hokko Chemical Industry Co., Ltd.)

Identification

TRIVIAL NAME: Kinubon.

Chemistry

COMPOSITION: Strontium quinolinolate.

Action/Use

ACTION: Disinfectant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1550 mg/kg.

Kipsin* — see Methomyl.

Kiron* — see Fenpyroximate.

Kisvax* — see Carboxin.

Kitazin* — see IBP.

Kitron* — see Acephate.

Kiwi Lustr* 277 — see DCNA.

Klartan* — see tau-Fluvalinate.

Klean Krop* Herbicide (dinoseb + naptalam) — Discontinued by Uniroyal Chemical Co., Inc.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Klearfac*

BP: BASF Corp. (Klearfac*)

Identification

COMMON NAME: Phosphate ester of alkoxylate alcohol.

Chemistry

COMPOSITION: Contains free phosphoric acid. Alkyl (C10-C15) Hydroxypoly (oxyethylene/oxypropylene) Heteric. polymer mono and diphosphate esters.

PROPERTIES: Anionic surfactant.

Action/Use

ACTION: Surfactant-adjutant.

USE: Emulsifier, wetting agent. Fertilizer compatible.

Safety Guidelines

TOXICITY: Slightly toxic. Skin and eye irritant.

PROTECTIVE CLOTHING: Wear personal protective equipment.

HANDLING AND STORAGE CAUTIONS: Store in plastic-lined tanks, drums. Avoid contact with metal.

Emergency Guidelines

FIRST AID: Get medical aid. Ingestion, drink water; induce vomiting.

Kleer-Lot* Herbicide (amitrole + linuron)— Discontinued by Rhone-Poulenc.**Klerat*** — see Brodifacoum.**Kloben* Herbicide (neburon)** — Discontinued 1986 by Du Pont Agricultural Products.**Klorex* Herbicide (sodium chlorate)** — Discontinued by Keno-Gard AB.**K-Lox***

(Discontinued 1985 by Kocide Chemical Corp.)

Chemistry

COMPOSITION: Copper triethanolamine complex (8% copper equivalent).

Action/Use

ACTION: Algicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 8 ml/kg. (Rabbit): Dermal LD₅₀ >8 ml/kg.

KM* — see Sodium Chlorate.

KMH — see Maleic Hydrazide.

Knapsack Duster

A duster carried on the back. It is operated by a bellows on top of a cylindrical dust container, the bellows being actuated by a hand lever at the side of the operator.

Knapsack Sprayer

A light sprayer constructed to fit the back of the operator. Unlike compressed air sprayers, it is fitted with a hydraulic pump actuated by a lever for hand movement up and down. Adapted for spraying small gardens and similar areas.

Knave* — see Disulfoton; Quinalphos.**Knockmate*** — see Ferbam.**Knox Out* 2FM**

BP: ELF Atochem North America, Inc. (Knox Out* 2FM)

Identification

ADDITIONAL TRADE NAME: Knox Out* Yellow Jacket Control.

Chemistry

COMPOSITION: Flowable microencapsulated formulation of diazinon.

PROPERTIES: Beige liquid with distinctive odor.

Action/Use

ACTION: Insecticide.

USE: Residual control of ants, carpet beetles, crickets, cockroaches, fleas, flies, greenhouse pests, stored product pests, ticks and silverfish in and around buildings including food handling establishments, greenhouses, food warehouses, processing plants, transportation equipment, etc.; mixed with a bait for western yellow jackets.

FORMULATIONS: Polymeric microcapsules (diazinon dispersed in water in a flowable type formulation). Do NOT use this formulation with oil.

Registration Notes

U.S.: Mound drench (Texas only) for imported fire ants.

Environmental Guidelines

SOLUBILITY: Disperses in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >21,000 mg/kg. (Rabbit): Dermal LD₅₀ >10,000 mg/kg. Inhalation LC₅₀ >22.4 mg/l.

HANDLING AND STORAGE CAUTIONS: Do not apply to humans, their clothing or bedding. Do not contaminate food or use on household tanks. Store in original container only.

Emergency Guidelines

FLASHPOINT: <96°C (TCC).

ANTIDOTE: Atropine. If symptoms of cholinesterase inhibition are present morphine is contraindicated.

EMERGENCY TELEPHONE: 215-419-7219 (ELF Atochem North America, Inc.).

Knoxweed* Herbicide (EPTC + 2,4-D isooctyl ester) — Discontinued by Stauffer Chemical Co.**Koban*** — see Etridiazole.**Kobasic* Fungicide (copper sulfate, basic)** — Discontinued by Kocide Chemical.**K-Obiol***

BP: Roussel Uclaf Corp.

Identification

COMMON NAME: Deltamethrin.

ChemistryCOMPOSITION: (S)- α -cyano-3-phenoxybenzyl (1R,3R)-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropanecarboxylate (TUPAC).**Action/Use**

ACTION: Insecticide.

USE: For insects damaging edible products in stored products, store-houses.

FORMULATIONS: Emulsifiable concentrates, dusts, flowables, ULV.

COMBINATIONS: With synergist piperonyl butoxide in EC, ULV formulations.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 710->40,000 mg/kg (varies by formulation).

HANDLING AND STORAGE CAUTIONS: Avoid eye, skin contact, especially with undiluted EC.

Kobu* — see PCNB.**Kobutol*** — see PCNB.**Kocide*** — see Copper Hydroxide.**Kocide* 20/20** — see Copper, Fixed; Copper Hydroxide.**Kodiak A-T*** — see System[®].**Koltra*** — see Goal.**Kombat* Fungicide (carbendazim)** — Discontinued by Hoechst AG.**Kombind***

BP: Conklin Co., Inc.

Chemistry

COMPOSITION: Phosphate ester + isopropyl alcohol.

PROPERTIES: Clear amber anionic liquid. Acidic pH.

Action/Use

ACTION: Compatibility agent; acidifying and buffering agent.

USE: Enhances compatibility of liquid or powder pesticides in nitrogen solutions or liquid mixed (NPK) fertilizers. Lowers and buffers the pH of spray solutions; adds to stability and uniformity of mixtures.

FORMULATIONS: Liquid.

Environmental Guidelines

SOLUBILITY: Completely water soluble.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

PROTECTIVE CLOTHING: NIOSH approved mist and organic vapor respirator, splash goggles and rubber gloves.

HANDLING AND STORAGE CAUTIONS: Wash thoroughly after handling. May cause skin and eye irritation. Do not store for extended periods of time in other than original container. Avoid freezing; store above 32°F. Do not use, spill, or store near heat or open flame.

Emergency Guidelines

FLASHPOINT: Flammable.

FIRST AID: **Eyes**, flush with water. **Ingestion**, call physician or Poison Control Center.**Komeen***

BP: Griffin Corp. (Komeen*)

Identification

CODE NUMBER: CAS 13426-91-0.

DISCONTINUED NAME: Koplex Aquatic Herbicide*.

Chemistry

COMPOSITION: Copper-ethylenediamine complex (8% copper equivalent).

FAMILY: Ethylenediamine Metallic Complex.

Action/Use

ACTION: Aquatic herbicide.

USE: Use in golf course, ornamental, fish and fire ponds; potable water reservoirs; fresh water lakes and fish hatcheries for control of Hydrilla verticillata, Egeria (Brazilian elodea), and southern naiad.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

FORMULATIONS: Aqueous solution.

COMBINATIONS: Compatible with diquat dibromide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 0.75 ml/kg. (Rabbit): Dermal >8 ml/kg.

PROTECTIVE CLOTHING: Rubber gloves, chemical safety glasses or goggles, dual cartridge respirator for dusts and mists.

HANDLING AND STORAGE CAUTIONS: Store below 35°C. Decomposes at temperatures above 200°C. Store in clean dry area. Average shelf life under proper storage conditions is 2 years. Exercise normal handling precautions for liquid materials.

Emergency Guidelines

FLASHPOINT: Nonflammable.

FIRST AID: Eyes, flush with plenty of water. Get medical attention if irritation persists. Skin, wash thoroughly with soap and water. Get medical attention if irritation persists. Ingestion, drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. Contact physician or Poison Control Center. Inhalation, remove to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. Get medical attention.

EMERGENCY TELEPHONE: 912-242-8635 (Griffin); 800-424-9300 (CHEMTREC).

Komet* — see Force*.

Konesta* Herbicide (TCA) — Discontinued 1986 by Akzo Chemicals B.V.

Konker* — see Carbendazim; Systemic Fungicides; Vinclozolin.

KOP 300* — see Copper Sulfate.

Kop-Fume* — see Ethylene Dibromide.

Kop-Mite* — see Chlorobenzilate.

Kop Thiodan* Insecticide (endosulfan) — Discontinued by Hoechst AG.

Kop-Thion* — see Malathion.

Koplex Aquatic Herbicide* — Discontinued 1985 by Kocide Chemical Corp.

Kopsol* (DDT) — Discontinued by Ciba-Geigy Ltd.

Korax* Fungicide (chloronitropropane) — Discontinued.

Koril* — see Bromoxynil.

Korilene* — see Bromoxynil.

Korlan* — see Ronnel*.

K-Othrine*

BP: Roussel Uclaf Corp.

Identification

COMMON NAMES: Deltamethrin (ISO-E, BSI); deltaméthrine (ISO-F). EXP. CODE NUMBERS: NRDC 161; RU 22974.

OTHER CODE NUMBERS: CAS 52918-63-5; OMS 1998 (WHO).

ADDITIONAL TRADE NAMES: Butoflin*, Butox*, Decis*.

DISCONTINUED NAME: Decamethrin.

Chemistry

COMPOSITION: (S)- α -cyano-m-phenoxybenzyl (1R, 3R)-3-(2,2-dibromovinyl)-2,2 dimethylcyclopropane carboxylate.

Action/Use

ACTION: Insecticide.

USE: Household, public health uses for flying, crawling insects.

FORMULATIONS: Emulsifiable concentrates, flowable, thermal fogging concentrates, ULV, wettable powder.

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 128.5 mg/kg - >5000 mg/kg (varies by formulation, carrier, test conditions). (Rabbit): Dermal LD₅₀ >2000 mg/kg. Flowable, ULV and WP practically nontoxic.

HANDLING AND STORAGE CAUTIONS: Avoid contact with mouth, eyes, and skin especially with undiluted EC. Store in original containers away from foodstuffs and animal feed.

Kotol* insecticide (lindane) — Discontinued by Shell Chemicals UK Ltd.

KO-ZINC WP*

BP: Cuproquim Corp.

Chemistry

COMPOSITION: Copper hydroxide + zinc oxide/sulfate.

FORMULATION: Wettable powder.

Action/Use

ACTION: Fungicide.

USE: For almonds, apricots, cherries, nectarines, peaches, pears and plums.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Corrosive, causes irreversible eye damage.

K-Pin* Herbicide (picloram) — Discontinued by Dow Chemical Co.

Kraftsperser* — see Dispersant; Lignosulfonates.

Krater* — see Asulam; Diuron.

Krenite S* — see Fosamine Ammonium.

Krenite UT* — see Fosamine Ammonium.

Kromad*

(Discontinued by Mallinckrodt, Inc.)

Chemistry

COMPOSITION: Cadmium sebacate + potassium chromate + thiram.

Action/Use

ACTION: Turf fungicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 400 mg/kg. (Rabbit): Dermal 1000 mg/kg.

Krotiline — see Crotilin.

Krovlar*

BP: Du Pont Agricultural Products

Chemistry

COMPOSITION: Bromacil + diuron.

Action/Use

ACTION: Broad spectrum herbicide.

USE: Weed control in citrus, noncrop situations.

Environmental Guidelines

SOIL PARTICLE ADSORPTION: Bromacil can seep or leach through soil and can enter groundwater which may be used as drinking water. Correct use rates by geographical area and proper mixing-loading site precautions and procedures must be followed to minimize potential bromacil movement into groundwater. Follow label.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed or absorbed through skin. Causes eye irritation. Avoid breathing dust or spray mist. Avoid contact with skin, eyes or clothing. Store in secure area out of reach of children and animals.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing before reuse. Inhalation, remove to fresh air.

EMERGENCY TELEPHONE: 800-441-2637 (Du Pont).

Kryocide* — see Cryolite.

Krysid — see Antu.

K-Salt Fruit Fix* 200 — see 1 Naphthaleneacetic Acid.

K-Salt Fruit Fix* 800 — see 1 Naphthaleneacetic Acid.

K-Tea*

BP: Griffin Corp. (K-Tea*)

Chemistry

COMPOSITION: Copper (8%) as copper-triethanolamine complex.

FAMILY: Triethanolamine metal complex.

Action/Use

ACTION: Algaecide.

USE: Controls planktonic and filamentous algae, hydrilla verticillata in golf course ornamental, fish and fire ponds, potable water reservoirs, fresh water lakes and fish hatcheries.

FORMULATIONS: Aqueous solution.

Environmental Guidelines

HAZARDS: Fish: Toxic (generally decreases as water hardness decreases). Consult State Fish and Game Agency before applying to public waters.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Low.

PROTECTIVE CLOTHING: Rubber gloves, chemical safety glasses or goggles, dual cartridge respirator for dusts and mists.

HANDLING AND STORAGE CAUTIONS: Store below 35°C. Decomposes at temperatures above 200°C. Store in clean dry area. Average shelf life under proper storage conditions is 2 years. Exercise normal handling precautions for liquid materials.

Emergency Guidelines

FLASHPOINT: Nonflammable.

FIRST AID: Eyes, flush with plenty of water. Get medical attention if irritation persists. Skin, wash thoroughly with soap and water. Get medical attention if irritation persists. Ingestion, drink 1 or 2 glasses of water and induce vomiting by touching the back of throat with finger. Contact physician or Poison Control Center. Inhalation, remove

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Exclusive reliance must be placed on information/directions supplied by manufacturer.

to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. Get medical attention if irritation persists.
EMERGENCY TELEPHONE: 912-242-8635 (Griffin); 1-800-424-9300 (CHEMTREC).

KUB 3359 — See Aclonifen.
KUE 2079 A — Discontinued by W.A. Cleary.
KUE 13032c — see Euparen*.
KUE 13183b — see Euparen M*.
Kuik* — see Methomyl.
Kumihop* — see IBP.
Kumulan* — see Nitrothal-isopropyl; Sulfur.
Kumulus* DF — see Sulfur.
Kuron* Herbicide (silvex) — Discontinued 1984 by Dow Chemical Co.
Kusagard — see Alloxym-Sodium.
Kusahope D* — see Avirosan*; Sanbird*.
Kusakarín 25* GR — see Butachlor; Sanbird*.
Kusakarín 35* GR — see Butachlor; Sanbird*.
Kusato! — see Sodium Chlorate.

Kylar* Plant Growth Regulator (daminozide) — Discontinued by Uniroyal Chemical Co., Inc.
Kypchlor* Insecticide (chlordane) — Discontinued.
Kypfarín* — see Warfarin.
Kypfos* — see Malathion.
Kypman* — see Maneb.
Kypzin* — see Zineb.
Kytrole* — see Amitrole.
L-205* — see Etridiazole; PCNB; Terrazole.
L-cysteine — see Ergostim*.
L' Fume* — see Aluminum Phosphide.

Label
The AAPCO has adopted this definition: "All written, printed, or graphic matter on, or attached to the economic poison, or the immediate container thereof, and the outside container or wrapper to the retail package of the economic poison."

Labeling
The AAPCO has adopted this definition: "All information and other written, printed, or graphic matter upon the economic poison or any of its accompanying containers or wrappers to which reference is made on the label or in supplemental literature accompanying the economic poison."

Labilite* — see Maneb; Thiophanate-methyl.
Lacco Creosote A.W.P.A.* — Discontinued 1987 by Los Angeles Chemical Co.
Lacco Hi Lin* Insecticide (lindane) — Discontinued by Los Angeles Chemical Co.
Lacco Lin-O-Mulsion* Insecticide (lindane) — Discontinued by Los Angeles Chemical Co.
Lacco Magic Sulphur* Fungicide (sulfur) — Discontinued 1987 by Los Angeles Chemical Co.
Lacco Soil Sulfur* #1 Fungicide (sulfur) — Discontinued by Los Angeles Chemical Co.
Lacco Wettable Sulfur* Fungicide (sulfur) — Discontinued by Los Angeles Chemical Co.
Laccobor Chlorate* — Discontinued by Agtrol Chemical Products)

Chemistry
COMPOSITION: Disodium octaborate tetrahydrate (73%), sodium chlorate (25%).

Action/Use
ACTION: Nonselective herbicide.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 4.3 g/kg.

Laccobor X-5* — Discontinued by Los Angeles Chemical Co.
Lactic Acid — see Propel*
Lactofen — see Cobra*.
Laddok* — see Atrazine; Bentazone.
Laddok* 600 — see Atrazine; Bentazone.
Lafar* — see Bromadiolone.
Lama* — see Nicosulfuron.

Lambast*
(Discontinued by Monsanto Agricultural Co.)
Identification
TRIVIAL NAME: MPMT.
EXP. CODE NUMBER: CP-17029 (Monsanto).
OTHER CODE NUMBER: CAS 845-52-3.

Chemistry
COMPOSITION: 2,4-Bis((3-methoxypropyl)amino)-6-(methylthio)-1,3,5-triazine (IUPAC).

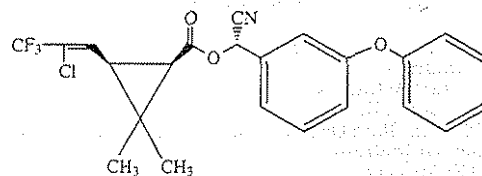
Action/Use
ACTION: Selective herbicide.
Registration Notes
OUTSIDE U.S.: Lambast* trade name reused by Monsanto for another product.

Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: Tech (Rat): Oral LD₅₀ 5700 mg/kg. EC: 1400 mg/kg.

Lambdacyhalothrin
BP: ZENECA Ag Products (Karate*)
ZENECA Agrochemicals (Karate*)
ZENECA Professional Products (Commodore*, Demand* CS, Scimitar*)
ZENECA Public Health (Commodore*, Demand*, Icon*, Jureong*, Kung Fu*, Matador*, Samurai*)

Identification
COMMON NAMES: Lambdacyhalothrin (ISO-E draft, BSI); lambda-cyhalothrin (ISO-F draft); cyhalothrin-lambda (CSA).
EXP. CODE NUMBER: ICIA-0321; PP321 (ZENECA Agrochemicals).
OTHER CODE NUMBER: CAS 91465-08-6; SHA 128867; OMS 3021 (WHO).
DISCONTINUED NAME: Samurai* (ZENECA Professional Products).

Chemistry
COMPOSITION: α-cyano-3-phenoxybenzyl 3-(2-chloro-3,3,3-trifluoro-prop-1-enyl)-2,2-dimethylcyclopropanecarboxylate, a 1:1 mixture of the (Z)-(1R,3R), S-ester and (Z), (1S,3S), R-ester (IUPAC).
FAMILY: Synthetic pyrethroid.
PROPERTIES: Solid, melting point 49.2°C. Soluble in range of common organic solvents.



Karate* and enantiomer (1:1 mixture)

Action/Use
ACTION: Insecticide, acaricide.
USE: Controls a wide range of agricultural, horticultural, domestic and structural pests, and animal ectoparasites.
FORMULATIONS: Emulsifiable concentrate, ULV, wettable powder.
Registration Notes
U.S.: RUP.

Environmental Guidelines
HAZARDS: Fish: LC₅₀ 0.21 mg/l (bluegill), 0.24 mg/l (rainbow trout).
Bird: LD₅₀ >3950 mg/kg (Mallard).
Dietary LC₅₀ >5000 ppm (quail).
SOLUBILITY: Low solubility in water; 0.004 mg/L at pH H in water.

Safety Guidelines
TOXICITY: (Tech) (Rat): Oral LD₅₀ 79 mg/kg (male); 56 mg/kg (female); Dermal LD₅₀ 632 mg/kg (male); 696 mg/kg (female).
PROTECTIVE CLOTHING: Chemical tight goggles and impervious gloves.
HANDLING AND STORAGE CAUTIONS: Do not store near feed, food or within reach of children. Skin and eye protection when handling concentrate. Refer to individual product labels.

Emergency Guidelines
FLASHPOINT: 187°F, 86°C (Setaflash).
FIRE EXTINGUISHING MEDIA: Water fog, foam, carbon dioxide, dry chemical, halogenated agents.
FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. If allowed to penetrate skin, apply fat based oil or cream. Water is highly polar and after a prolonged period of time will not decrease but may prolong the irritation. Remove contaminated clothing and shoes. **Ingestion**, drink one or two glasses of water. **Inhalation**, remove to fresh air.

Lambrol*
(Discontinued by Agrimont S.p.A.)
Identification
COMMON NAMES: Fluénéthyl (France); fluenetyl (ISO, BSI).
EXP. CODE NUMBER: M 2060 (Farmoplant S.p.A.).

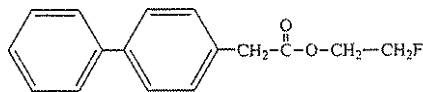
Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator
Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

OTHER CODE NUMBERS: CAS 4301-50-2; SHA 462200.

OTHER NAME: Fluenyl.

Chemistry

COMPOSITION: 2-Fluoroethyl biphenyl-4-ylacetate (IUPAC).



Fluenetil

Action/Use

ACTION: Acaricide, insecticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 6-8 mg/kg.

Lance*

(Discontinued by BASF AG)

Identification

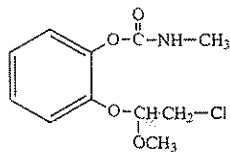
COMMON NAME: Cloethocarb (ISO, BSI).

EXP. CODE NUMBER: BAS 263L.

OTHER CODE NUMBER: CAS 51487-69-5.

Chemistry

COMPOSITION: 2-(2-chloro-1-methoxyethoxy)phenyl methylcarbamate (IUPAC and CAS).



Cloethocarb

Action/Use

ACTION: Insecticide-nematicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 35.4 mg/kg. Dermal >4000 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine.

Lance* Herbicide — see Alachlor; Trifluralin.

Landmaster* BW

BP: Monsanto Co., The Agricultural Group (Landmaster* BW)

Chemistry

COMPOSITION: Glyphosate (N-phosphonomethyl glycine) + 2,4-D (2,4-dichlorophenoxy acetic acid) as the isopropylamine salts.

Action/Use

ACTION: Nonselective postemergent herbicide.

USE: For field bindweed and annual weeds in fallow and reduced tillage systems in barley, corn, milo, oats, rye and wheat.

Environmental Guidelines

SOLUBILITY: Very soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 3860 mg/kg (slightly toxic). (Rabbit): Dermal >6366 mg/kg (practically nontoxic). Severely irritating to eyes, moderately irritating to skin.

PROTECTIVE CLOTHING: Long sleeved shirt, long pants, water-proof gloves, socks, shoes, and protective eyewear. When mixing or loading without a mechanical system, wear the above plus coveralls or a chemical resistant apron.

HANDLING AND STORAGE CAUTIONS: Do not get into eyes, on skin or on clothing.

Emergency Guidelines

FLASHPOINT: >212°F (tag closed cup).

FIRE EXTINGUISHING MEDIA: Water spray, foam, dry chemical, CO₂ or other Class B agent.

EMERGENCY TELEPHONE: 314-694-4000 (Monsanto Co., The Agricultural Group).

Landrin*

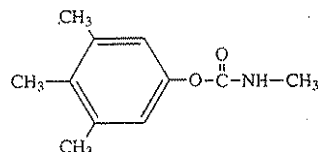
(Discontinued by Shell Chemical Co.)

Identification

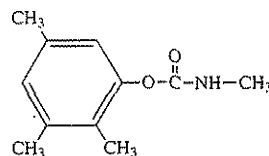
CODE NUMBERS: CAS 12407-86-2; SHA 102401.

Chemistry

COMPOSITION: Approx. 4:1 ratio of 3,4,5- and 2,3,5- isomers of trimethylphenyl methylcarbamate.



3,4,5-Trimethylphenyl Methylcarbamate



2,3,5-Trimethylphenyl Methylcarbamate

Action/Use

ACTION: Soil insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 208 mg/kg. (Rabbit): Dermal LD₅₀ >2500 mg/kg.

Lannate* — see Methomyl; Methyl Parathion.

Lanox* — see Methomyl.

Lanray*

BP: Kumiai Chemical Industry Co., Ltd. (Lanray*)

Identification

COMMON NAMES: Orbencarb (ISO draft, BSI); orthobencarb (JMAF).

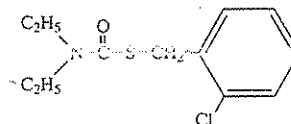
CODE NUMBER: CAS 34622-58-7.

ADDITIONAL TRADE NAMES: Aciray* 50 (Agro Chemicals Industries Ltd.).

Chemistry

COMPOSITION: S-2-chlorobenzyl diethylthiocarbamate (IUPAC).

PROPERTIES: Very soluble in xylene, alcohols and acetone.



Orbencarb

Action/Use

ACTION: Preemergent herbicide.

USE: Lanray* for control of grasses, broadleaf weeds in wheat, barley and turf.

FORMULATIONS: Emulsifiable concentrate.

COMBINATIONS: Lanray*-L EC (+ linuron).

Environmental Guidelines

SOLUBILITY: 23.9 mg/l in water (27°C).

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Mouse): Oral LD₅₀ 1010 mg/kg.

Lanslide* (lenacil + linuron) — Discontinued 1984 by Pan Britannica Industries, Ltd.

Lanstan* Fungicide (chloronitropropane) — Discontinued 1973 by FMC Corp.

Lapfran* (ditalimfos) — Discontinued by Dow Chemical Co.

Lariat*

BP: Monsanto Co., The Agricultural Group (Lariat*)

Chemistry

COMPOSITION: Alachlor + atrazine.

Action/Use

ACTION: Selective herbicide.

USE: Preplant incorporated, preemergence weed control in corn, sorghum. Applications on sorghum must be made only to grain sorghum (milo) planted with seed that has been properly treated with the screen seed protectant.

FORMULATIONS: Liquid.

Registration Notes

U.S.: RUP.

Safety Guidelines

SIGNAL WORD: WARNING.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 4400 mg/kg. (Rabbit): Dermal >5000 mg/kg. Moderate eye, severe skin, irritant.

PROTECTIVE CLOTHING: Coveralls over short sleeved shirt and short pants, chemical resistant gloves, socks, chemical resistant footwear, protective eyewear, chemical resistant apron when cleaning equipment, mixing or loading, and chemical resistant headgear for overhead exposure. Discard, do not reuse, clothing and other absorbent materials that have been drenched or heavily contaminated with product concentrate.

HANDLING AND STORAGE CAUTIONS: Store >40°F. May freeze at <32°F.

Emergency Guidelines

EMERGENCY TELEPHONE: 314-694-4000 (Monsanto Co., The Agricultural Group).

Larva

The early stage (caterpillar, maggot, grub, etc.) in development of such insects as moths, flies, beetles, ants, bees, etc. It is the stage following the egg and before the adult and pupa or resting stage. Plural, larvae. See Nymph.

Larvacide* — see Chloropicrin.

Larvadex* — see Cyromazine.

Larvatroi* Insecticide (*Bacillus thuringiensis* var. *kurstaki*)

— Discontinued by Biochem Products.

Larvicide

A substance intended to kill especially the larvae of certain insect pests such as mosquitoes.

Larvin*

BP: Rhone-Poulenc

Identification

COMMON NAME: Thiodicarb (ISO, ANSI, BSI).

EXP. CODE NUMBER: UC 51762, UC 51769 (Union Carbide Corp.).

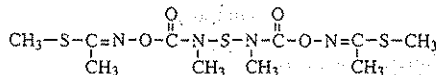
OTHER CODE NUMBERS: CAS 59669-26-0; SHA 114501; OMS 3026 (WHO); AI3-29311.

ADDITIONAL TRADE NAME: Chipco* Nivral* (Rhone-Poulenc).

Chemistry

COMPOSITION: Dimethyl N,N-(thiobis(methylimino)carbonyloxy)bis(ethanimidothioate) (IUPAC).

PROPERTIES: White to light tan crystalline powder (solid), slightly sulfurous odor, melting point 168-172°C. Solubility at 25°C (Weight %): acetone - 0.8; dichloromethane 15.0; methanol 0.5; xylene 0.3.



Larvin*

Action/Use

ACTION: Insecticide, ovicide.

USE: Active against major Lepidopterous; suppresses Coleopterous, and some Hemipterous insect pests. Controls budworms, bollworms, podworms, corn earworms, corn borers, cutworms, armyworms, loopers, leafworms, budworm, midge, green cloverworm, velvetbean caterpillar, foliage feeding beetles, tortrix, hornworms, bagworms, leafroller, webworm, and other caterpillars. Active as an ovicide alone and in tank mix combinations with pyrethroids and organophosphates against cotton bollworms and budworms.

FORMULATIONS: Dry flowable, flowable, wettable powder.

Registration Notes

U.S.: Cotton, soybeans and fresh market corn in Florida only. Applications for processing sweet corn, sorghum, peanuts, ornamentals and noncrop areas, seed treatment, tomatoes, broccoli, cabbage, cauliflower, peppers and leafy vegetables have been submitted.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Moderately toxic as direct treatment. Field data show nontoxic after spray residues dry. Bird: Toxic. The impact of thiodicarb on most beneficial arthropods is minimal at recommended use rates. Foliage residual activity may last up to 14 days or longer.

SOLUBILITY: At 25°C (Weight %): water 35 ppm.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat-water): Oral LD₅₀ 166 mg/kg. (Rat-corn oil): 120 mg/kg. (Dog): >800 mg/kg. (Monkey): >467 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

Larvin* 3.2 (Rat): Inhalation LC₅₀ 1.51 mg/l (4h).

Larvin* 80DF: 0.52 mg/l (4h).

Aqueous flowables and 80DF are in toxic category 3 (NIL) in CA.

HANDLING AND STORAGE CAUTIONS: Do not store in or around the home. Store unused product in a cool, dry locked area. Do not allow prolonged storage at >115°F (46°C). Do not contaminate food, water, or feed by storage or disposal. Do not reuse container. Unused pesticide, spray mixtures, or rinse water that cannot be applied as directed on label instructions must be disposed of according to applicable Federal, State or local procedures.

Emergency Guidelines

ANTIDOTE: Specific treatment consists of parenteral atropine sulfate. Caution should be maintained to prevent overatropinization. Narcotics and other sedatives should not be used. Further, drugs such as 2-PAM are NOT recommended unless organophosphate intoxication is also suggested. See label.

Larvo-BT* Insecticide (*Bacillus thuringiensis* var. *kurstaki*)

— Discontinued 1994 by FERMONE Corp., Inc.

Larvos* — see Fenitrothion.

Laser* Herbicide — see Focus*.

Laser* Insecticide — see Baythroid*.

Lasher* — see Chlorsulfuron.

Lasso* — see Alachlor.

Late Postemergence

Applied after the specified crop or weeds are well established.

Latron*

BP: Rohm and Haas Co.

Action/Use

ACTION: Series of EPA exempt spray adjuvants, including a spreader-activator, spreader-binder, spreader-sticker and compatibility and buffering (acidifying) agent.

USE: Varies with formulations.

Safety Guidelines

SIGNAL WORD: DANGER, WARNING, CAUTION. Varies with formulation.

TOXICITY CLASS: I, II, III.

PROTECTIVE CLOTHING: Chemical splash goggles, Viton* (Du Pont) or polyvinyl alcohol gloves.

HANDLING AND STORAGE CAUTIONS: Store in well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRST AID: **Eyes,** flush immediately and for at least 15 min. with plenty of water. **Skin,** wash thoroughly with soap and water. If irritation persists, get medical aid. **Inhalation,** remove to fresh air. Give artificial respiration if breathing has stopped; give oxygen if breathing is difficult, and get prompt medical aid. **Ingestion,** drink 2 glasses of water. Get prompt medical aid.

Lauryl Thiocyanate — see Loro*.

Lauseto Neu**Chemistry**

COMPOSITION: Chloromethyl p-chlorophenyl sulfone.

Action/Use

ACTION: Insecticide.

Lawn-Keep* — see 2,4-D.

Layby Application

Applied with or after the last cultivation of a crop.

Lazeril* — see Diflufenican.

Lazo* Herbicide (dithiopyr + bromobutide) — Discontinued 1993 by Monsanto Co., The Agricultural Group.

LC₅₀

Abbreviation denoting median lethal concentration, rather than median lethal dose as in the case of LD₅₀.

LC₅₀ is often used to measure the toxicity of a chemical present in air or water. Often expressed in parts per million (ppm), the lower the LC₅₀ value, the more poisonous the chemical.

See LD₅₀.

LD₅₀

Abbreviation of median lethal dose, MLD. It indicates the amount of toxicant necessary to effect a 50% kill of the pest being tested. It is expressed in weight of the chemical per unit of body weight (mg/kg). LD₅₀ is used to measure the acute oral and dermal toxicity of a chemical. The lower the LD₅₀, the more poisonous the chemical.

See LC₅₀.

Leaching

Downward movement of a material in solution through soil.

Lead Arsenate**Identification**

COMMON NAME: Lead arsenate (for acid form).

CODE NUMBERS: CAS 7784-40-9; SHA 013503.

ADDITIONAL TRADE NAMES: Gypsine*, Soprabel*.

DISCONTINUED NAME: Taibot* (Mechema Chemicals Ltd.).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: Acid orthoarsenate, $PbHAsO_3$, known as acid lead arsenate; also basic orthoarsenate, $Pb_3(PbOH)(AsO_3)_3$, known as basic lead arsenate.

FAMILY: Inorganic arsenicals.

PROPERTIES: Not so readily decomposed as other arsenical insecticides and less likely to be phytotoxic. Especially true of the basic lead arsenate, which could be applied to peach trees. Basic lead arsenate had limited application, as on peach or even other fruits in moist climates where the less stable acid form caused leaf burn.

Action/Use

ACTION: Stomach insecticide.

USE: Acid lead arsenate has had extensive use in the control of fruit insects, especially on apple and other orchards. Synthetic organic chemicals have replaced much of its use.

Registration Notes

OUTSIDE U.S.: For fruit trees, vegetables, rubber, coffee, cocoa, grapefruit, turf treatment.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bird: Moderately toxic.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Leader* Herbicide (bentazone) — Discontinued 1994 by Terra International, Inc.

Leaf Act 80*

BP: PureGro Co.

Identification

ADDITIONAL TRADE NAMES: Leaf Act 80A*, Leaf Act 80B*, Leaf Act 80HE*, Leaf Act 80S*.

Action/Use

ACTION: Spreader activator, herbicide enhancer, spreader/sticker, and buffer spreader.

USE: Nonionic spray adjuvant to increase contact activity by enhancing spreading, penetration, and retention of pesticide sprays, and by minimizing alkaline hydrolysis.

FORMULATIONS: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

See Penetrant; Spreader; Sticker.

Leaf-All* — see Cacodylic Acid; Sodium cacodylate.

Leafex* — see Sodium Chlorate.

Leafex 2* — see Sodium Chlorate.

Leafex 3* — see Sodium Chlorate.

Lebaycid* — see Fenthion.

Legumex Extra* — see 2,4-DB; Galtak*; MCPA.

Legurame* — see Carbetamide.

Leivasom* — see Trichlorfon.

Lektan* Herbicide (ethiozin) — Discontinued by Mobay Corp.

Lenacil

BP: Chemol Trading Ltd. Co. (Adol*)
Du Pont Agricultural Products (Venzar*)
HELM AG

Identification

COMMON NAMES: Lenacil (ISO-E, ANSI, BSI, WSSA); lenacile (ISO-F).

CODE NUMBERS: CAS 2164-08-1; SHA 525200; EINECS 218-499-0.

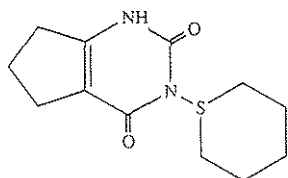
ADDITIONAL TRADE NAMES: Lenacilo Flo Aragonesas* (Aragonesas Agro S.A.).

DISCONTINUED NAME: Ban-Hoe* (+ propham) (Shell Chemicals UK).

Chemistry

COMPOSITION: 3-Cyclohexyl-5,6-trimethylenuracil; or 3-cyclohexyl-6,7-dihydro-1H-cyclopentapyrimidine-2,4-(3H,5H)-dione.

PROPERTIES: Colorless crystals, melting point 316-317°C.



Lenacil

Action/Use

ACTION: Herbicide.

USE: Primarily in Europe for weed control in sugar beets, strawberries and flax.

COMBINATIONS: Lenapac* and Pyrasur* (+ metolachlor) (BASF AG); Pyrasur* L (+ chloridazon + metolachlor) (BASF Corp.); Seppic Lin* (+ linuron); Trammat* Combi (+ ethofumesate).

FORMULATIONS: Flowable, wettable powder.

Environmental Guidelines

HAZARDS: Fish: Low toxicity. Bee: Nontoxic.

SOLUBILITY: Water solubility 6 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): LD_{50} >11,000 mg/kg.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Lenacile — see Lenacil.

Lenacilo Flo Aragonesas* — see Lenacil.

Lenapac* — see Lenacil; Pyramin*.

Lentagran* — see Pyridate.

Lentemul* — see 2,4-D; Dichlorprop; MCPA; MCPP.

Lentrek* — see Chlorpyrifos.

Lepit* — see Chlorophacinone.

Lepticide* Insecticide (Bacillus thuringiensis var. kurstaki)

— Discontinued by Biochem Products.

Leptophos — see Phosvel*.

Leptox* Insecticide (Bacillus thuringiensis var. kurstaki) —

Discontinued by Biochem Products.

Lesan*

(Discontinued 1989 by Bayer AG)

Identification

COMMON NAMES: Fenaminosulf (ISO-E, BSI); phénaminosulf (ISO-F).

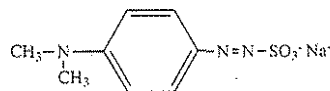
EXP. CODE NUMBERS: Bay 22555, Bayer 5072.

OTHER CODE NUMBERS: CAS 140-56-7; SHA 034201.

DISCONTINUED NAME: Diazoben*.

Chemistry

COMPOSITION: Sodium [4-(dimethylamino)phenyl]diazenesulfonate (CAS).



Fenaminosulf

Action/Use

ACTION: Fungicide, seed treatment.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD_{50} 75 mg/kg. Dermal LD_{50} >100 mg/kg.

Lethane 384 Regular*

(Discontinued 1984 by Rohm and Haas Co.)

Identification

CODE NUMBER: CAS 112-56-1.

Chemistry

COMPOSITION: 2-(2-butoxyethoxy)ethyl thiocyanate (IUPAC) in petroleum distillate.

Action/Use

ACTION: Insecticide.

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD_{50} 90 mg/kg. (Rabbit): Dermal 34 mg/kg.

Lethox* Insecticide/Acaricide (carbophenothion) — Discontinued by Planters Products, Inc.

Lexone* — see Metribuzin.

Ley-Cornox* Herbicide (benazolin) — Discontinued by FBC Ltd.

Leymin* Herbicide (benazolin) — Discontinued by FBC Ltd.

Leyspray — see MCPA.

Leytosan*

Chemistry

COMPOSITION: Phenylmercury urea.

Action/Use

ACTION: Fungicide.

LH 30/Z — see Propineb.

Lidax* — see Lindane.

Lider* — see Glyphosate.

Life Cycle

The complete succession of developmental stages in the life of an organism.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Lignasan* Fungicide (ethylmercury phosphate) — Discontinued by Du Pont Agricultural Products.

Lignasan* BLP Fungicide — Discontinued by Du Pont Agricultural Products.

Lignosite* — see Lignosulfonates.

Lignosol*

BP: LignoTech USA

Identification

COMMON NAME: Lignosulphonic acid salts.

CODE NUMBER: CAS 102-71-6.

Chemistry

COMPOSITION: Sodium or calcium lignosulphonates.

Action/Use

ACTION: Dispersing agents, sequestrants.

USE: In wettable powders, in flowables, metal complexing agents.

Registration Notes

U.S.: Approved as inert ingredient in agricultural formulation for pre or postharvest application by FDA and EPA.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Relatively nontoxic.

HANDLING AND STORAGE CAUTIONS: No special handling cautions.

See Dispersant; Lignosulfonates.

Lignosulfonates

BP: Georgia-Pacific Corp. (Lignosite*)

LignoTech USA, Inc. (Borresperse*, Diwatex*, Lignosol*,

Maracarb*, Maracell*, Maraspense*, Norlig*, Vanisperse*)

R.T. Vanderbilt Co., Inc. (Darvan*)

Westvaco Corp., Polychemicals Dept. (Kraftspense*,

POLYFONS*, Reax*)

Action/Use

ACTION: Dispersants for wettable powders, water dispersible granules and suspension concentrates; stabilizers of liquid concentrates.

USES: Borresperse*, Lignosite*, Lignosol*, Maraspense*, Norlig*, Polyfons*, Reax* and Vanisperse* refer to several different types of lignosulfonate dispersing agents suitable for suspending toxicants in the preparation of wettable powders, flowables and water dispersible granules. Experimentation is usually required to match the proper dispersant with a specific formulation. These materials are water-soluble, anionic derivatives of lignin: Darvan* is a dispersing agent in flowables and wettable dust. Maracell XC* will effectively prevent 2,4-D amine concentrates from precipitating when diluted with hard water. Polyfons* are a series of sugar-free sodium lignosulfonate dispersants having varying degrees of sulfonation. Reax* is the name applied to a series of sulfonated lignin dispersants, wetter-dispersants, and metal complexing agents each of which is specifically designed for use in its area of application. All members of the series are sugar-free, highly soluble, free-flowing powders. Lignosite* available in liquid or powder form with various cations. Raylig* is the name of a group of sodium lignosulfonates formerly made by ITT Rayonier, Inc. The group consisted of several variations to perform specific functions.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Relatively nontoxic. Approved as inert ingredients in agricultural formulations by FDA and EPA.

PROTECTIVE CLOTHING: Dust mask, goggles, rubber gloves recommended.

Lihocin* — see Chloromequat Chloride.

Limalum*

F: Comercial Tecnica Aralf S.A.

Chemistry

COMPOSITION: Phosphoric acid, citric acid, octyl phenoxy polyethoxyethanol.

FAMILY: Organic and inorganic acids.

PROPERTIES: Light yellow clear liquid. Corrosive acid.

Action/Use

ACTION: Descaler remover.

USE: Removes scales and oxides from metal in fruit and vegetable processing equipment.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic. Bird: Toxic.

SOLUBILITY: 100% soluble in water.

Safety Guidelines

PROTECTIVE CLOTHING: Synthetic rubber gloves, glasses, apron and rubber gloves.

HANDLING AND STORAGE CAUTIONS: Keep container sealed.

Emergency Guidelines

COMBUSTION PRODUCTS: Not flammable but can react with met-

als to liberate hydrogen.

FIRST AID: Get medical attention. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water.

EMERGENCY TELEPHONE: 506-32-7954 (Comercial Tecnica).

Limatox* — see Metaldehyde.

Lime — see Hydrated Lime.

Limeol G* — see Metaldehyde.

Lime Sulfur

BP: Best Sulfur Products (BSP Lime-Sulfur Solution*, Soil-Mend*, Sulforix*)

Biochem S.R.L. (Policalcio 30*, Zolfosol 25*)

Chemol Trading Ltd. Co. (Neviken*)

Miller Chemical and Fertilizer Corp.

SureCo, Inc.

Identification

COMMON NAME: Lime sulfur (ESA, JMAF).

CODE NUMBERS: CAS 1344-81-6.

ADDITIONAL TRADE NAME: OR-CAL Rex Lime Sulfur* (Oregon-California Chemicals, Inc.).

Chemistry

COMPOSITION: Calcium polysulfides.

FAMILY: Sulfur.

PROPERTIES: Deep red-orange liquid; rotten egg odor.

Action/Use

ACTION: Fungicide, insecticide (scalecide), miticide.

USE: Provides continued protection by decomposition to leave a residue of sulfur. Has miticidal activity. Was largely supplanted by newer synthetic fungicides with a milder action on plants, but use is increasing due to cancellations and/or resistance of synthetics.

FORMULATIONS: Liquid concentrate.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (form).

TOXICITY CLASS: I (form).

TOXICITY: (Rat): Oral LD₅₀ 400-500 mg/kg. May cause irreversible corneal damage.

PROTECTIVE CLOTHING: Coveralls over long-sleeved shirt and long pants, chemical-resistant footwear plus socks, waterproof gloves, safety goggles, approved respirator, and chemical-resistant apron when cleaning equipment, mixing or loading.

HANDLING AND STORAGE CAUTIONS: Potential formation of explosive and toxic hydrogen sulfide gas should this product come in contact with acids. Caustic and disagreeable to apply. Commonly mixed in dormant oil sprays but cannot be formulated with soap or oil emulsion without the addition of a stabilizer. May burn when weather becomes warm. Keep out of reach of children. Causes eye damage and skin irritation.

Emergency Guidelines

FIRST AID: Get medical attention for eye contact. **Eyes**, wash immediately with fresh water for at least 15 minutes. **Skin**, remove contaminated clothing and wash thoroughly. **Inhalation**, move victim to fresh air. **Ingestion**, do NOT give anything but water; see a doctor.

See also Sulfur.

Limestone — see Calcium Carbonate.

Limit*

(Discontinued 1993 by PBI/Gordon Corp.)

Identification

TRIVIAL NAME: Amidochlor (rejected common name proposal).

EXP. CODE NUMBERS: MON-4620, CP-76963 (Monsanto Co., The Agricultural Group).

CODE NUMBER: CAS 40164-67-8.

DISCONTINUED NAMES: Trade name Limit* was formerly used for the preemergence herbicide α -chloro-N,N-diallylacetylacetamide plus 2,4-D.

Chemistry

COMPOSITION: N-[(acetylamino)methyl]-2-chloro-N-(2,6-diethylphenyl)acetamide (CAS).

Action/Use

ACTION: Turf grass regulator.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3100 mg/kg.

Lim-N8* — see Brodifacoum.

Linamex* — see Butralin.

Lindacol* Insecticide (lindane) — Discontinued by Shell Chemicals UK Ltd.

Lindagam* — see Lindane.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Lindane

BP: All India Medical Corp. (Lintox*)
Drexel Chemical Co.
HELM AG
India Pesticides Ltd.
Inquinosa
Krishi Rasayan
Rhone-Poulenc

Identification

COMMON NAMES: Lindane (except in Great Britain), gamma BHC, gamma HCH.

CODE NUMBERS: CAS 58-89-9; SHA 009001.

ADDITIONAL TRADE NAMES: Acitox* (Agro Chemicals Industries Ltd.); Hammer* (Agsin Pte. Ltd.); Forlin*, Gamaphex*, Gammex*, Isotox* (Chevron Chemical Co.); Chimac L200*, Lidax* (Chimac-Agriphar S.A.); Etan 3G* (Diachem S.P.A.); Lindasun* EC (Gupta Chemicals Pvt. Ltd.); Germate* Plus, Lindane 30, Lindane 40% (Gustafson Inc.); Gamma-Mean 400* and Gamma-Mean L.O.*; Gamma Mean Seed*, Gamma-Up* (Oregon-California Chemicals, Inc.); Sulbenz* (Sulphur Mills Ltd.); Lindagam*, Novigam*, Silvanol*.

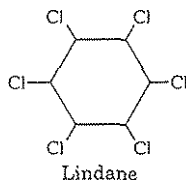
DISCONTINUED NAMES: Agrox* 3-Way (+ captan + diazinon) (Chipman Chemicals); Gammalin* 20 (ICI Agrochemicals); Noitakoisumu* (+ DDT) (Kemira Oy); Lacco Hi Lin*, Lacco Lin-O-Mulsion* and Lin-O-Sol* (Los Angeles Chemical Co.); Lindol 6G* (Rhone-Poulenc); Kotal*, Lindacol* (Shell Chemicals UK Ltd.); Agronexit*, Inexit*, Nexit* (Shell International Chemical Co. Ltd.); Ceregam* (+ methoxyethylmercury silicate), Sopragam* (+ parathion) (SOPRA).

Chemistry

COMPOSITION: Gamma isomer of 1,2,3,4,5,6-hexachloro-cyclohexane.

FAMILY: Chlorinated hydrocarbons.

PROPERTIES: Must not contain less than 99% of the gamma isomer of BHC. White, free-flowing crystalline, melting point 112-113°C. Essentially odor-free. Slightly soluble in mineral oils, soluble in acetone, aromatic, and chlorinated hydrocarbons.

**Action/Use**

ACTION: Insecticide.

USE: Many uses of which seed and soil treatments are prominent. More vapor activity than most organochlorine insecticides. For protection of tobacco transplants from cutworms and wireworms (Tobacco Transplant Solution).

FORMULATIONS: Emulsifiable concentrates, flowables, wettable powders, oil-base sprays, granules, dusts, aerosols, smoke generator. COMBINATIONS: DB-Green* (+ maneb) (AGSCO, Inc.); Seed Shield* Isopro* and Seed Shield* Protos* (+ captan + graphite), Seed Shield* Maneb/Lindane (+ maneb) (Cornbelt Chemical); Gamatin*, Germate Plus* (+ carboxin + diazinon), Enhance Plus* (+ carboxin + maneb), Vitavax*-Thiram-Lindane (+ carboxin + thiram) (Gustafson); Kick-Start* (+ carboxin + diazinon) (Helena Chemica); Sevidol* (+ carbaryl) (Rhone-Poulenc); Grain Guard Plus* (+ mancozeb), Kernel Guard* (+ captan + diazinon), Sorghum Guard* (+ captan) (Trace Chemicals, Inc.); Agrox* D-L Plus (+ captan + diazinon), Gammasan* (+ captan), Granol* (+ maneb) (Wilbur-Ellis Co.).

Registration Notes

U.S.: Some applications have been classified as RUP. Recommended as seed treatment for control of wireworms and seed corn maggots on various crops. Currently marketed under SLN registrations.

OUTSIDE U.S.: Sevidol* (Rhone-Poulenc) for rice and sugarcane in India and Vietnam.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: Solubility in water varies with temperature: 7.3 ppm at 25°C, 12 ppm at 35°C, 14 ppm at 45°C.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 88-125 mg/kg. Dermal 1000 mg/kg.

PROTECTIVE CLOTHING: Wear protective equipment to avoid personal contact.

HANDLING AND STORAGE CAUTIONS: If ingested, induce emesis, then administer magnesium sulfate and observe. Some physicians

may discourage use of saline emesis. If on skin, remove contaminated clothing and wash with soap and water; if in eyes, flush with running water. Store in a dry place. Avoid exposure of product to extreme heat, strong alkalis, and powdered metals.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Foam, halon, dry chemical, CO₂. Water may not be effective.

ANTIDOTE: Lindane is a central nervous system stimulant for which no specific antidote is available. A short acting barbiturate should be used for alleviation of symptoms. Diazepam is the treatment of choice for convulsions.

See gamma-BHC.

Lindane HG1* — see Lindane.

Lindasun* EC — see Lindane.

Lindol 6G* Insecticide (lindane) — Discontinued by Rhone-Poulenc.

Line Rider* Herbicide (2,4,5-T) — Discontinued.

Linex* — see Linuron.

Linfafer* —

BP: Biochem S.R.L.

Chemistry

COMPOSITION: Soluble aminoacids + peptones N (from aminoacids).

Action/Use

ACTION: Growth regulator.

USE: Foliar application, local fertigation at various plant stages.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Store in original container in well-aired storehouse. Shelf life more than 5 yr. under normal conditions.

Linormone 60* Herbicide (sodium + potassium + MCPA amine salts) — Discontinued by Pechiney Progil.

Linorox — see Linuron.

Lin-O-Sol* Insecticide (lindane) — Discontinued by Los Angeles Chemical Co.

Lintox* — see Lindane.

Linurac* — see Linuron.

Linurex* — see Linuron.

Linuron

BP: Drexel Chemical Co.

Du Pont Agricultural Products (Lorox*)

Griffin Corp. (Linex*)

Hoechst Schering AgrEvo GmbH (Afalon*)

Makhteshim-Agan (Linurex*, Norunil*)

Identification

COMMON NAME: Linuron (ISO, ANSI, BSI, JMAF, WSSA).

EXP. CODE NUMBER: Hoe 002810 (Hoechst AG).

OTHER CODE NUMBERS: CAS 330-55-2; SHA 035506.

ADDITIONAL TRADE NAMES: Desherbant Legumes*, Linurac* (Chimac-Agriphar S.A.); Linurex* (Fersol Indústria E Comércio Ltda.); Linorox*, Sarclax*.

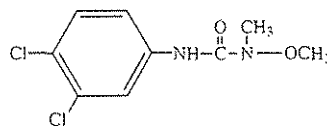
DISCONTINUED NAMES: Linuron-Chimiberg*, Malurane* (Diachem S.P.A.); Kleer-Lot* (+ amitrole), Premalin* (+ monolinuron) (Rhone-Poulenc); Bronox* (+ trietazine), Pre-Empt* (+ trietazine + trifluralin) (Schering AG); Amilon* WP (+ chloramben) (Union Carbide Corp.).

Chemistry

COMPOSITION: 3-(3,4-dichlorophenyl)-1-methoxy-1-methylurea or N-(3,4-dichlorophenyl)-N'-methoxy-N'-methylurea.

FAMILY: Substituted urea.

PROPERTIES: Fine flakes or coarse powder. Melting range 86-91°C. Slight solubility (tech. ai) in aliphatic hydrocarbons, moderate in ethanol and common aromatic solvents.

**Action/Use**

ACTION: Herbicide.

USE: Selective weed control in field corn, sweet corn (layby), grain sorghum, soybeans, asparagus, carrots, celery (post transplant), parsnips, potatoes, cotton (layby), and wheat (Pacific Northwest); used for short-term control of annual weeds in noncrop areas such as roadsides and fence rows.

FORMULATIONS: Dry flowable, flowable, water dispersible granule, wettable powder.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

COMBINATIONS: Nemifest* (+ trifluralin) (ISAGRO); Lorox Plus* (+ chlorimuron ethyl) (Du Pont); Lanslide* (+ lenacil).

Registration Notes

U.S.: Lorox* use on cotton voluntarily cancelled by Du Pont.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96 h) 9.6 mg/l (bluegill); 3.3 (rainbow trout).

Bee: Nontoxic.

SOLUBILITY: Water solubility (pure a.i.) approx. 55 mg/1000 ml. at 22°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech in starch mucilage (Rat, female): Oral LD₅₀ 4000 mg/kg. HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, and clothing. Wash contaminated clothing with soap and hot water before re-use. Store in a cool, dry place. Keep out of lakes, streams, or ponds. Do not contaminate water by cleaning of equipment or disposal of wastes.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush with water for at least 15 minutes. Skin, wash with water, change clothes.

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Linuron-Chimiberg* — see Linuron.

Liphadione — see Chlorophacinone.

Liqua-Gel*

BP: Miller Chemical & Fertilizer Corp. (Liqua-Gel*)

Identification

DISCONTINUED NAME: Aqua-Gel* (Miller Chemical & Fertilizer Corp.).

Chemistry

COMPOSITION: 100% Starch acrylate potassium polymer.

PROPERTIES: When mixed with water, absorbs many times its own weight of water, forming a gel. In pure deionized water, Liqua-Gel* absorbs about 400 to 500 times its own weight of water.

Action/Use

ACTION: Water-holding gel.

USE: For transplant water used for transplanting tobacco, vegetables, flowers. Seed treatment to maintain moisture close to seeds for faster germination and earlier emergence, also in transplanting of trees and shrubs, bare root plants, balled plants, etc.

Environmental Guidelines

SOLUBILITY: Swells in water; is not completely water soluble. Does contain water extractable material.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children.

Emergency Guidelines

FIRST AID: Eyes, flush with large amounts of water. Skin, wash exposed area thoroughly with soap and water.

Liqua-Tox Liquid Concentrate — see Warfarin.

Liquified Petroleum Gas — see LP Gas.

Liquiphene* — see PMA.

Liqui-Stik* — see 1-Naphthaleneacetic Acid.

Lironion*

Discontinued by Ciba-Geigy Ltd.)

Identification

COMMON NAME: Difenoxuron (ISO, BSD).

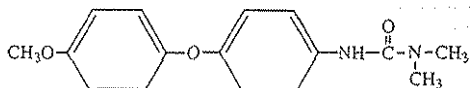
EXP. CODE NUMBER: C 3470 (Ciba-Geigy Ltd.).

OTHER CODE NUMBERS: CAS 14214-32-5; SHA 551400.

DISCONTINUED NAME: Pinoran*.

Chemistry

COMPOSITION: 3-[4-(4-methoxyphenoxy)phenyl]-1,1-dimethylurea (IUPAC).



Difenoxuron

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >7750 mg/kg. Dermal >2150 mg/kg.

Lissapol NX — see Agral 90*.

Lite-R-Cobs*

BP: The Andersons Industrial Products Group (Lite-R-Cobs*)

Identification

COMMON NAME: Corncobs.

OTHER NAMES: Ground Corncobs, Ground Non-Woody Ring, Coarse Chaff, Fine Chaff and Pith.

Chemistry

COMPOSITION: C 0.54 H 1.00 O 0.43.

PROPERTIES: Inert toward almost all pesticides. Stable substrate for carbamates and phosphates.

Action/Use

ACTION: Carrier for pesticides.

USE: Pesticides formulated on Lite-R-Cobs* tend to remain on leaves rather than fall to the ground. Over 100 other uses.

FORMULATIONS: Variety of pesticides formulated on Lite-R-Cobs*.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

PROTECTIVE CLOTHING: Goggles recommended. NIOSH-approved mask if nuisance dust >TLV.

HANDLING AND STORAGE CAUTIONS: Combustible; handle, store as such.

Lithate* 2,4-D

BP: Guth Corp.

Chemistry

COMPOSITION: Lithium 2,4-dichlorophenoxyacetate.

PROPERTIES: Nonvolatile metal salt.

Action/Use

ACTION: Herbicide.

USE: Postemergent application for broadleaf weeds in small grains, rice, corn, sorghum, grass pastures, and noncropland.

Environmental Guidelines

SOLUBILITY: 100% soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 850 mg/kg.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. Do not store or ship with food or foodstuffs. Dosage-unit when dissolved in several gallons of water for spraying presents no appreciable handling hazards.

Lithium Hypochlorite**Identification**

CODE NUMBERS: CAS 13840-33-0; SHA 014702.

Action/Use

ACTION: Disinfectant.

LM-91 — see Chlorophacinone.

Lock-On* — see Chlorpyrifos.

Locucide* — see Nosema locustae Canning.

Lo-Drift* — see Viscosity Adjuvant.

Logic* — see Fenoxycarb.

Logran* — see Amber*.

Lolop Granule*

(Discontinued by Nihon Nohyaku Co., Ltd.)

Identification

OTHER NAME: Phenopylate.

CODE NUMBER: CAS 40575-34-6.

Chemistry

COMPOSITION: Pyrolidynyl-2,4-dichlorophenyl carbamate.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Mouse): Oral LD₅₀ 850 mg/kg.

Lomar*

BP: Henkel Corp.

Action/Use

ACTION: Dispersant.

See Dispersant.

Lomica* — see Uniconazole.

Lonacol* Fungicide (zineb) — Discontinued by Bayer AG.

Lonchocarpus — see Cube.

Londax*

BP: Du Pont Agricultural Products (Londax*)

Identification

COMMON NAME: Bensulfuron-methyl (ISO draft, ANSI, BSI, WSSA).

EXP. CODE NUMBER: DPX F5384.

OTHER CODE NUMBER: CAS 83055-99-6.

Chemicals are cross-referenced by common and trade name

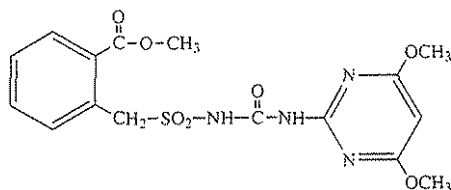
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: Methyl 2-[[[[(4,6-dimethoxypyrimidin-2-yl) amino] carbonyl]amino]sulfonyl]methyl]benzoate (CAS).

PROPERTIES: Odorless, white to pale yellow solid, melting range 185-188°C. Soluble in methylene chloride, relatively soluble in acetonitrile, ethyl acetate, acetone and methanol.



Bensulfuron-Methyl

Action/Use

ACTION: Herbicide.

USE: Londax* for selective (postemergence to rice) control of most broadleaf and sedge weeds in continuously flooded rice. Application should be made directly to standing water and water should be held on the field a minimum of 5 days prior to release (if any).

FORMULATIONS: Dry flowable.

COMBINATIONS: FujiGrass* (+ esprocarb) (ZENECA).

Registration Notes

U.S.: Registered 1989.

OUTSIDE U.S.: Marketed in most rice-growing countries.

Environmental Guidelines

SOLUBILITY: Water 2.9-1200 ppm at 25°C, pH 5-8.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg. Nonmutagenic. Noncarcinogenic. Nonirritating to skin, eyes.

HANDLING AND STORAGE CAUTIONS: Store product in original container only. Wash hands before eating or smoking. Keep out of reach of children. Do not contaminate water, other pesticides, food or feed by storage or disposal. Keep from contact with fertilizers, insecticides, fungicides, and seeds during storage.

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

London Purple

An early mixture of calcium arsenite, calcium arsenate, and dye materials as a byproduct of English dye industry. It was variable in composition and therefore difficult to use safely.

Lontrel* — see Clopyralid.

Lontrel* 205 — see Clopyralid; 2,4-D.

Loro* Insecticide (lauryl thiocyanate) — Discontinued 1971 by Du Pont Agricultural Products.

Lorox* — see Linuron.

Lorox Plus*

BP: Du Pont Agricultural Products

Chemistry

COMPOSITION: Linuron + chlorimuron ethyl.

Action/Use

ACTION: Herbicide.

USE: Preemergence annual broadleaf control in soybeans.

FORMULATIONS: Dry flowable.

Safety Guidelines

SIGNAL WORD: WARNING.

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Lorsban* — see Chlorpyrifos; Thiram.

Lo-Scent* Odor Inhibitor — Discontinued 1985 by Rhone-Poulenc.

Lospel* Fungicide — see Tetraconazole.

Lo-Vol* Herbicide (2,4-D) — Discontinued 1984 by SDS Biotech Corp.

Lovoza* Insecticide/Acaricide (fenazaflor) — Discontinued by Fisons Ltd.

Low-volatile Ester

An ester (2,4-D, for example) in which the alcohol component is one like isooctyl alcohol which is above the boiling range, resulting in a material liable to drift any considerable distance.

See Ester.

Low Volume Spray

This term on a label signifies that the total volume of spray to be applied is adequate to cover uniformly the crop being treated, but not to the point of runoff.

See Ultra Low Volume Spray; Full Coverage Spray.

LP-Gas*

Liquified (or compressed) petroleum gas or bottled gas for flame cultivation, crop drying and tobacco curing as well as domestic purposes. This material is a byproduct of petroleum refining or natural gasoline manufacture, and usually consists of propane, and propane-butane mixtures.

BP: Phillips 66 Co.

LS 74783 — see Fosetyl-Aluminum.

LS 80 1213 — see Blazer*.

Lucanal* — see Naled.

Lucaphos* — see DDVP.

Lucathion* — see Malathion.

Lucavex* — see Trichlorfon.

Lucel*

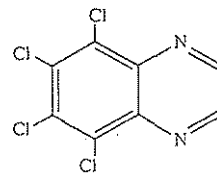
Identification

COMMON NAME: Chlorquinox (ISO, BSI).

CODE NUMBER: CAS 3495-42-9.

Chemistry

COMPOSITION: 5,6,7,8-Tetrachloroquinoxaline (IUPAC and CAS).



Chlorquinox

Action/Use

ACTION: Fungicide.

Lucenit* — see Diuron.

Lupins* — see Diflufenican.

Luprosil*

BP: BASF AG (Luprosil*)

Identification

CODE NUMBERS: CAS 79-09-4; SHA 077702.

Chemistry

COMPOSITION: Propionic acid C₂H₅CO.OH

Action/Use

ACTION: Bactericide, fungicide, mold inhibitor.

USE: Acid: Liquid grain and feed preservative. Salts: Powder and liquid feed preservative.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 3500 mg/kg. Corrosive.

PROTECTIVE CLOTHING: Wear rubber gloves, goggles and protective clothing.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g. suitable incineration, in accordance with local regulations.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, skin, wash immediately with plenty of water.

See Grain Preservatives.

Lure — see Pheromone; Attractant.

Luxistelm* Insecticide (thiometon) — Discontinued by Sandoz Ltd.

LV 400 2,4-D Weedkiller — see 2,4-D.

Lye**Identification**

CODE NUMBER: CAS 1310-73-2.

Chemistry

COMPOSITION: Strong alkaline solution of potassium hydroxide (caustic potash) or sodium hydroxide (caustic soda).

Action/Use

ACTION: Disinfectant.

Lynx* — see Tebuconazole.

Lypor* — see Temephos.

Lyton* Herbicide (dithiopyr + bromobutide) — Discontinued 1993 by Monsanto Co., The Agricultural Group.

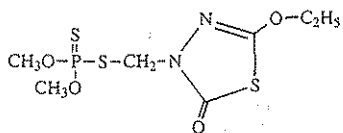
Lythidathion**Identification**

COMMON NAME: Lythidathion (ISO, BSI).

EXP. CODE NUMBERS: GS 12968 (Ciba-Geigy Ltd.); NC-2962 (Fisons).

OTHER CODE NUMBERS: CAS 2669-32-1; SHA 427400.

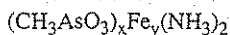
Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.



Lythidathion

Action/Use
ACTION: Insecticide.
Registration Notes
 Experimental. Never marketed.
2M-4Kh-M — see MCPB.
M 74 — see Disulfoton.
M 2060 — see Lambrol*.
M 3432 — see Drepamon*.
M 8164 — see Serinal*.
M 9834 — see Galben*.
M 14360 — see Tetraconazole.
M40* Herbicide (MCPA) — Discontinued by Shell Chemicals UK Ltd.
M-81 — see Thiometon.
MAA — see Methanearsonic Acid.
MAA + 2,4-D — see Methanearsonic Acid.
MAbs — see Monoclonal Antibodies.
Machal* — see XMC.
Machete* — see Butachlor.
MACH-MACH* — see Butachlor.
Macondray* — see 2,4-D.
Mad* Herbicide (2,4-D + MSMA) — Discontinued 1989.
Maestro* — see Ioxynil.
MAF
 Designates the Japanese Ministry of Agriculture and Forestry.
 See also Common Name; JMAF.
MAFA, MAF
 BP: Kumiai Chemical Industry Co., Ltd. (Neo-Asozin*)
 Shinung Corp. (Neo So Sin Gin*)

Identification
COMMON NAME: MAFA, MAF (JMAF).
Chemistry
COMPOSITION: (MAFA) Ferric ammonium salt of methane arsenic acid. (MAF) Ferric methane arsonate.
PROPERTIES: Stable under light.



MAFA



MAF

Action/Use
ACTION: Fungicide.
USE: For rice sheath blight, ripe rot of grapes.
FORMULATIONS: Dust, liquid.
Safety Guidelines
SIGNAL WORD: DANGER—POISON.
TOXICITY CLASS: I.
TOXICITY: (Rat): Oral: LD₅₀ 2600 mg/kg (male); 2100 mg/kg (female).
HANDLING AND STORAGE CAUTIONS: Avoid contact with skin or eyes. Wash with plenty of soap and water after handling. Keep away from children.
Mafu* — see DDVP.
Maggot
 Larval stage of a fly or certain other insects.
Magic* — see Fenpropimorph; Monocrotophos; Prochloraz.
Magic Circle Deer Repellent*
 F: State College Laboratories (Subsidiary of J.C. Ehrlich Chemical Co., Inc.)

Chemistry
COMPOSITION: Bone tar oil (93.75%), inert ingredient (6.25%).
Action/Use
ACTION: Deer repellent.
USE: Repels deer by odor. Dilute mixture as coarse spray for field perimeter or area requiring protection. Use undiluted to saturate strips of absorbent material to be placed around area to be protected.

Registration Notes
 Do not apply to plants or crops intended for human or animal consumption.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
Magic Circle Rabbit Repellent*
 F: State College Laboratories (Subsidiary of J.C. Ehrlich Chemical Co., Inc.)

Chemistry
COMPOSITION: Thiram a.i. tetramethylthiuram disulfide (20%), inert (80%).
Action/Use
ACTION: Rabbit and deer taste repellent.
USE: As a summer application, spray liberally over entire plant to be protected. During fall and winter, apply liberally to trunks and lower branches of trees and shrubs.
Registration Notes
 Do not apply to plants or crops intended for human or animal consumption.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
HANDLING AND STORAGE CAUTIONS: Harmful if swallowed. Avoid contact with skin or eyes. Keep out of reach of children.
Magister* — see Command*.
Magnacide* B — see Magnacide* H.
Magnacide* H
 BP: Baker Performance Chemicals, Inc., Magna-Herbicide Div.

Identification
COMMON NAME: Acrolein.
CODE NUMBERS: CAS 107-02-8; SHA 000701.
ADDITIONAL TRADE NAMES: Magnacide* B (microbiocide).

Chemistry
COMPOSITION: Prop-2-enal (IUPAC); 2-propenal (CAS).
Action/Use
ACTION: Aquatic herbicide, rodenticide.
USE: Controls submerged and floating aquatic weeds, algae in irrigation canals.
Registration Notes
 U.S.: In registration process for all 50 states. Registered as a rodenticide under SLN in California, Idaho, Nevada, Utah, and Wyoming.

Environmental Guidelines
SOLUBILITY: In water, 21.5% (68°F).
Safety Guidelines
SIGNAL WORD: DANGER—POISON.
TOXICITY CLASS: I.
PROTECTIVE CLOTHING: Nonvented goggles and gloves to be worn during application. Full face respirator with organic vapor cartridge to be available in the event of a leak.
HANDLING AND STORAGE CAUTIONS: Extremely flammable; irritating vapor and liquid. Poisonous by inhalation, skin contact or swallowing. Do not breathe vapor; do not get in eyes or skin or on clothing. Keep away from fire sparks and heated surfaces. Should be stored in a cool, shady, well-ventilated area, protected from weather and away from other chemicals. (No alkalies or oxidizing materials should be near.)

Emergency Guidelines
FIRST AID: Get medical aid. **Eyes,** wash immediately with running water for at least 15 minutes. **Skin,** remove all contaminated clothing and wash skin with soap, running water. **Inhalation,** remove to fresh air immediately; give artificial respiration if breathing has stopped. **Ingestion** DO NOT induce vomiting. Drink large quantity of milk, egg whites, gelatin solution, or if those are not available, large quantities of water. Avoid alcohol.

Magnaphos* — see Magnesium Phosphide.
Magnate* — see Imazalil.
Magnesium Aluminum Silicate — see Van Gel*.

Magnesium Arsenate
Identification
CODE NUMBER: CAS 10103-50-1.
Action/Use
ACTION: Insecticide.
USE: Secondary magnesium arsenate, trimagnesium orthoarsenate, and basic magnesium orthoarsenate all have been used as insecticides. Although these compounds have a high arsenic content they give poorer results than calcium or lead arsenates and are more expensive. When used they were applied as a dust or spray diluted with hydrated lime or other carrier.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Magnesium Carbonate**Identification**

CODE NUMBERS: CAS 546-93-0 (anhydrous); CAS 23389-33-5 (dihydrate).

Action/Use

ACTION: Acts as a desiccant dust.

USE: For stored product insects.

Magnesium Chlorate

BP: Aragonesas Agro, S.A. (Defoal*, Desecol*)

Identification

CODE NUMBER: CAS 10326-21-3.

ADDITIONAL TRADE NAMES: De-Fol-Ate*, E-Z-Off*, Magron*, MC Defoliant*, Ortho MC*.

Action/Use

ACTION: Formerly used mainly for defoliation of cotton and for desiccation of regrowths in vine.

See Chlorates.

Magnesium Fluosilicate**Identification**

ADDITIONAL TRADE NAME: Eulava SM*.

Action/Use

ACTION: Insecticide; some value as a wood preservative.

Magnesium Phosphide

BP: Degesch America, Inc.

Degesch de Chile Ltd.

Degesch de Mexico, S.A.

Degesch So. Africa (Pty.) Ltd.

Detia Degesch GmbH (Degesch Plate*, Fumi-Cel*,

Fumi-Strip*, Magtoxin*)

United Phosphorus Ltd. (Magnaphos*)

Identification

CODE NUMBERS: CAS 12057-74-8; SHA 066504.

Chemistry

COMPOSITION: Magnesium phosphide, Mg₃P₂.

FAMILY: Inorganic phosphides.

PROPERTIES: The magnesium phosphide in Fumi-Cel* and Fumi-Strip* and Magtoxin* reacts with atmospheric moisture to release hydrogen phosphide (PH₃, phosphine), an effective insect-killing gas.

Action/Use

ACTION: Fumigant.

USE: For insects in stored almonds, barley, brazil nuts, cashews, cocoa beans, coffee beans, corn, cottonseed, dates, filberts, flower seed, grass seed, millet, oats, peanuts, pecans, pistachio nuts, popcorn, rice, rye, sorghum, soybeans, sunflower seed, triticale, walnuts, wheat, vegetable seed, animal feed or feed ingredients, specified processed foods, and stored tobacco. Magtoxin* Prepac Spot Fumigant for control of insects in food and feed processing machinery and equipment.

Formulations

FORMULATIONS: Tablets, pellets, plate, and prepac spot.

Registration Notes

U.S.: RUP. Marketed as Fumi-Cel*, Fumi-Strip*.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Hydrogen phosphide TLV/time weighted average 0.3 ppm. TLV/short-term exposure limit 1.0 ppm. Immediately dangerous to life or health level 200 ppm.

PROTECTIVE CLOTHING: Gloves for Magtoxin* tablets or spent dust.

HANDLING AND STORAGE CAUTIONS: Under no circumstances shall any processed food or bagged commodity come in contact with residual dust from metal phosphide fumigants. Store only in a cool, dry, locked and ventilated room. Open containers outdoors only. Protect from moisture, open flames and heat. Wash hands thoroughly after handling. Aerate used gloves and other contaminated clothing in a well-ventilated area prior to laundering.

Emergency Guidelines

FIRST AID: Inhalation, remove to fresh air and keep warm. Get medical aid.

EMERGENCY TELEPHONE: 703-234-9281 (Degesch America); 562-811-1575 (Degesch de Chile); 525-888-1417 (Degesch de Mexico); 2711-974-2338 (Degesch So. Africa (Pty.) Ltd.); 49-6201-7080 (Detia Degesch GmbH).

Magnet* — see Polytrap*.

Magnetic* 6 Fungicide/Acaricide (sulfur) — Discontinued by Stauffer Chemical Co.

Magnetic 70* — see Sulfur.

Magnum* Herbicide — see Pyramin*.

Magnum* Pyrethroid Insecticide — see Beta-cyfluthrin; Methamidophos.

Magron* — see Magnesium Chlorate.

Magtoxin* — see Magnesium Phosphide.

Magtoxin* Prepac Spot Fumigant — see Magnesium Phosphide.

Mahatz* — see Chlordane.

Maintain* — see Maleic Hydrazide.

Maintain A* — see chlorflurenol.

Maintain CF 125* — see chlorflurenol.

Maizox* — see EPTC.

Maki* — see Bromadiolone.

Malachite — see Copper Carbonate, Basic; Kromad*.

Malachite Green — see Thiram*.

Malamar* — see Malathion.

Malaoxon**Chemistry**

PROPERTIES: Oxygen analog of malathion.

Malaphéle — see Malathion.

Malarior* Larvicide — Discontinued by Shell International Chemical.

Malaspray* — see Malathion.

Malasun* EC — see Malathion.

Malathane* — see Malathion.

Malathion

BP: All India Medical Corp. (Maltox*)

American Cyanamid Co. (Cythion*)

Cheminova Agro A/S (Fyfanon*)

HELM AG

Hindustan Insecticides Ltd. (Hilthion*, Hilmala*)

Hubei Sanonda Co., Ltd.

Khatau Junker Ltd. (Khatau Malathion*)

Krishi Rasayan

Pesticides India (Vegfru Malatox*)

Quimica Lucava, S.A. de C.V. (Lucathion*)

Rhone-Poulenc (Malixol*)

Sumitomo Chemical Co., Ltd. (MLT)

Velpol, S.A. de C.V. (Maraton*)

Identification

COMMON NAMES: Malathion (ISO, BAN, BSI, ESA, ISI, USA, USP); mercaptothion (So. Africa); carbofos (USSR); mercaptotion (Argentina); maldison (Australia, New Zealand).

CODE NUMBERS: CAS 121-75-5; SHA 057701.

ADDITIONAL TRADE NAMES: Acimal* (Agro Chemicals Industries Ltd.); Joseol*, Malathane*, Malathyne* (Chimac-Agriphar S.A.);

Malathion 50* (Diachem S.P.A.); For-Mal 50* (Forshaw Chemicals);

Malasun* EC (Gurta Chemicals Pvt Ltd.); OR-CAL Stabilized

Malathion* (Oregon-California Chemicals, Inc.); Prentox* Malathion

(Prentiss Incorporated); Rion* (Rotam Group); Sulmathion* (Sulphur

Mills Ltd.); Vap-Malathion* (VAPCO); Emmatos*, Emmatos Extra*,

Karbofos*, Kop-Thion*, Kypfos*, Malaspray*, Malamar*, Malaphéle*,

Sumitox*, Zithiol*.

DISCONTINUED NAMES: Calmathion, Celthion* (Excel Industries

Ltd.); Dielathion*, Exathion* (Rhone-Poulenc); Malméd* (Agrimont

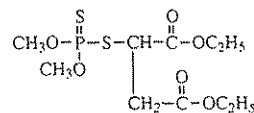
S.p.A.); Malatol* (Cyanamid Brasil); Capthion* (+ captan + sulfur)

(ICI, Australia).

Chemistry

COMPOSITION: O,O-dimethyl phosphorodithioate of diethyl mercaptosuccinate or diethyl mercaptosuccinate, S-ester with O,O-dimethyl phosphorodithioate.

PROPERTIES: Clear to amber liquid with a mercaptan odor. Specific gravity 1.23 at 25°C melting point 2.85°C. Vapor pressure 4 × 10⁻⁵ mm Hg at 30°C. Cythion*, Fyfanon*, Emmatos Extra* are low-odor products manufactured by patented processes. Miscible in most organic solvents; limited solubility in aliphatic hydrocarbon.



Malathion

Action/Use

ACTION: Insecticide.

USE: For aphids, spider mites, scale insects, and other sucking, chewing insects attacking fruits, vegetables, ornamentals, and stored products.

FORMULATIONS: Dust, emulsifiable concentrate, oil solutions, powder, ULV concentrate, wettable powder.

Environmental Guidelines

HAZARDS: Fish: Toxic. LC₅₀ 200 ppm. (rainbow trout). Bee: Toxic.

SOLUBILITY: Water solubility 145 ppm.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Min. 95% tech (Rat): Oral 5500 mg/kg. Dermal >2000 mg/kg. Inhalation (4h) >5.2 mg/l.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Harmful if swallowed or inhaled. Avoid contact with skin. Wash thoroughly after handling. Change contaminated clothing. Do not contaminate food or feed products. Biological activity of malathion premium grade remains practically unvaried for 2 years provided stored in unopened, undamaged original containers, in cool, shaded, well ventilated places. Recommended 68-86°F (20-25°C) for good shelf life. Do not heat above 55°C. Above 100°C, decomposes rapidly and explosion may be induced.

Emergency Guidelines

FLASHPOINT: Above 325°F (Tag open cup).

COMBUSTION PRODUCTS: Thermal decomposition (e.g. fire) may produce dimethyl sulfide, sulfur dioxide, carbon monoxide, carbon dioxide, phosphorus pentoxide, nitrogen oxides.

FIRE EXTINGUISHING MEDIA: Use water, foam, carbon dioxide, or dry chemical to extinguish fires.

ANTIDOTE: Atropine, PAM, 2-PAMCI, 2-PAMM.

FIRST AID: Get medical aid. **Eyes**, flush with plenty of water for 15 minutes. **Skin**, remove clothing, flush skin with plenty of water. **Inhalation**, remove to fresh air. Give oxygen if breathing difficult. **Ingestion**, induce immediate vomiting.

EMERGENCY TELEPHONE: 800-424-9300 (Cheminova Agro A/S).

Malathion 50* — see Malathion.

Malathyne* — see Malathion.

Malatol* Insecticide (malathion) — Discontinued 1991 by Cyanamid Brasil.

Malatox* — see Malathion.

Maldison* — see Malathion.

Maleic Hydrazide

BP: Drexel Chemical Co. (Retard*, Sprout Stop*, Sucker Stuff*, Super Sprout Stop*, Super Sucker Stuff*)
Fair Products, Inc. (De-Cut*, Fair-2*, Fair-30*, Fair Plus*, Super De-Sprout*, Super Hex*)
Uniroyal Chemical Co., Inc. (Royal MH-30*, Royal MH-30 SG, Royal MH-30 XTRA, Royal Slo Gro*)

Identification

COMMON NAMES: Maleic hydrazide (ISO-E, BSI, JMAF); hydrazide maléique (ISO-F).

CODE NUMBERS: CAS 123-33-1; SHA 051501.

ADDITIONAL TRADE NAMES: Burtolin*, KMH*, Maintain* 3, Regulox* W, Regulox* 50W, Stunt-Man*.

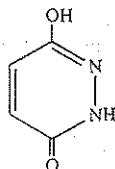
DISCONTINUED NAMES: Vondalhyde*, Vondrax* (Atochem Agri BV); Evimazid* (Chemol Trading Ltd. Co.); Sucker Atak* (Drexel Chemical); BH* 43 (+ 2,4-D) (SDS Biotech); Chemform*, De-Sprout*, Fair 30*, Maleic Hydrazide 30%, MH 36 Bayer*, MH 2P*.

Chemistry

COMPOSITION: 6-hydroxy-3(2H)pyridazinone; or 1,2-dihydro-3,6-pyridazinedione.

FAMILY: Hydrazide.

PROPERTIES: Melting point 292°C. Tech.: Solubility of tech at 25°C: ethanol 0.1%, DMF 2.4.



Maleic Hydrazide

Action/Use

ACTION: Plant growth regulator.

USE: When sprayed on plants, it is absorbed and moves internally where it blocks cell division. Response to the chemical often varies with the dosage and the stage of plant development. Maleic hydrazide formulations control such weeds in turf and elsewhere as wild onion, wild garlic. For the temporary growth inhibition of various trees, shrubs and grasses. For use in controlling the sprouting of edible onions and potatoes in storage. Retards sucker growth of tobacco plants. FORMULATIONS: Emulsifiable concentrate, water-soluble liquids.

Registration Notes

U.S.: Some or all classifications may be classified RUP.

Environmental Guidelines

SOLUBILITY: Tech.: Solubility at 25°C: water 0.6.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Sodium Salt: (Rat): Oral LD₅₀ 6950 mg/kg. Diethanolamine Salt or Potassium Salt: 3900 mg/kg. Both maleic hydrazide and its sodium and potassium salt have a low order of toxicity.

HANDLING AND STORAGE CAUTIONS: De-Cut*, Fair Plus*, Super De-Sprout* have indefinite shelf life and should be stored at room temperature.

Emergency Guidelines

FLASHPOINT: Tech 572°F (300°C) COC.

FIRE EXTINGUISHING MEDIA: Water spray, dry chemical.

FIRST AID: **Ingestion**, induce vomiting.

Malerbane* — see 2,4-D.

Malerbane Cereali* — see 2,4-D.

Malerbane Giavoni L* — see Molinate.

Malerbane* MCPA — see MCPA.

Malerbane* MCPP Herbicide (MCP) — Discontinued by Diachem S.P.A.

Malermals* — see Atrazine.

Malix* — see Endosulfan.

Malixol* — see Malathion.

Maimed* Insecticide (malathion) — Discontinued by Agrimont S.p.A.

Malonoben*
(Discontinued by Gulf Oil Chemical Co.)

Identification

EXP. CODE NUMBER: GCP-5126.

Action/Use

ACTION: Acaricide-insecticide.

Maloran*

BP: Ciba-Geigy Ltd.

Identification

COMMON NAMES: Chlorbromuron (ISO, BSI, WSSA, abandoned ANSD); chlorobromuron (ISO-F).

EXP. CODE NUMBER: C6313* (Ciba-Geigy Ltd.).

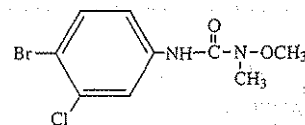
OTHER CODE NUMBER: CAS 13360-45-7.

DISCONTINUED NAME: Bromex*.

Chemistry

COMPOSITION: 3-(4-bromo-3-chlorophenyl)-1-methoxy-1-methylurea (IUPAC).

PROPERTIES: Off-white color, crystalline, melting point 97°C Soluble in acetone and dimethylformamide, only moderately in xylene.



Chlorbromuron

Action/Use

ACTION: Selective herbicide.

USE: Preemergence in soybeans and Irish potatoes for certain annual grass and broadleaf weeds.

FORMULATIONS: Wettable powder.

COMBINATIONS: Maloran* 50WP (Lasso* 4EC) tank mix formerly for soybeans.

Registration Notes

U.S.: Discontinued.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic.

SOLUBILITY: Soluble 35 ppm at 20°C in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal >2000 mg/kg.

Maltox* — see Malathion.

Malurane* Herbicide (linuron) — Discontinued by Diachem S.P.A.

MAMA

Identification

COMMON NAME: MAMA (WSSA).

CODE NUMBERS: CAS 2321-53-1; SHA 013808.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: Monoammonium methanearsonate.

Action/Use

ACTION: Selective postemergent herbicide.

USE: Controls Dallisgrass, and nutgrass in turf.

Registration Notes

U.S.: Tested as postemergent herbicide in crop and noncrop areas.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: LD₅₀ 750 mg/kg.

Mambo* — see Glyphosate.

Mammals

Animals of the vertebrate class Mammalia, which are warm-blooded, possess hair, and nourish their young with milk.

See Vertebrate Animals.

Manage*

F: Hokko Chemical Industry Co., Ltd.

Identification:

COMMON NAME: Imibenconazole (ISO-E draft, BSI).

EXP. CODE NUMBERS: HF-6305; HF-8505

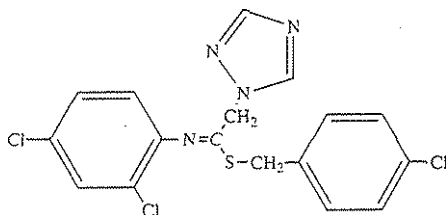
OTHER CODE NUMBER: CAS 86598-92-7.

Chemistry

COMPOSITION: 4-chlorobenzyl N-(2,4-dichlorophenyl)-2-(1H-1,2,4-triazol-1-yl)thioacetimidate (IUPAC).

FAMILY: Triazole.

PROPERTIES: Light yellow crystal; melting point 89.5-90°C; vapor pressure (25°) 85nPa. Solubility: Acetone (25°C) 1063 g/l, xylene (25°C) 250 g/l.



Imibenconazole

Action/Use

ACTION: Fungicide.

USE: Controls apple scab, powdery mildew and rust, pear scab and rust, citrus scab, grape powdery mildew and anthracnose, peach scab, Japanese apricot scab, melon powdery mildew, watermelon powdery mildew, peanut brown leaf spot, tea anthracnose and blister blight.

FORMULATIONS: WP, EC, SC, WDG.

COMBINATIONS: Manage* M (+ mancozeb) (Hokko Chemical Industry Co., Ltd.).

Environmental Guidelines

SOLUBILITY: Water (20°C) 1.7 mg/l.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 2800 mg/kg (male), 3000 mg/kg (female). (Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Rubber gloves, long-sleeved shirt, long pants.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency GuidelinesFIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, induce vomiting.

Manage* M — see Manage*; Mancozeb.

Manager* Fungicide (maneb + zinc) — Discontinued 1989 by Agrol Chemical Products.

Manco-75* — see Mancozeb.

Mancosol* — see Mancozeb.

Mancozan* Fungicide (maneb + zineb) — Discontinued by Rhone-Poulenc.

Mancozeb

BP: All India Medical Corp. (Aimcozeb*)

W.A. Cleary Chemical Corp. (Protect T/O*)

Crystal Chemical Inter-America (Mancozin*, Manzin*)

Desarrollo Quimico Industrial, S.A.

Du Pont Agricultural Products (Manzate*)

ELF Atochem Agri B.V. (Penncozeb*, Pennfluid*, Tridex*, Trimanoc*)

ELF Atochem Agri S.A. (Pennfluid*, Trimanoc*)

ELF Atochem North America, Inc. (Penncozeb*)

Gilmore, Inc.

Grupo Bioquimico Mexicano S.A. de C.V. (Flonex* MZ 400)

HELM AG

Hubei Sanonda Co., Ltd. (Deal*)

Ingenieria Industrial, S.A. de C.V. (Mancosol*)

ISAGRO (Nemisor*)

Rohm and Haas Co. (Dithane*, Fore*)

Sanachem (Pty) Ltd. (Sancozeb*)

Sanex Inc.

Tecomag (Tecozeb*)

Identification

COMMON NAMES: Mancozeb (ISO-E, BSI); manzeb (JMAF); mancozèbe (ISO-F).

CODE NUMBERS: CAS 8018-01-7; SHA 014504.

ADDITIONAL TRADE NAMES: Fungizeb* (Agsin Pte. Ltd.); Agrizeb* (Chimac-Agriphar S.A.); Seed Shield* Potato Seed Treater M-Z (Cornbelt Chemical); Phytos MZ80* (Diachem S.P.A.); Khatau Manzeb* (Khatau Junker Ltd.); Manco-75* (Sulphur Mills Ltd.); Grain Guard* (Trace Chemicals, Inc.); Pennflo*; Ziman*.

DISCONTINUED NAME: Tairel* M (+ benalaxyl) (Agrimont S.p.A.); Manzeb* (+ maneb) (Cumberland International); Mansul* (Cuproquim Corp.); Pennflo* (ELF Atochem Agri B.V.); Manefor ZN* (General Quimica, S.A.); Serinal* M (+ chlozolinate) (ISAGRO).

Chemistry

COMPOSITION: Coordination product of zinc ion, manganese ethylene bisdithiocarbamate (80% a.i.) related to both maneb and zineb.

FAMILY: Ethylene bisdithiocarbamate.

PROPERTIES: Yellowish powder, practically odorless. Decomposes in acid and alkaline conditions. Decomposed by heat and when exposed to moisture and air. No corrosive properties. Negligible volatility at room temperature. Practically insoluble in most organic solvents.

Action/Use

ACTION: Ready-to-use fungicide.

USE: For many fruit, vegetable, nut, and field crops against a wide spectrum of plant diseases. Seed treatment for cotton, potatoes, corn, safflower, sorghum, peanuts, tomatoes, flax and cereal grains. Trimastan* for potato blight and Cercospora diseases of sugar beets and celery.

FORMULATIONS: Dust, flowable suspension, liquid flowable, water dispersible granules, wettable powder.

COMBINATIONS: Occidor Plus* (+ carbendazim) (Chimac-Agriphar S.A.); Rondo M* (+ pyrifenoxy) (Ciba, Ltd.); Cuprofix* 30 (+ copper sulfate) (ELF Atochem North America, Inc.); Manage* M (+ imibenconazole) (Hokko Chemical Industry Co., Ltd.); Galben* M (+ benalaxyl) (ISAGRO); Pulsan* and Ripost* M (+ cymoxanil + oxadixyl), Trimiltox* (+ copper oxychloride + copper sulfate + copper carbonate) (Sandoz Agro Ltd.); Grain Guard Plus* (+ lindane) (Trace Chemicals, Inc.); Curtine-V* (+ cymoxanil), Vacomil-MZ* (+ metalaxyl) (VAPCO); Dicamate*, Karamate* (+ zineb); Curzate* M8 (+ cymoxanil), Ridomil* MZ (+ metalaxyl), Riozeb* Fuerte WP (+ carbendazim), Riozeb* Cobre WP (+ copper).

Registration Notes

U.S.: Label clearances common to maneb, zineb as well as different uses. OUTSIDE U.S.: Mancozin*, Manzin* (Crystal Chemical), Ziman-Dithane* (ICI Australia Ltd.), Flonex* MZ 400 (Mexico, Costa Rica, Peru, Dominican Republic).

Environmental Guidelines

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 11,200 mg/kg. Dermal >15,000 mg/kg.

PROTECTIVE CLOTHING: Wear appropriate protective clothing and equipment.

HANDLING AND STORAGE CAUTIONS: Biological activity remains practically unvaried for 2 years under environmental conditions provided product stored in unopened, undamaged original containers in shaded, possibly well-aired places. Do not contaminate water, food or feed by storage or disposal. Do not re-use container. Dispose of empty container by procedures recommended by federal, state or local authorities. Open dumping is prohibited. Recommended product temperature should not exceed 25-30°C. Stack containers to permit a free circulation of air at bottom and inside of the piles.

Emergency Guidelines

FLASHPOINT: Approx. 137°C.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

FIRST AID: Ingestion, induce vomiting. Eyes, flush with plenty of water. Skin, wash thoroughly with soap and plenty of water.

Mancozèbe* — see Mancozeb.

Mancozin* — see Mancozeb.

Manderol* — see Serinal*

Maneb

- BP:** Crystal Chemical Inter-America (Manex*, Manox*)
 Desarrollo Quimico Industrial, S.A.
 Drexel Chemical Co. (Maneb 80*, Manzi*)
 ELF Atochem Agri B.V. (Trimangol*, Vondac M*)
 Grupo Bioquimico Mexicano S.A. de C.V. (Flonex* MST)
 Ingenieria Industrial, S.A. de C.V. (Mansol*)
 Sanachem (Pty) Ltd. (Saneb*)
 Sanex Inc.

Identification

COMMON NAMES: Maneb (ISO-E, BSI, JMAF); manèbe (ISO-F).

TRIVIAL NAME: MEB.

CODE NUMBERS: CAS 12427-38-2; SHA 014505; ENT-14875; EINECS 235-654-8.

ADDITIONAL TRADE NAMES: Maneb Spritzpulver* (BASF AG); Manogil* (Chimac-Agriphar S.A.); Seed Shield* Maneb Planter Box 50 (Cornbelt Chemical); Maneb 80* (Diachem S.P.A.); Superman* Maneb F (Pesticide Service Consultants); Benatec* (Tecomag); Kypman* 80, Maneba*, M-Diphar*, Sopranebe*.

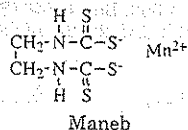
DISCONTINUED NAMES: Nespor* (Agrimont S.p.A.); Manager* (+ zinc), Manpower* (+ copper hydroxide) (Agtrol Chemical Products); Calixin* M (+ tridemorph), Pallinal* M (+ metiram + nitrothal-isopropyl), Polyram* M, Ronilan* M (+ vinclozolin) (BASF AG); Agrosol* S (+ captan), Granox* (+ HCB) (Chipman Chemicals); Chloroble M*, Maneb ZL4*, Manzeb* (+ mancozeb), Man-Zox* (Cumberland International Corp.); Curzate* M, Delsene* M (+ carbendazim) (Du Pont); (Bolda* (+ carbendazim + sulfur) (Farm Protection Ltd.); Manebgan* (Makhteshim-Agan); Res-Q* (+ hexachlorobenzene + captan) (PBI/Gordon); Mancozan* (+ zineb), Manesan*, Rhodianebe*, Tubothane* (Rhône-Poulenc); Unicrop* Maneb (Universal Crop Protection Ltd.); Vancide* Maneb 80 (R.T. Vanderbilt).

Chemistry

COMPOSITION: Manganese ethylenebisdithiocarbamate.

FAMILY: Dithiocarbamate.

PROPERTIES: A.i.: solid, yellow, practically odorless. Insoluble in most organic solvents.



Action/Use

ACTION: Fungicide.

USE: Controls early and late blights on potatoes, tomatoes and many other diseases of fruits, vegetables, and field crops, onions, tobacco, groundnuts, sugar beets. For use on cucumbers, eggplant, pepper, cabbage, bean, grapes, bananas, hops, cacao, winter wheat, potatoes, tomatoes, roses, and tulips.

FORMULATIONS: Flowable, flowable suspension, wettable powder.

COMBINATIONS: AGSCO Dustret A* (+ streptomycin sulfate), DB-Green* (+ lindane) (AGSCO, Inc.); Tricuproxi* (+ copper + zineb) (Aragonesas Agro, S.A.); Raydor* (+ carbendazim) (Chimac-Agriphar S.A.); Seed Shield* Maneb/Lindane (+ lindane) (Cornbelt Chemical); Trimastan*, Trimastan 3311* (+ triphenyltin acetate), Vondozeb* (+ zineb), Vondozeb Plus* (ELF Atochem Agri B.V.); Cuprofix* M (+ copper sulfate), Vondozeb* (+ zineb) (ELF Atochem North America, Inc.); 4-Way* (+ captan + PCNB + etridiazole); Enhance Plus* (+ carboxin + lindane) (Gustafson); Bravo C/M* (+ chlorothalonil + copper oxychloride) (ISK Biotech); Comac Bordeaux M* (Sulfoma* in France) (+ pre-reacted bordeaux mixture), Comac Bordeaux MZ* (Super X Macclesfield* in France) (+ pre-reacted bordeaux mixture + zineb) (both La Cornubia S.A.); Labilite* (+ thiophanate-methyl) (Nippon Soda); Granol* (+ lindane), Granox* P-F-M (+ captan + molybdenum), Granox* Plus (+ thiabendazole) (Wilbur-Ellis); Chem Neb 54*.

Registration Notes

OUTSIDE U.S.: Manex*, Manox*. Germany: Maneb Spritzpulver*. Mexico: Flonex* MTS.

Environmental Guidelines

HAZARD: Fish: Toxic; Bee: Nontoxic; Bird: LD₅₀ 1467 mg/kg (quail).

SOLUBILITY: Moderately soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ 7990 mg/kg. Dermal LD₅₀ >5000 mg/kg. **PROTECTIVE CLOTHING:** Long pants, long-sleeved shirt, gloves, hat and boots during mixing and loading.

HANDLING AND STORAGE CAUTIONS: Store <40°C. May be absorbed through skin and throat. Do not breathe dust or spray mist. Do not contaminate water, food, or feed by storage or disposal. Do not reuse container. Dispose of empty container by procedures recommended by federal, state or local authorities. Open dumping is prohibited.

SPILL CONTROL/CLEANUP: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush with plenty of water for at least 15 minutes. Skin, flush with plenty of water for at least 15 minutes. Ingestion, induce vomiting and treat symptomatically.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

See Dithiocarbamates.

Maneb 80* — see Maneb.

Maneb Spritzpulver* Fungicide (maneb) — Discontinued by BASF AG.

Maneb ZL4* Fungicide (maneb) — Discontinued 1985 by Cumberland International.

Maneba* — see Maneb.

Manèbe* — see Maneb.

Manebgan* Fungicide (maneb) — Discontinued by Makhteshim-Agan.

Maneor ZN* Fungicide (mancozeb) — Discontinued 1992 by General Quimica, S.A.

Maneor* — see Dithiocarbamates.

Manesan* Fungicide (maneb) — Discontinued by Rhône-Poulenc.

Manex* — see Maneb.

Mango Bloom*

BP: Planters Products, Inc.

Chemistry

COMPOSITION: Potassium nitrate, sodium nitrate.

Action/Use

ACTION: Flower inducer.

USE: For mango.

FORMULATIONS: Liquid.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

PROTECTIVE CLOTHING: Long-sleeved shirt or jacket and long pants.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place away from feed and foodstuffs. Avoid oral, dermal, and eye exposure in handling spray mixture. Keep out of reach of children.

Manogil* — see Maneb.

Manoi* (Discontinued by Exxon Co.)

Chemistry

COMPOSITION: Maneb as an additive to spray oil.

Action/Use

ACTION: Fungicide.

Manox* — see Maneb.

Manpower* Fungicide (copper hydroxide + maneb) — Discontinued by Agtrol Chemical Products.

Mansol* — see Maneb.

Mansonil* — see Bayluscid*.

Mansul*

(Discontinued by Cuproquim Corp.)

Chemistry

COMPOSITION: Zinc ion/manganese ethylene bisdithiocarbamate and micronized sulfur.

Action/Use

ACTION: Fungicide.

Safety Guidelines

TOXICITY CLASS: III.

SIGNAL WORD: CAUTION.

Manta* — see Methoprene.

Manzate* — see Dithiocarbamates.

Manzate* 200 — see Benomyl; Mancozeb.

Manzeb* Fungicide (mancozeb + maneb) — Discontinued by Cumberland International Corp.

Manzi* — see Maneb.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Manzin* — see Mancozeb.
Manzin 80* — see Mancozeb.
Man-Zox* Fungicide (maneb) — Discontinued by Cumberland International Corp.
Mapica* — see MCPCA.
MAPO — see Metepa.
Maposo!* — see Metam-sodium.
MAPS — see Methiotepea.
Maracarb* — see Lignosulfonates.
Maracell* — see Lignosulfonates.
Marasperse* — see Dispersant; Lignosulfonates.
Marathon* — see Imidacloprid.
Maraton* — see Malathion.
Marble Dust — see Calcium Carbonate.
Margosan-O*

BP: Grace-Sierra Crop Protection Co.

Identification

TRIVIAL NAMES: Azadirachtin, neem extract.
 CODE NUMBERS: CAS 992-20-1; SHA 121701.

Action/Use

USE: Antibacterial, anti-fungal and anti-viral activity on a broad spectrum of pests, greenhouse and sweet potato whitefly, thrips (including western floral), larvae of bugs and beetles, loopers and caterpillars, and mealybugs.

Environmental Guidelines

HAZARDS: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg.

Markant* — see Prochloraz.

Marks 4-CPA* — see 4-CPA.

Marksman*

BP: Sandoz Agro, Inc.

Chemistry

COMPOSITION: Potassium salt of dicamba + atrazine.

Action/Use

ACTION: Herbicide.

USE: For many annual and perennial broadleaf weeds when applied preemergence or postemergence in field, seed or silage corn. Seed corn selectivity should be verified with the supplying seed corn company.

FORMULATIONS: Flowable liquid.

Registration Notes

U.S.: RUP as of 9/1/90.

Environmental Guidelines

SOLUBILITY: 0.5% in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 5897 mg/kg. (Rabbit): Dermal >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in a cool, ventilated area away from seed, fertilizers, insecticides or fungicides in an area suitable for pesticide storage.

Marlate* — see Methoxychlor.

Marmer* — see Diuron.

Marshal* — see Carbofuran.

Marvex Super* — see DDVP.

MAS — see Rhizoctol*.

Mascot* — see Alsystin*.

Masolon* Fungicide (pyrazophos) — Discontinued 1984 by Hoechst AG.

Masquerade*

F: Wilbur-Ellis Co. (Masquerade*)

Identification

COMMON NAME: Wintergreen Oil.

CODE NUMBERS: CAS 119-36-8.

Chemistry

COMPOSITION: Methyl salicylate.

PROPERTIES: Colorless liquid with a wintergreen odor, specific gravity 1.18, vapor density 5, vapor pressure nil.

Action/Use

ACTION: Pesticide odor masking agent.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

PROTECTIVE CLOTHING: Long sleeved coveralls, neoprene or rubber gloves, and chemical goggles.

Emergency Guidelines

FLASHPOINT: 214°F COC.

FIRE EXTINGUISHING MEDIA: Alcohol foam, CO₂, dry chemical.

FIRST AID: In all cases, get prompt medical attention. **Ingested**, give several glasses of water and induce vomiting. Do NOT induce vomiting if victim is unconscious. **Skin**, remove contaminated clothing and wash with soap and water. **Eyes**, irrigate eyes for a minimum of 15 minutes with water. **Inhalation**, remove victim to fresh air and administer CPR if necessary.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Master* — see Methamidophos.

Mastiff* Fungicide/Plant Growth Regulator (carbendazim + chlormequat chloride) — Discontinued 1989 by BASF AG.

Mastrap*

BP: ISAGRO (Mastrap*, Mastrap* L)

Action/Use

ACTION: Pheromone insect attractant.

USE: Traps reduce the reproductive activity of the involved species, and limit infestation. Pheromone dispenser hanging inside the trap attracts specified insects which slip into the funnel, fall into the bag and cannot escape. For stores and food industries where chemical treatments must be kept to a minimum. Available for various armyworms, bollworms, cutworms, leafworms, leafminers, moths, and tortrix. **Mastrap***: Funnel-shaped trap for mass trapping of lepidopterous insects in warehouses and crops. **Mastrap* L**: Large funnel-shaped trap for mass trapping of lepidopterous insects in orchards and forestry.

Safety Guidelines

SIGNAL WORD: Harmless to both man and domestic animals.

HANDLING AND STORAGE CAUTIONS: Avoid contamination among pheromone dispensers targeted on different species in order to assure selectivity. Used stick bottoms and replaced dispensers are to be destroyed to avoid undesired attraction sources. Dispensers should be stored in a refrigerated or cool place.

Mastrap* L — see Mastrap*.

MAT 7484 — see Phostebupirim.

Matacil*

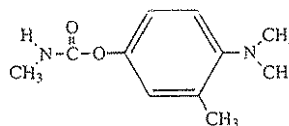
(Discontinued 1989 by Bayer AG)

Identification

COMMON NAMES: Aminocarb (ISO-E, BSI, ESA); aminocarbe (ISO-F).

EXP. CODE NUMBERS: A 363, Bay 44646 (Bayer AG).

OTHER CODE NUMBERS: CAS 2032-59-9; SHA 044401.



Aminocarb

Action/Use

ACTION: Insecticide.

Matador* — see Baytan*, Folicur*.

Mataven*

BP: American Cyanamid Co. (Mataven*)

Identification

COMMON NAME: Flamprop-methyl (ISO, BSI, WSSA).

EXP. CODE NUMBER: WL 29671.

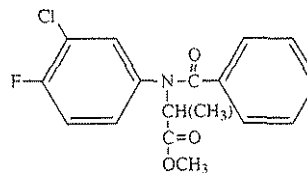
OTHER CODE NUMBERS: CAS 37924-13-3; SHA 108001.

ADDITIONAL TRADE NAME: Mataven* L (pure D isomer).

Chemistry

COMPOSITION: Methyl N-benzoyl-N-(3-chloro-4-fluorophenyl)-DL-alaninate (IUPAC).

PROPERTIES: White, light-tan crystalline solid. Melting point 81-82°C. Solubility: 20°C >500 g/l in acetone.



Flamprop-methyl

Action/Use

ACTION: Selective herbicide.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

USE: Postemergence control of wild oats and suppression of other grasses in wheat.

FORMULATIONS: Emulsifiable concentrate.

Registration Notes

OUTSIDE U.S.: Mataven*.

Environmental Guidelines

HAZARDS: Fish: Low. Bee: Low. Bird: Low.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1200 mg/kg; Dermal LC₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Overalls, neoprene or PVC gloves.

HANDLING AND STORAGE CAUTIONS: Observe normal safe pesticide handling precautions. Store with other herbicides away from insecticides, fungicides, etc. Do not store near foodstuffs, animal feed, seeds or fertilizers.

Emergency Guidelines

FIRST AID: No human intoxication cases recorded, treat symptomatically.

Matayuyos Selectivo MCPA* — see MCPA.

Mate* — see Ioxynil.

Matikus* — see Brodifacoum.

Mator* — see GenTrol*.

Matrix* Herbicide (tribenuron-methyl) — Discontinued.

Mavrik* — see tau-Fluvalinate.

Mavrik Aquaflow* — see tau-Fluvalinate.

Mavrik B — see tau-Fluvalinate; Thiometon.

Maxforce* Insecticide (hydramethylnon) — Discontinued by American Cyanamid.

Maxim* — see Fludioxonil.

Maximizer* 420

(Discontinued 1992 by HACO, Inc.)

Chemistry

COMPOSITION: Paraffinic oil, emulsifier.

Action/Use

ACTION: Spray tank adjuvant, crop oil concentrate.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Essentially that of paraffinic petroleum oil.

Maximum Contaminant Levels

Maximum Contaminant Levels (MCLs) are maximum allowable levels established by EPA for contaminants, including several pesticides and nutrients, found in drinking water. They are covered under the Primary and Secondary Water Standards of the Safe Drinking Water Act. These levels apply to public water supplies, but often are used as health advisory levels for groundwater.

See Environmental and Safety Section (Section E).

Maximum Dosage

The largest amount of a pesticide chemical that can be safely used without damaging the plant, animal, or object which is being protected and which will not result in excess residues.

Maxipack Trac* 50—see Acetochlor.

Maxx-90* — see Propazine.

Mayclene* Herbicide (dichlorprop + MCPA) — Discontinued 1989 by Agrolinz.

Maygon* Herbicide (2,3,6-TBA + dicamba + MCPA + mecoprop) — Discontinued by Shell Chemicals UK Ltd.

Maytril* — see Bromoxynil; Ioxynil; Mecoprop.

Mazidox

Identification

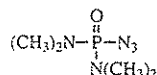
COMMON NAME: Mazidox (ISO, BSI).

CODE NUMBERS: CAS 7219-78-5; SHA 442300.

Chemistry

COMPOSITION: azido-bis(dimethylamino)phosphine oxide (IUPAC).

PROPERTIES: Related to dimefox.



Mazidox

Action/Use

ACTION: Insecticide.

M&B 25-105*

(Discontinued 1990 by Rhone-Poulenc)

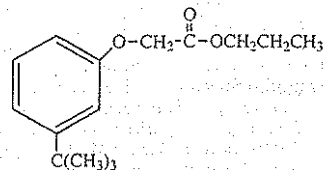
Identification

EXP. CODE NUMBER: M&B 25-105 (May & Baker Ltd.).

OTHER CODE NUMBER: CAS 66227-09-6.

Chemistry

COMPOSITION: Propyl 3-tert butylphenoxyacetate (IUPAC).



M&B 25-105

Action/Use

ACTION: Plant growth regulator.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1800 mg/kg. Dermal >2000 mg/kg.

M+B 10064 — see Bromoxynil.

MB 9057 — see Asulam.

MB 38544 — see Diflufenican.

MBC

MBC (Methyl 2-benzimidazolecarbamate) is a common breakdown product of several fungicides, including benomyl (Benlate*), thiophanate-methyl (Topsin-M*), and other ethyl and methyl thiophanates. Exhibits the common characteristic of cross-resistance: once a fungus has developed resistance to one of these fungicides, it also possesses resistance to other fungicides of the same group.

MBC* Herbicide (sodium chlorate borate) — Discontinued by Occidental Chemical Co.

MBCP Insecticide (leptophos) — Discontinued by Velsicol Chemical Corp.

MBR 8251 — see Perfluidone.

MBR 12325 — see Mefluidide.

MC 25 — see Guazatine.

MC 474 — see Mecarbam.

MC 833 — see Carbamorph.

MC 1053 — see Dinobuton.

MC 1108 — see Dinoterb Acetate.

MC 1488 — see Medinoterb Acetate.

MC 1945 — see Dinoceton-o.

MC 1947 — see Dinoceton-4.

MC 2188 — see Chlormephos.

MC 2420 — see Mecarphon.

MC 4379 — see Bifenox.

MC 10978 — see Blazer*.

MC Defoliant* — see Magnesium Chlorate.

MCA-600* — see Mobam*.

MCAs — see Monoclonal Antibodies.

MCC — see Swep.

MCLs — see Maximum Contaminant Levels.

MCP* — see MCPA.

2,4-MCPA* — see MCPA.

MCPA

BP: Agrolinz, Inc. U.S.A.

Akzo Nobel Chemicals B.V.

Atanor S.A. (Matayuyos Selectivo MCPA*)

BASF AG (U 46* M-Fluid)

Ciech-Agrochemia (Pol-Chwastox Extra*)

DowElanco

Gilmore, Inc.

A.H. Marks & Co., Ltd.

Nissan Chemical Industries, Ltd. (MCP*)

Nufarm U.K. Ltd.

PBI/Gordon Corp. (Gordon's* Amine)

Probelte, S.A.

Rhone-Poulenc (Chiptox*, Rhomene*, Rhonox*)

Sanachem (Pty) Ltd. (Sanaphen-M*)

Universal Crop Protection Ltd. (Empal*)

Identification

COMMON NAMES: MCPA (ISO, BSI, WSSA); 2,4-MCPA (France); metaxon (USSR).

EXP. CODE NUMBER: CA 38083010 (Ciech-Agrochemia).

CODE NUMBERS: CAS 94-74-6; SHA 030501; EINECS 202-360-6.

ADDITIONAL TRADE NAMES: Lentemul* (Agrolinz, Austria); AG-SCO MXL* (AGSCO, Inc.); Chimac Oxy*, Selectyl 40*, Selectyl Forte* (Chimac-Agriphar S.A.); Malerbane* MCPA (Diachem S.P.A.);

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Butilglicólico* (Probelte, S.A.); Bordermaster*, BH* MCPA, Kilssem*, Mephanac*, Zelan*.

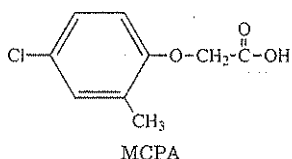
DISCONTINUED NAMES: Dakota* TP (+ fenoxaprop-P-ethyl) (Agra-Evo USA Co.); Aramo* (+ bentazone), Ultima* Plus (+ bentazone + dichlorprop) (BASF AG); Hedonal* M (Bayer AG); New Legumex* (FBC Ltd.); Weed-Rhap* (Helena Chemical Co.); Agroxone*, Tetroxone* M (+ bromoxynil + ioxynil + dichlorprop) (ICI Agrochemicals); Hormotuhó*, Hormotuhó Special* (+ dicamba) (Kemira Oy); Harness* (+ bromoxynil + mecoprop), Superormone Concentre* (+ 2,4-D) (Rhône-Poulenc); Mondak* (+ dicamba) (Sandoz Agro, Inc.); Shamrox*, Vacate* (SDS Biotech Corp.); M40*, Maygon* (+ 2,3,6-TBA + dicamba + mecoprop), Scogal* (+ cyanazine) (Shell Chemicals UK Ltd.); Ded-Weed* (+ 2,4-D + dalapon + silvex + 2,4,5-T) (T & H Agri. & Nutrition).

Chemistry

COMPOSITION: (4-chloro-2-methyl)phenoxyacetic acid.

FAMILY: Phenoxy herbicide.

PROPERTIES: White to light brown solid, flakes, crystal powder or liquid. Same as 2,4-D except for replacement of one chlorine atom by a methyl group. Melting point 114-119°C. Vapor pressure 7.7×10^{-6} mbar. Non-corrosive. Solubility: At 20-25°C. in ethanol 150 g/l; acetone >200 g/l. Pol-Chwastox Extra*: Density 1.18-1.21 g/ml at 20°C.



Action/Use

ACTION: Hormone type, postemergence, selective herbicide.

USE: Translocated herbicide in small grains, rice, peas, grassland, sugar cane, tree crops, turf and noncrop areas for postemergent control of many annual and perennial broadleaf weeds.

FORMULATIONS: Potassium, sodium, dimethylamine salts (water soluble concentrates), isooctyl and isobutyl esters (emulsifiable concentrates).

COMBINATIONS: Cheyenne* Herbicide [Twin Pack of Cheyenne* FM (MCPA + fenoxaprop-P-ethyl) & X-TRA* (thifensulfuron methyl + tribenuron methyl)], Dakota* (+ fenoxaprop-ethyl), Tiller* (+ 2,4-D + fenoxaprop-P-ethyl) (AgraEvo USA Co.); Sable* (+ glyphosate) (Aragones Agro, S.A.); Barox*, Basagran M*, Basagran* M60, Basagran* M75, Quilt* (all - bentazone), Acumen* (+ bentazone + MCPB), Duplosan* DP-M (+ dichlorprop-P), Duplosan* Super (+ dichlorprop-P + mecoprop-P), Triagran* (+ bentazone + dichlorprop-P), U 46* DP-M-Fluid (+ dichlorprop), U 46* Combi-Fluid (+2,4-D), U 46* M-KV-Fluid (+ mecoprop), U 46* Super (+ dichlorprop + mecoprop) (all BASF AG); Ustinex in various combinations (Bayer AG); Chimac Mixte* (+ 2,4-D), Diptyl* (dicamba + MCPB), Selectyl MD* (+ 2,4-D), Superselectyl* (+ dichlorprop + MCPB), Trimonal* (+ 2,4-D + dicamba) (Chimac-Agriphar S.A.); Curtail* M (+ clopyralid) (DowElanco); Banlene Plus* and Docklene* (+ mecoprop + dicamba), Legumex Extra* (+ 2,4-DB + benazolin) (Hoechst Schering AgrEvo GmbH); Trimec* Encore* (+ MCPB + dicamba) (PBI/Gordon); Actril 3* (+ dichlorprop salts + ioxynil), Actril S* (+ bromoxynil + dichlorprop + ioxynil), Brominal Plus*, Bronate* (+ bromoxynil), Grasalam* (+ asulam + mecoprop), Tropotox Plus* (+ MCPB) (Rhône-Poulenc); Tri-Power* (+ MCPB + dicamba), Triamine* II and Tri-Ester* II (+ MCPB + 2,4-DP) (Riverdale Chemical); mixed potassium salt solutions of MCPA and MCPB, also of MCPA and 2,4-D; Farmco One-Shot* (+ dicamba); Tigrex* (+ diflufenican).

Registration Notes

U.S.: Some or all applications may be classified as RUP.

OUTSIDE U.S.: Lentemul*.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 117 mg/l (trout). Bee: Nontoxic. Bird: LD₅₀ 377 mg/kg body weight (quail).

SOLUBILITY: In water at room temperature, 825 ppm.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ 1160 mg/kg. (Mouse): Oral 550 mg/kg. Dermal LD₅₀ >4000 mg/kg.

Pol-Chwastox Extra*: (Rat): Oral LD₅₀ 700 mg/kg. (Mouse): Oral 550 mg/kg.

PROTECTIVE CLOTHING: Wear goggles, face shield or safety glasses. **HANDLING AND STORAGE CAUTIONS:** Avoid contact with skin, eyes and respiratory tract. Causes irreversible eye damage. Harmful if swallowed. Avoid breathing dust. Avoid spray drifts onto susceptible

plants such as grapes, tomatoes, and cotton. Do not contaminate water for irrigation or domestic use. Do not transport or store near fertilizers, seeds, insecticides, or fungicides. Amine salt stable indefinitely. Ester stability depends upon formulations. Reacts with alkalis to form salts. **SPILL CONTROL/CLEANUP:** Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: Nonflammable (TC).

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. **Eyes,** flush with plenty of water. **Inhalation,** move to fresh air. **Ingestion,** do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-832-4357 (BASF). 800-424-9300 (CHEMTREC).

MCPA-thioethyl — see Phenothiol.

MCPB

BP: Rhône-Poulenc (Thistrol*, Tropotox*)
Universal Crop Protection Ltd.

Identification

COMMON NAMES: MCPB (ISO, BSI, JMAF, WSSA); 2,4-MCPB (France), 2M-4Kh-M (USSR).

CODE NUMBERS: CAS 94-81-5 (MCPB acid), CAS 6062-26-6 (MCPB-sodium); SHA 019201; EINECS 202-365-3.

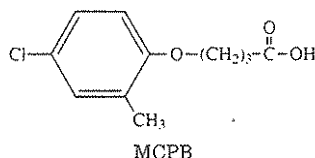
ADDITIONAL TRADE NAMES: PDQ*.

DISCONTINUED NAMES: Can-Trol* (Rhône-Poulenc); Vortex* (+ cyanazine) (Shell Chemicals UK Ltd.).

Chemistry

COMPOSITION: 4-(4-chloro-o-tolyloxy)butyric acid (IUPAC).

PROPERTIES: White crystalline solid. Solubility: At 20-25°C in ethanol 150g/l; acetone > 200 g/l.



Action/Use

ACTION: Herbicide. (Susceptible plants oxidize the acid to MCPA.)

USE: Postemergence selective weed control in green peas grown for canning or freezing; spring cereals undersown with clovers, seedling clovers, maize, pastures, sainfoin.

FORMULATIONS: Aqueous solution.

COMBINATIONS: Acumen* (+ MCPA + bentazone), Pulsar* (+ bentazone) (BASF AG); Tropotox Plus* (+ MCPB + MCPA salts) (Rhône-Poulenc).

Registration Notes

OUTSIDE U.S.: In Canada, Europe, S. Africa, Australia. MCPB is recommended for weed control in clovers, pastures, and peanuts.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 75 mg/l (48 h) (rainbow trout). Bee: Nontoxic.

SOLUBILITY: At 20-25°C. in water 44 mg/l.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 680 mg/kg. (Mouse): Oral LD₅₀ 800 mg/kg.

PROTECTIVE CLOTHING: Not required.

HANDLING AND STORAGE CAUTIONS: Handle carefully. Do not contaminate water, food, or feed by storage or disposal of this chemical. If allowed to freeze, thaw and remix before using.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: N/Ap.

FIRST AID: Symptomatic treatment.

MCPA

Identification

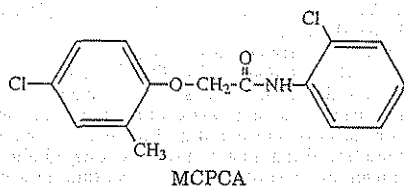
CODE NUMBER: CAS 2453-96-5.

ADDITIONAL TRADE NAME: Mapica*.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: 2'-Chloro-2-(4-chloro-o-tolyloxy) acetanilide; or 2-methyl-4-chloro-phenoxyacet-o-chloroanilide.



MCPA

Action/Use

ACTION: Herbicide.

Registration Notes

OUTSIDE U.S.: Registered in Japan.

MCPES — see Methin*.

MCPP (Potassium Salt)

BP: Agrolinz (Austria)

W.A. Cleary Chemical Corp. (Cleary's MCPP*)
PBI/Gordon Corp. (Mecomec*)

Identification

CODE NUMBERS: CAS 1929-86-8; SHA 031501.

ADDITIONAL TRADE NAMES: Lentemul* (Agrolinz, Austria); Chimac Cop*, Mecozyl*, Propionyl* (Chimac-Agriphar S.A.); Mecopex*.

DISCONTINUED NAMES: Malerbane* MCPP (Diachem S.P.A.); Methoxone* M (ICI Agrochemicals); Vi Par* (+ 2,4-D), Vi Pex* (Vine-land Chemical).

Chemistry

COMPOSITION: Potassium (RS)-2-(2-methyl-4-chlorophenoxy)propionate.

Action/Use

ACTION: Herbicide.

USE: Controls clover, chickweed, plantain, and other broadleaf weeds in grasses such as fescue, bluegrass, ryegrass, bentgrass, bermuda-grass.

FORMULATIONS: Aqueous solution.

COMBINATIONS: Chimac Cop Special* (+ 2,4-D), Diptyl* (dicamba + MCPA), Superselectyl* (+ dichlorprop + MCPA) (Chimac-Agriphar S.A.); MCPP-2,4-D (+ 2,4-D) (W.A. Cleary); 2 Plus 2* (+ 2,4-D) (ISK Biosciences Corp.); Trimec* 992; Trimec* Bentgrass, Trimec* Classic, Trimec* Southern (all with 2,4-D + dicamba), Trimec* Encore* (+ MCPA + dicamba), Trimec* Plus (+ 2,4-D + MSMA + dicamba) (PBI/Gordon); Foxtar* (+ bifenoxy + isoproturon), Galop* (+ bifenoxy + ioxynil + isoproturon), Ioniz* VR (+ diflufenican + ioxynil + isoproturon), Iotox* (+ ioxynil), Isotril* (+ ioxynil + isoproturon) (Rhone-Poulenc Ag Co.); DM 68* (+ dinoterb salts) (Rhone-Poulenc Agrochimie S.A.).

Registration Notes

OUTSIDE U.S.: Lentemul* (Agrolinz, Austria).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Methoxone M* (Rat): Oral LD₅₀ 930 mg/kg.

PROTECTIVE CLOTHING: Goggles and gloves.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes or skin. Keep away from food, feedstuff, water, heat and open flames.

Emergency Guidelines

FLASHPOINT: Noncombustible, nonflammable.

FIRST AID: Get medical aid. Ingestion, induce vomiting and treat symptomatically.

See also Mecoprop.

MCPP-2,4-D — see 2,4-D; MCPP; Mecoprop.

MCPP-D-4 — see Mecoprop.

MCPP-K-4 — see Mecoprop.

M-Cresyl Acetate**Identification**

CODE NUMBER: CAS 122-46-3.

TRADE NAME: Cresatin*.

Chemistry

PROPERTIES: Colorless liquid with phenolic odor boiling at 212°C. Soluble in most organic solvents.

Action/Use

ACTION: Fungicide.

USE: Prevention of mold under tropical conditions.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

MDBA — see Banvel*.

M-Diphar* — see Maneb.

ME4 Brominal* Herbicide (bromoxynil) — Discontinued by Union Carbide Corp.

MEA — see Methoxyethylmercury Acetate.

Mebenil**Identification**

CODE NUMBERS: CAS 7055-03-0; SHA 458100.

Action/Use

ACTION: A new systemic fungicide.

MeBr — see Methyl Bromide.

Mebrom 50* Fumigant (methyl bromide) — Discontinued 1993

by Mebrom N.V.

Mebrom 67* Fumigant (methyl bromide) — Discontinued 1993

by Mebrom N.V.

Mebrom 75* Fumigant (methyl bromide) — Discontinued 1993

by Mebrom N.V.

Mebrom 98* Fumigant (methyl bromide) — Discontinued 1993

by Mebrom N.V.

Mebrom 100* Fumigant (methyl bromide) — Discontinued 1993

by Mebrom N.V.

Mecarbam**Identification**

COMMON NAMES: Mecarbam (ISO-E, BSI, JMAF); mécarbame (ISO-F).

EXP. CODE NUMBER: MC 474 (Murphy Chemical Ltd.).

OTHER CODE NUMBER: CAS 2595-54-2.

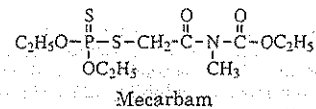
ADDITIONAL TRADE NAME: Afos*.

DISCONTINUED NAMES: Murfotox* (Murphy Chemical); Pestan* (Takeda).

Chemistry

COMPOSITION: S-(N-Ethoxycarbonyl-N-methylcarbamoylmethyl)-diethyl phosphorodithioate.

PROPERTIES: Colorless oily liquid when pure; tech. grade pale yellow to brown, specific gravity 1.222/20°C. Miscible in all proportions with alcohols, ketones, aromatic hydrocarbons and chlorinated hydrocarbons. Hydrolyzed below pH 3.



Mecarbam

Action/Use

ACTION: Insecticide, acaricide with ovicidal action.

USE: Controls aphid, whitefly, red spider, scale insects and mealybugs on citrus, apples, and other fruit trees; olive fly and fruit flies; plant hoppers, leafhoppers, and miners of rice; vegetable root maggots on brassicas, onions, carrots, and celery.

FORMULATIONS: Dust, emulsifiable concentrate, granules, oil formulations, wettable powder.

COMBINATIONS: Pescombi* (EPN).

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 36 mg/kg. Dermal LD₅₀ >1220 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine or PAM under medical supervision.

Mécarbame — see Mecarbam.

Mecarphon

(Discontinued by Murphy Chemical Ltd.)

Identification

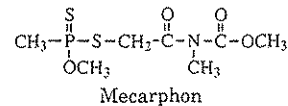
COMMON NAME: Mecarphon (ISO, BSI).

EXP. CODE NUMBER: MC 2420 (Murphy Chem. Ltd.).

OTHER CODE NUMBERS: CAS 29173-31-7; OMS 1478 (WHO).

Chemistry

COMPOSITION: S-(N-Methoxycarbonyl-N-methylcarbamoylmethyl)-O-methylphosphonothiothionate.



Mecarphon

Action/Use

ACTION: Systemic insecticide-acaricide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 57 mg/kg. Dermal 720 mg/kg.

Emergency Guidelines

ANTIDOTE: 2-PAM or atropine.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Mecharsemon* — see Cholecalciferol.

Mecomec* — see MCPP.

Mecopar*

(Discontinued by NOR-AM Chemical Co.)

Identification

CODE NUMBERS: CAS 7085-19-0; SHA 031501.

Chemistry

COMPOSITION: Diethanolamine salt of MCPP + diethanolamine salt of 2,4-D (= 2 lb. and 1 lb. respectively of the acids).

Action/Use

ACTION: Postemergence herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1900 mg/kg (= 610 mg acids).

Mecopex* — see MCPP (Potassium Salt); Mecoprop.

Mecoprop

BP: Akzo Nobel Chemicals B.V.

A.H. Marks & Co., Ltd.

Nufarm U.K. Ltd.

Universal Crop Protection Ltd. (Propal*)

Identification

COMMON NAMES: Mecoprop (ISO, BSI, WSSA); MCPP (JMAF).

TRIVIAL NAME: CMPP.

CODE NUMBERS: CAS 7085-19-0; SHA 031501.

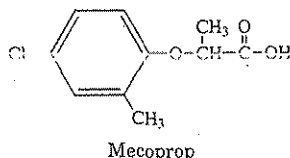
ADDITIONAL TRADE NAMES: Methoxone* (BASF AG); Clifton CMPP 60* (Clifton Chemicals); BH* Mecoprop, Compitox*, Compitox Plus*, Iso-Cornox* 57, Kilprop*, MCPP-D-4, MCPP-K-4, Mecopex*, Mepro*.

DISCONTINUED NAMES: Fagal* (BASF AG); Hedonal* MCPP (Bayer AG); Mecopar* (+ 2,4-D) (NOR-AM); Chipco Turf Kleen* (+ 2,4-D), Chipco Turf Herbicide MCPP*, Harness* (+ bromoxynil + MCPA) (all Rhone-Poulenc Ag Co.); Maygon* (+ 2,3,6-TBA + dicamba + MCPA), Proponex* D (+ 2,4-D), Proponex-Plus* (Shell Chemicals UK Ltd.).

Chemistry

COMPOSITION: (RS)-2-(4-chloro-2-methylphenoxy)propionic acid.

PROPERTIES: Colorless crystals; off-white flakes. Melting point 93-94°C. Vapor pressure <10⁻⁵ mbar (acid); 1.3 X 10⁻⁵ mbar at 20°C (butoxyethyl ester). Non-corrosive. Solubility (25°C) in benzene 5.4. Readily soluble in most organic solvents.



Action/Use

ACTION: Systemic hormone type herbicide.

USE: Ornamental, sports turf for selective control of surface-creeping broadleaf weeds such as red, white clovers, chickweed, plantain. In cereals, alone or in mixture with other hormone type herbicides, (e.g. 2,4-D) for chickweed, cleavers, etc. In pastures, newly sown grass leys.

FORMULATIONS: Soluble concentrates.

COMBINATIONS: Basagran*-KV (+ bentazone), U 46* KV-Combi-Fluid (+ 2,4-D), U 46* M-KV-Fluid (+ MCPA), U 46* Super (+ dichloroprop + MCPA) (BASF AG); Certrol H* and Mextrol* (+ ioxynil) (CFPI); MCPP-2,4-D (+ 2,4-D) (W.A. Cleary); Banlene Plus* and Docklene* (+ MCPA + dicamba), Post-Kite* (+ isoproturon + ioxynil) (Hoechst Schering AgrEvo GmbH); 2 Plus 2* (+ 2,4-D amine) (ISK Biosciences Corp.); Trimec* 992, Trimec* Bentgrass, Trimec* Classic, Trimec* Southern (all with 2,4-D + dicamba), Trimec Encore* (+ MCPA + dicamba), Trimec* Plus (+ 2,4-D + MSMA + dicamba) (PBI/Gordon); Axall*, Brittox* and Maytril* (+ bromoxynil + ioxynil), Belgran* (+ ioxynil + isoproturon), Graslam* (+ asulam + MCPA), Ioniz* VR (+ diflufenican + ioxynil + isoproturon), Mylone* (+ ioxynil), Terset* (+ bromoxynil + ioxynil + isoproturon) (Rhone-Poulenc Ag Co.); Dissolve* (+ 2,4-D + 2,4-DP), Triamine* and Tri-Ester* (+ 2,4-D + 2,4-DP), Triamine* II and Tri-Ester* II (+ MCPA + 2,4-DP), Triplet* (+ 2,4-D + dicamba), Tri-Power* (+ MCPA + dicamba) (Riverdale Chemical).

Registration Notes

OUTSIDE U.S.: Axall* in New Zealand, Brittox* in Ireland. Maytril* in Ethiopia and Kenya. Clifton CMPP 60*.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >150 <220 mg/l (trout). Bee: Nontoxic. Bird: LD₅₀ >500-1000 mg/kg by body weight (quail).

SOLUBILITY: Solubility (20°C) in water 0.62.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 1166 mg/kg; (Mouse): 650 mg/kg. Dermal LD₅₀ >4000 mg/kg.

PROTECTIVE CLOTHING: Gloves, goggles, dust mask.

HANDLING AND STORAGE CAUTIONS: Solutions of the salt of MCPP are stable for several years under normal storage conditions. At low temperatures the salt will crystallize out of solution, but the crystals will redissolve on warming. Handle carefully; observe use directions. Avoid breathing dust or spray mist as inhalation may prove harmful. Causes eye irritation. Do not contaminate water, food, or feed by storage or disposal of this chemical. Do not use or store near heat or open flame. Protect from freezing. If allowed to freeze, thaw and re-mix before using.

SPILL CONTROL/CLEANUP: Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting unless advised by a physician, treat symptomatically.

EMERGENCY TELEPHONE: 800-832-4357 (BASF). 800-424-9300 (CHEMTREC).

Mecoprop-P — see Duplosan* KV.

Mecozyl* — see MCPP.

Mediben* Herbicide (dicamba) — Discontinued.

Medifene* Herbicide (phenmedipham) — Discontinued by Diachem S.P.A.

Medinoterb Acetate

(Discontinued by Murphy Chemical Ltd.)

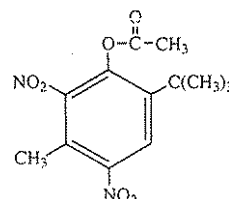
Identification

COMMON NAME: Medinoterb acetate (BSI, ISO).

EXP. CODE NUMBER: MC 1488 (Murphy Chemical Ltd.).

Chemistry

COMPOSITION: 2-Tert-butyl-5-methyl-4,6-dinitrophenyl acetate.



Medinoterb Acetate

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 42 mg/kg.

Medlure*

Chemistry

COMPOSITION: sec-Butyl-4(or 5)-chloro-2-methylcyclo-hexanecarboxylate.

Action/Use

ACTION: Baiting attractant.

USE: For Mediterranean fruit fly.

Mefenacet — see Hinochloa*.

Mefluidide

BP: PBI/Gordon Corp. (Embark*, Embark* Lite, Trim-Cut*)

Identification

COMMON NAME: Mefluidide (ISO, BSI, ANSI, WSSA)

EXP. CODE NUMBER: MBR 12325.

OTHER CODE NUMBER: CAS 53780-34-0.

DISCONTINUED NAME: Vistar* Herbicide (3M Co.).

Chemistry

COMPOSITION: N-[2,4-Dimethyl-5-[(trifluoromethyl)sulfonyl]aminophenyl] acetamide (CAS).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Plant growth regulator, herbicide.
USE: Embarc* registered to suppress seedhead formation and vegetative growth of various turf grass species, including usage around farm premises, and for use on woody ornamentals.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: Tech (Rat): Oral LD₅₀ >4000 mg/kg. (Rabbit): Dermal >4000 mg/kg.
PROTECTIVE CLOTHING: Rubber gloves.

Emold* — see Calixin*
Melitorin* — see Dicumarol*

Malprex* — see Dodine.

Meltatox* — see Dodemorph acetate.

Meltatox Combi* Fungicide (+ dodine + nitrothal isopropyl)
 — Discontinued 1994 by BASF AG.

MEMA

Identification

DISCONTINUED NAMES: Cekusil Universal A* (Cequisa); Pano-gen*, Panogen* M (Rhône-Poulenc).

Chemistry

COMPOSITION: Methoxyethylmercury acetate.
PROPERTIES: Soluble in methanol and ethylene-glycol. Stable at pH = 9.5-11.5.

Action/Use

ACTION: Fungicide, seed dressing.

Safety Guidelines

SIGNAL WORD: DANGER.
TOXICITY CLASS: I.
TOXICITY: (Rat): Oral LD₅₀ 25 mg/kg.

MEMC

BP: All India Medical Corp.
 Excel Industries Ltd. (Emisan* 6)
 United Phosphorus Ltd. (Bagalol*, Curetan*)

Identification

COMMON NAME: MEMC (2-methoxyethylmercury chloride).
CODE NUMBER: CAS 123-88-6.
ADDITIONAL TRADE NAMES: Agallo forte*, Ceresan-Universal-Nassbeize, Emisan* 6.

DISCONTINUED NAMES: Cekusil Universal C* (Cequisa); Aretan* (ICI Agrochemicals); Agalol*, Aretan* (Bayer AG); Ceresan* (Du Pont); Tayasato* (Kemira Oy); Curesan* (Shroffs Industrial).

Chemistry

COMPOSITION: 2-methoxyethylmercurychloride chloro(-2-methoxyethyl) mercury.
PROPERTIES: White crystalline, melting point 65°C. Vapor pressure 1.0 × 10⁻³ torr at 35°C. Readily soluble in acetone and alcohol. Decomposed by halogen acids to ethylene, alcohol and mercuric salt. Solubility in water 50 g/l at room temperature. Stable to alkali.



MEMC

Action/Use

ACTION: Systemic fungicide.
USE: Controls pineapple disease of sugarcane and protects sets against soil-borne rots. Controls base rot of pineapples and surface-borne diseases of seed potatoes, as well as flower bulbs. Seed dressing against seed-borne diseases of cereals, legumes, and root crops.

FORMULATIONS: Dust, liquid.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.
SOLUBILITY: Solubility in water 50 g/l at room temperature.

Safety Guidelines

SIGNAL WORD: DANGER.
TOXICITY CLASS: I.
TOXICITY: (Rat): Oral LD₅₀ 22-44 mg/kg; 15% Hg concentrate: 400 mg/kg.
PROTECTIVE CLOTHING: Wear gloves.

HANDLING AND STORAGE CAUTIONS: Do not breathe dust or get on skin or in eyes. Wash hands well after use. For seed treatment, do not prepare MEMC dip solutions in metal containers; use plastic pails or buckets. Keep away from children, domestic animals, foods and feeds.

Emergency Guidelines

ANTIDOTE: Activated charcoal, egg white or 2-5% sodium bicarbonate solutions (gastric lavage), 5% sodium formaldehyde sulphoxylate (gastric lavage), high colonic irrigation, I.V. fresh 100-200 ml solu-

tions. Sodium citrate, oral 1-4 g. every 4 hrs. For spasms 100 ml. 10% calcium gluconate I.V.

Memilene L* — see Methomyl.

Memmi*

(Discontinued by Velsicol Chemical Corp.)

Identification

CODE NUMBERS: CAS 5902-79-4; SHA 045302.

Chemistry

COMPOSITION: N-Methylmercuri-1,2,3,6-tetrahydro-3,6-methano-3,4,5,6,7,8-hexachlorophthalimide.

Action/Use

ACTION: Fungicide.

Menaphtame — see Sesin*.

Menazon

Identification

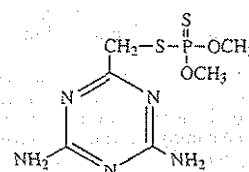
COMMON NAMES: Menazon (BSI, CSA, ESA, ISO) not accepted in U.S. or Italy. Azidithion (France).

CODE NUMBERS: CAS 78-57-9; SHA 285300.

DISCONTINUED NAMES: Saphi-Col*, Saphizon*, Saphos*, Sayfor*, Sayfos*, Sayphos* (all ICI Agrochemicals).

Chemistry

COMPOSITION: S-(4,6-Diamino-1,3,5-triazin-2-yl)methyl O,O-dimethylphosphorodithioate (CAS).



Menazon

Action/Use

ACTION: Systemic aphicide.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 1950 mg/kg.

Mendok*

(Discontinued)

Chemistry

COMPOSITION: 2,3-Dichloro-2-methylpropionic acid, sodium salt.

Action/Use

ACTION: Plant growth regulator, gameticide.

Registration Notes:

No commercial registrations.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: IV.
TOXICITY: (Rat): Oral LD₅₀ 8000 mg/kg.

Menite* — see Mevinphos.

Meobal*

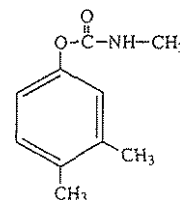
BP: Sumitomo Chemical Co., Ltd.

Identification

COMMON NAME: Xylycarb (ISO, BSI); MPMC (JMAF).
CODE NUMBER: CAS 2425-10-7.

Chemistry

COMPOSITION: 3,4-Dimethylphenyl methylcarbamate.
PROPERTIES: Light yellowish solid; melting point 71-76°C. Moderately soluble in alcohol, toluene and kerosene; and soluble in chloroform and acetone.



Xylycarb

Action/Use

ACTION: Insecticide.

USE: Controls hoppers on rice, and scales on fruit.
FORMULATIONS: Dust, emulsifiable concentrate, micro-granule, wettable powder.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Environmental Guidelines

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 380 mg/kg.

Meothrin* — see Fenpropathrin.

MEP — see Fenitrothion.

Mepaton* — see Methyl Parathion.

Mephanac* — see MCPA.

Mephostoian — see Cytrolane*.

Méphospholan — see Cytrolane*.

Mepichlor* — see Mepiquat Chloride.

Mepiquat Chloride

BP: BASF AG (Pix*)
BASF Corp. (Pix*)
Gharda Chemicals Ltd. (Chamatkar*)
Micro Flo Co. (Mepichlor*)

Identification

COMMON NAME: Mepiquat-chloride.

EXP. CODE NUMBERS: BAS 0830W; BAS 08305W; BAS 08306W;
BAS 08307W.

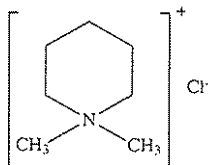
OTHER CODE NUMBERS: CAS 24307-26-4; SHA 109101; EINECS
246-147-6.

ADDITIONAL TRADE NAMES: Agtragro* (Agsin Pte. Ltd.); Mepi-
quat Chloride 4.2 (Gowan Co.); Roquat* (Rotam Group).

Chemistry

COMPOSITION: 1,1-dimethylpiperidinium chloride.

PROPERTIES: Solid, white/gray, melting point approx. 223°C. Solu-
bility: Soluble in ethanol, moderately soluble in acetone ((20°C) 0.20 g/
kg) and chloroform, sparingly soluble in benzene, cyclohexane, ethyl
acetate, ether. Negligible solubility in water.



Mepiquat Chloride

Action/Use

ACTION: Bioregulator.

USE: Controls vegetative growth; affects boll retention, maturity,
yield in cotton; improves berry set on wine and Concord grapes.

FORMULATIONS: Aqueous solution, soluble concentrate, ULV.

COMBINATIONS: Terpal* (+ ethephon), Terpal* M (+ chlormequat-
chloride + ethephon) (BASF AG).

Registration Notes

U.S.: Pix* not registered.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >100 mg/l (trout). Bee: Nontoxic. Bird: LD₅₀
>4640 mg/kg (quail).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (600 g/l) (Rat): Oral LD₅₀ ca. 464 mg/kg.

Pix* (Rat): Oral LD₅₀ >6900; Dermal LD₅₀ >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes,
skin, clothing, foodstuffs.

SPILL CONTROL/CLEANUP: Large liquid spillage should be
dammed-off and pumped into containers; soak up remainder with ab-
sorbent material and dispose of in accordance with local regulations.
Solid spillage should be picked up with an industrial vacuum cleaner
and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable
incineration, etc.) in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. Treat symptomatically. Eyes, flush with
water. Inhalation, remove to fresh air. Ingestion, do NOT induce vom-
iting unless advised by a physician.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300
(CHEMTREC).

Mepiquat Chloride 4.2 — see Mepiquat Chloride.

Mepro* — see Mecoprop.

Mepronil — see Basitac*.

Meptox* — see Methyl Parathion.

Mepyrium**Chemistry**

COMPOSITION: 1-(4-Amino-4-propyl-5-pyrimidylmethyl)2-meth-
ylpyridinium chloride hydrochloride.

Action/Use

ACTION: Bactericide, fungicide.

Mer Sol*

(Discontinued by Stauffer Chemical Co.)

Chemistry

COMPOSITION: Various formulations of phenyl mercuric ammonium
acetate; phenyl mercuric acetate; ethyl mercuric acetate.

Merade* — see Voltage*.

Merbam 10*

(Discontinued)

Chemistry

COMPOSITION: 5% phenylmercuric dimethyl dithiocarbamate.

Action/Use

ACTION: Paper mill slimicide.

Mer-Cad*

(Discontinued 1971 by Stauffer Chemical Co.)

Chemistry

COMPOSITION: Anilino cadmium dilactate-phenyl mercury forma-
mide mixture.

Action/Use

ACTION: Seed treatment.

Mercan***Chemistry**

COMPOSITION: p-Aminophenylmercury acetate.

Mercaptide

(Discontinued 1973 by Du Pont Agricultural Products)

Identification

CODE NUMBERS: CAS 108-07-6, 2597-95-7.

DISCONTINUED NAMES: Ceresan* L, Granosan* (Outside U.S. and
Canada).

Action/Use

ACTION: Mercurial seed disinfectant.

Mercaptobenzothiazole**Identification**

ADDITIONAL TRADE NAMES: Niacides*, Nuodex 84*.

Action/Use

ACTION: Ingredient of industrial fungicides.

USE: Nuodex 84* contains the sodium salt for use in water-base adhe-
sives, paper sizings, etc. Niacides* are mixtures with carbamate fun-
gicides for control of apple scab and rust.

mercaptodimethur — see Methiocarb.

Mercaptofos — see Demeton-O*, Systox*.

Mercaptophos — see Systox*.

Mercaptofos teolery — see Demeton-S.

Mercaptothion — see Malathion.

Mercaptotion — see Malathion.

Merculine — see Phenylmercury Salicylate.

**Mercuram* Fungicide (phenylmercury-dimethyldithiocar-
bamate + malachite green + thiram)** — Discontinued 1994 by IS-
AGRO.

Mercuran*

(Discontinued)

Chemistry

COMPOSITION: Methoxyethylmercury acetate.

Action/Use

ACTION: Fungicide, seed treatment.

Mercuric Chloride — see Corrosive Sublimate.

Mercuric Lactate**Identification**

OTHER NAME: Puratized B-2*.

ACTION: Fungicide.

Mercuric Oxide — see Yellow Oxide of Mercury.

Mercurous Chloride — see Calomel.

Mercury

Metallic mercury (quicksilver) has been employed in India to fumigate
and protect grain in closed containers from further insect infestation.

Mercury Pentanedione**Identification**

CODE NUMBERS: CAS 14024-55-6; SHA 052103.

Action/Use

ACTION: Seed treatment.

USE: For cotton and peanuts.

Mercusol — see Phenylmercury Salicylate.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Merfenel* 51

(Discontinued)

Chemistry

COMPOSITION: Phenylmercury dimethyl dithiocarbamate.

Action/Use

ACTION: Formerly for application to apples.

Mergamma* — see PMA.

Merge*

BP: Custom Chemicides

Chemistry

COMPOSITION: Alkylphenoxy polyphosphate.

Action/Use

ACTION: Compatibility agent.

USE: With liquid fertilizers to form stable emulsions when mixed with pesticides.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Merge 823* Herbicide (MSMA) — Discontinued 1994 by Harcros Chemicals, Inc.

Merit* Herbicide — see Bromoxynil; Command*.

Merit* Insecticide — see Imidacloprid.

Merpatol* Fungicide (captafol) — Discontinued by Makhteshim-Agan.

Merpan* — see Captan.

Merpelan AZ* Herbicide (isocarbamid) — Discontinued 1986 by Bayer AG.

Merphos — see Folex* 6EC.

Mersolite* — see PMA.

Mertect* — see Thiabendazole.

Merthiolate* — see Thimerosal*.

Merthon*

Chemistry

COMPOSITION: Polyethylmercury phosphate.

Action/Use

ACTION: Fungicide.

Mes-100*

BP: Drexel Chemical Co.

Chemistry

COMPOSITION: Methylated seed oil + nonionic surfactant blend.

PROPERTIES: Methyl ester (vegetable oil) + surfactant blend.

Action/Use

ACTION: Surfactant.

USE: With postemergent herbicides.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: CO₂, foam, H₂O.

Mesh, Screen

Standard screens are used to separate solid particles into size ranges. The mesh is stated in number of openings to each linear inch. The finest screen practical in this work is the 325-mesh which has openings 44 microns in diameter, 1 micron being equivalent to 0.001 mm. This screen has over 105,000 openings per square inch. Fine dusting sulfur preferably has 95% of the particles passing a 325-mesh screen. A common range for granular formulations is in the 15/30 range. Particles small enough to pass a 60-mesh screen are considered dusts.

Mesamate* — see MSMA.

Mesanate* — see MSMA.

Mesoranil*

BP: Ciba Ltd. (Brasoran*, Mesoranil*)

Identification

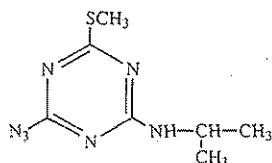
COMMON NAMES: Aziprotryn (USA); aziprotryne (ISO, BSI).

EXP. CODE NUMBER: C 7019

OTHER CODE NUMBER: CAS 4658-28-0.

Chemistry

COMPOSITION: 2-Azido-4-(isopropylamino)-6-(methylthio)-s-triazine (CAS 8CI).



Aziprotryn

Action/Use

ACTION: Herbicide.

USE: Controls annual broadleaf weeds, some grasses in brassicas.

FORMULATIONS: Wettable powder.

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3600-5833 mg/kg. Dermal LD₅₀ >3000 mg/kg.

Mesox* — see Gallery*; Tribunil*.

Mestranol

Identification

CODE NUMBERS: CAS 72-33-3; SHA 115401.

Chemistry

COMPOSITION: (17 α)-3-methoxy-19-norpregna-1,3,5(10)-trien-20-yn-17-ol.

Action/Use

ACTION: Rat sterilant.

USE: Hormone compound used in a bait to sterilize rats, but rats refused to eat food in which it was placed.

Mesulfan*

Chemistry

COMPOSITION: Methanesulfonyl-N-trichloromethyl-sulfenyl-4-chloroanilide.

Mesuroil* — see Methiocarb.

Mesuroil* 50% HBT (methiocarb) — Discontinued 1989 by Gustafson, Inc.

MET 1486 — see Ustilan*.

META* — see Metaldehyde.

Metabolite

A compound derived in the case of a pesticide by chemical, biological, or physical action upon the pesticide within a living organism (plant, insect, higher animal, etc.). The action varies (oxidation, reduction, etc.) and the metabolite may be either more toxic or less toxic than before. The same derivative may in some cases develop upon exposure of the pesticide outside a living organism.

Metacetaldehyde — see Metaldehyde.

Metacid* ST — see Thiram.

Metacide* — see Methyl Parathion.

Metacrate* — see MTMC.

Metalaxyl

BP: Ciba (Apron*, Ridomil*, Subdue*)

Ciba, Ltd. (Ridomil*, Acylon*, Apron*, Subdue*)

Hubei Sanonda Co., Ltd.

Rotam Group (Roxyl*)

Identification

COMMON NAME: Metalaxyl (ISO, ANSI, BSI).

EXP. CODE NUMBER: CGA 48988 (Ciba, Ltd).

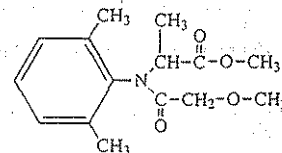
OTHER CODE NUMBERS: CAS 57837-19-1; SHA 113501.

ADDITIONAL TRADE NAMES: Apron*-FL (Gustafson Inc.); Coopxil* (Vinexport S.A.); Apron* TL (Wilbur-Ellis).

Chemistry

COMPOSITION: N-(2,6-Dimethylphenyl)-N-(methoxyacetyl)-DL-alanine methyl ester (CAS).

PROPERTIES: Solubility at 20°C, 65% in methanol; 55% in benzene.



Metalaxyl

Action/Use

ACTION: Fungicide seed dressing, soil and foliar fungicide.

USE: Foliar or soil with curative and systemic properties. Controls soil borne diseases caused by Phytophthora and Pythium spp. in many crops. Controls foliar diseases caused by oomycetes, i.e. downy mildews and late blights. Used in combination with fungicides of different mode of action.

FORMULATIONS: Emulsifiable concentrate, granule, flowable, wettable powder.

COMBINATIONS: Pace* (+ mancozeb) (Ciba); Boscor* (+ fenpropidin), Fubol*, Ridomil* MZ (+ mancozeb), Ridomil*/Bravo* (+ chlorothalonil), Beret MLX* (+ fenpiclonil) (all Ciba, Ltd.); Apron* + Captan (+ captan), Apron*-Terraclor* (+ PCNB), Prevail* (+ carboxin + PCNB)

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

(Gustafson): System* (+ PCNB + *Bacillus subtilis*) (Helena Chemical Co.); Nu-Flow AD and Nu-Gro Delta-Coat AD (+ chloroneb) (Wilbur-Ellis); Vacomil*-MZ (+ mancozeb), Vacomil*-Plus (+ copper oxychloride) (VAPCO); Apron* TZ69WS (+ thiabendazole), Apron* C 70SD, Apron* 35SD.

Environmental Guidelines

HAZARDS: Fish: Relatively nontoxic.

SOLUBILITY: Solubility at 20°C in water 7100 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 669 mg/kg. Dermal >3100 mg/kg. HANDLING AND STORAGE CAUTIONS: Apron* 25W has 3-5 year shelf life when stored in a dry area at minimum storage temperatures. Maintain <90°F for prolonged storing of Apron* FL.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water.

Metaldehyde

BP: Lonza Ltd. (META*)

Identification

COMMON NAME: Metaldehyde (ISO, BSI, JMAF).

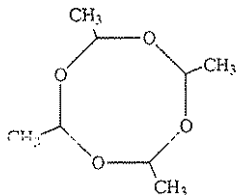
CODE NUMBERS: CAS 108-62-3; SHA 053001.

ADDITIONAL TRADE NAMES: Cekumeta* (Cequisa); Limeol G* (Chimac-Agriphar S.A.); Superflor* (C.M.I. Ltd.); Limatox* (Diachem S.P.A.); Metason* (Jewnin-Joffe Industry Ltd.); Halizan* (Tamogan Ltd.); Slug N' Snail* (Micro Flo Co.); Slug Pest Colloidal 25* (Oregon-California Chemicals, Inc.); Deadline* (Pace International LP); Vegfru Snailkil* (Pesticides India); Antimilace*; Namekil*.

Chemistry

COMPOSITION: 2,4,6,8-tetramethyl-1,3,5,7-tetroxocane. Polymer of acetaldehyde; or metacetaldehyde (tech. 99.0% minimum).

PROPERTIES: White crystalline, with powdery appearance, mild characteristic odor. Sublimes at approx. 112°C, with partial depolymerization. Soluble to 1.8 g/100 ml in ethyl alcohol at 70°C.



Metaldehyde

Action/Use

ACTION: Molluscicide.

USE: Apply as a bait for slugs and snails to soil surface around vegetable crops in field or greenhouse; on the soil around trees in avocado or citrus orchards, around blackberry, blueberry, dewberry, boysenberry, loganberry, strawberry, or raspberry plants, and around banana plants, on ornamental plants. Avoid contamination of edible parts of plants. Metaldehyde is a highly selective molluscicide which has no reported effects upon non-target organisms such as earthworms and carabid beetles.

FORMULATIONS: Pelleted baits, granules, liquids and wettable powders.

Environmental Guidelines

HAZARDS: Bee: Bait agents nontoxic, used as directed.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION. WARNING (Halizan*).

TOXICITY CLASS: III, II (Halizan*).

TOXICITY: (Rat): Oral LD₅₀ 630 mg/kg. (Dog): Oral 250-1000 mg/kg. HANDLING AND STORAGE CAUTIONS: Combustible. Store in a cool place to minimize sublimation. Avoid prolonged storage. Wash after handling.

Emergency Guidelines

FLASHPOINT: Flammable.

Metalkamate — Abandoned common name for Bux* Insecticide (bufencarb).

Metam 32.7* — see Metam-Sodium.

Metam 42* — see Metam-Sodium.

Metam 426* — see Metam-Sodium.

Metambane* — see Banvel*.

Metam-Fluid BASF* — see Metam-Sodium.

Metamidofos Estrella* — see Methamidophos.

Metamitron — see Goltix*.

Metamorphosis

Any change in form or structure of an insect during the growing period.

Metam S.A.U.* — see Metam-Sodium.

Metam-Sodium

BP: Amvac Chemical Corp. (Metam 426*)

Aragonesas Agro, S.A. (Arapam*)

BASF AG (Metam-Fluid BASF*)

Buckman Laboratories, Inc. (Busan* 1020)

ELF Atochem Agri B.V. (Trimaton*)

Oregon-California Chemicals, Inc. (Sectagon*)

UCB Chemicals (Agrochemicals Headquarters)

UCB Chemicals Corp. (Metam 32.7*, Metam 42*, Ucetam*)

Universal Crop Protection Ltd.

ZENECA Ag Products (Vapam*)

Identification

COMMON NAMES: Metam-sodium, metam for the acid (BSI, ISO);

SMDC, carbam (JMAF).

CODE NUMBER: CAS 137-42-8.

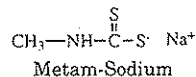
ADDITIONAL TRADE NAMES: Metildiene K* (Diachem S.P.A.); Sectagon II*, Sectagon 42*, Pole Life*, Metam S.A.U.* (Oregon-California Chemicals, Inc.); Maposol* (Procida); Soil-Prep (Wilbur-Ellis); Karbation*.

DISCONTINUED NAMES: Sistan* (ICI Agrochemicals); Nemasol* (Inchema, Inc.); A7 Vapam* (Procida).

Chemistry

COMPOSITION: Sodium N-methyldithiocarbamate.

PROPERTIES: White crystalline solid, with pungent rotten egg odor. Moderately soluble in ethanol. Insoluble in most organic solvents.



Action/Use

ACTION: Fungicide, herbicide, insecticide, nematocide, soil fumigant. USE: Soil disinfectant for soil fungi, nematodes, soil insects (wireworms, centipedes). Controls germinating weeds. Field area or row application by soil injection or sprinkler injection. Treatment of seed or plant beds and treatment of potting soil by different methods. Penetration and effectiveness is improved by water seal.

FORMULATIONS: Soluble concentrates, aqueous solutions.

Registration Notes

U.S.: Homeowner uses cancelled by Metam-Sodium Task Force. Agricultural labels are general use, except small area uses which are classified RUP. Metam S.A.U.* is RUP.

OUTSIDE U.S.: Germany: Metam-Fluid BASF*.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic. Bird: LD₅₀ ca. 500 mg/kg (quail).

SOLUBILITY: Solubility in water 722 g/l at 20°C.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 1891 mg/kg (male); 1928 mg/kg (female). (Rabbit): Dermal LD₅₀ >3074 mg/kg; slight skin, mild eye irritant.

PROTECTIVE CLOTHING: For direct-contact activities: Chemical resistant headgear for overhead exposure; chemical resistant apron when cleaning equipment, or when mixing, loading, or transferring without dry disconnect fittings; face sealing goggles, unless full-face respirator is worn (respirator with an organic-vapor-removing cartridge with MSHA/NIOSH approved prefilter or a MSHA/NIOSH approved canister). Handlers in enclosed cabs: Coveralls, shoes and socks. If pungent rotten egg odor of product can be detected inside of cab, face-sealing goggles, unless full-face respirator is worn (respirator with an organic-vapor-removing cartridge with MSHA/NIOSH approved prefilter or a MSHA/NIOSH approved canister).

HANDLING AND STORAGE CAUTIONS: Stable in concentrated solution; unstable on dilution. Harmful if swallowed or inhaled, irritating to eyes, nose, throat and skin. Avoid breathing vapors or spray mist. Do not get in eyes, on skin or clothing. May be fatal if absorbed through skin. Keep children and pets out of treated areas until treatment is complete and pesticide has dissipated.

Material must be handled outdoors and inhalation must be prevented. SPILL CONTROL/CLEANUP: Use adequate ventilation and air-supplied respirators, as well as impervious clothing and safety goggles. For small spills, cover with absorbent (clay, sawdust, straw, kitty lit-

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

ter, etc.) to absorb the liquid; sweep into an open drum. Clean area with a stiff brush and a slurry made of water and powdered household cleanser; absorb and sweep into same open drum. Rinse with water, absorb, and add to drum. Close drum and dispose of properly. For large spills, dike spill to prevent contamination of local water sources. Siphon majority of liquid into drums for use or disposal, depending on circumstances. Clean area as directed for small spill.

PRODUCT/WASTE DISPOSAL: This spilled product is a hazardous waste and disposal must be at an approved toxic waste dump. Consult with Federal, State, or local disposal authorities for the actual method to be followed.

Emergency Guidelines

FLASHPOINT: Vapam*: >200°F, 94°C (Tag CC).

FIRST AID: **Eyes,** contact physician immediately. Hold eyelids apart and immediately flush eyes with copious amounts of clear, cool running water for a minimum of 15 minutes (30 minutes if there will be a delay in getting medical attention). **Skin,** immediately flush all affected areas with large amounts of clean water for at least 15 minutes. Remove contaminated clothing. Do not attempt to neutralize with chemical agents. Wash before reusing. If skin irritation develops, contact physician. **Ingestion,** if conscious, dilute swallowed product by giving large amounts of clean water. Contact physician or hospital immediately for further instructions. **Inhalation,** remove from contaminated atmosphere. If breathing has ceased, clear airway and begin mouth-to-mouth respiration. If breathing is labored, give oxygen. Contact physician immediately.

EMERGENCY TELEPHONE: Medical: 800-228-5635 Ext. 169 (Hazard Information Services); Transportation: 800-424-9300 (CHEMTREC); 33-10-4725171 (ELF Atochem Agri B.V.).

Metaphos — see Methyl Parathion.

Metaphoxide — see Metepa.

Metapside — see Methiotepa.

Metaran* — see Cyhexatin.

Metasol* Fungicide (methylmercury quinolinolate) — Discontinued 1975 by Merck & Co., Inc.

Metason* — see Metaldehyde.

Metasystox*

(Discontinued by Bayer AG)

Identification

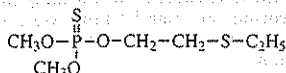
COMMON NAMES: Demeton methyl, methyl demeton.

EXP. CODE NUMBER: Bay 15203.

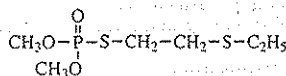
OTHER CODE NUMBERS: CAS 8022-00-2; SHA 058701.

Chemistry

COMPOSITION: S-[2-ethylthioethyl] O,O-dimethyl phosphorothioate.



(I) or Thiono Isomer



(I) or Thiolo Isomer

Action/Use

ACTION: Systemic insecticide, acaricide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 180 mg/kg. (I); 64 mg/kg (H).

Metasystox* (I)

BP: Bayer AG (Metasystox* (I))
Hanwha Corp.

Identification

COMMON NAMES: Demeton-S-methyl, methyl-mercaptotiotil (USSR).

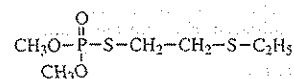
CODE NUMBERS: CAS 919-86-8 (demeton-S-methyl); EINECS 213-052-6.

DISCONTINUED NAMES: Gusathion MS* (+ azinphos-methyl) (Bayer AG); Duratox* (Shell Chemicals UK).

Chemistry

COMPOSITION: S-[2(ethylthio)ethyl] O,O-dimethyl phosphorothioate.

PROPERTIES: Tech: Pale yellow oil. Specific gravity 1.21 at 20°/4°C. Vapor pressure 4.0 mPa at 20°C. Readily soluble in dichloromethane, 2-propanol, toluene. Soluble in n-hexan.



Demeton-s-methyl

Action/Use

ACTION: Systemic insecticide, acaricide.

USE: Controls aphid vectors of virus diseases, whiteflies, leafhoppers, sawflies, and spider mites in fruit, beets, potatoes, and other vegetables, cereals, hops, and ornamentals.

FORMULATIONS: Emulsifiable concentrates.

Environmental Guidelines

HAZARDS: 250 EC: Fish: LC₅₀ 6.4 mg/l (96 h) (rainbow trout). 250 EC:

Bee: Toxic. Bird: 44-50 mg/kg/b.w (Japanese quail).

SOLUBILITY: Hardly soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ approx. 30 mg/kg/b.w. Dermal approx. 30 mg/kg/b.w.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Atropine, PAM.

Metasystox* R — see Oxydemeton-methyl.

Metasystox*-S

BP: Bayer AG (Estox*, Metasystox*-S)

Identification

COMMON NAMES: Oxydeprofos (ISO, BSD); ESP (JMAF).

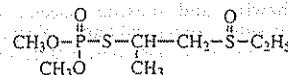
EXP. CODE NUMBERS: Bay 23655, S 410.

OTHER CODE NUMBER: CAS 2674-91-1.

Chemistry

COMPOSITION: S-[2-(ethylsulfanyl)-1-methylethyl] O,O-dimethyl phosphorothioate.

PROPERTIES: Oily liquid. Specific gravity 1.257 at 20°/4°C. Vapor pressure 4.0 × 10⁻⁶ mbar at 20°C.



Active Ingredient of Metasystox-S*

Action/Use

ACTION: Systemic insecticide, acaricide.

USE: Controls aphids, whiteflies, leafhoppers, and sawflies on tree fruits, citrus, and vegetables.

FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

SOLUBILITY: Miscible in water.

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ approx. 100 mg/kg. Dermal (50EC) approx. 300 mg/kg.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, food, feed.

Metaxon — see MCPA.

Metazachlor — see Butisan S*.

Metazachlore — see Butisan S*.

Metecor* — see Fenpyroximate.

Metepa

Identification

CODE NUMBER: CAS 57-39-6.

TRIVIAL NAMES: MAPO, metaphoxide, methaphoxide, methyl aphoxide.

Chemistry

COMPOSITION: Tris(2-methyl-1-aziridinyl) phosphine oxide.

Action/Use

ACTION: Insect chemosterilant.

See Chemosterilants.

Methabenzthiazuron — see Tribunil*.

Methachlorphenprop — see Bidisin*.

Metham — see Metam-Sodium.

Metham-Sodium — see Metam-Sodium; Dithiocarbamates.

Methamidophos

BP: AQ Group (MTD*)

Bayer AG (Tamaran*)

Biesterfeld U.S., Inc.

CHEMIE AG Bitterfeld-Wolfen (Filitox*)

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/T/M BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Crystal Chemical Inter-America (Tamanox*)
 Fersol Indústria E Comércio Ltda.
 Forward International Ltd. (Master*)
 Gilmore, Inc.
 HELM AG
 Hubei Sanonda Co., Ltd. (Themanitar*)
 Jin Hung Fine Chemicals Co., Ltd. (Tam*)
 Miles Inc. (Monitor*)
 Pilarquim Corp. (Pilaron*)
 Productos OSA S.A.C.I.F.I.A. (Patrole*)
 Quimica Estrella ACA S.A. (Metamidofos Estrella*)
 Rotam Group (Rometa*)
 Shinung Corp.
 Sundat (S) Pte. Ltd. (Sundaphos*)
 Taiwan Tainan Giant Industrial Co., Ltd.

Identification

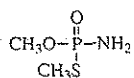
COMMON NAMES: Methamidophos (ANSI, BSI, ISO); acephate-met.
 EXP. CODE NUMBERS: Bay 71628; SRA 5172.
 OTHER CODE NUMBERS: CAS 10265-92-6; SHA 101201; ENT-27396; EINECS 233-606-0.

ADDITIONAL TRADE NAMES: Swipe*, Taperon* (Agsin Pte. Ltd.); Nuratron* (Atabay); Monitor* (Valent U.S.A.); Vetaron* (VAPCO).
 DISCONTINUED NAME: Tahmabon* (Equitable Trading Co.).

Chemistry

COMPOSITION: O,S-Dimethyl phosphoramidothioate (IUPAC and CAS).

PROPERTIES: Colorless crystalline, melting point 46.1°C. Vapor pressure approx. 2.3 mPa at 20°C. Readily soluble in n-hexane, dichloromethane, 2-propanol, toluene.



Methamidophos

Action/Use

ACTION: Insecticide, acaricide.

USE: Controls chewing and sucking insects, and spider mites on beets, broccoli, brussels sprouts, cabbage, celery, citrus, grapes, hops, maize, pome and stone fruit, potatoes, cotton, ornamentals, tobacco, and other crops.

FORMULATIONS: Soluble concentrate.

COMBINATIONS: Baythroid* TM (+ cyfluthrin), Magnum* (+ beta-cyfluthrin), Tamaron Combi* (+ triflurumuron), Tamaron* EP (+ parathion) (Bayer AG).

Registration Notes

U.S.: Monitor* applications may be classified as RUP. Monitor* marketed by Miles and Valent U.S.A.

OUTSIDE U.S.: Tamanox*.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 25-51 mg/l (96 h) (rainbow trout). Bee: Toxic.

Bird: LD₅₀ 8-11 mg/kg (bobwhite quail).

SOLUBILITY: Readily soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: 75% Tech (Rat): Oral LD₅₀ 21 mg/kg (male); 16 mg/kg (female). (Rabbit): Dermal 118 mg/kg.

PROTECTIVE CLOTHING: Respirator, chemical goggles, rubber gloves and impervious protective clothing.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, food, feed.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemical, carbon dioxide, halon, water spray or foam.

ANTIDOTE: Methamidophos is a cholinesterase inhibitor. Measurement of blood cholinesterase activity may be useful in monitoring exposure. If signs of cholinesterase inhibition appear, atropine sulfate is antidotal. 2-PAM (Protopam*) is also antidotal and may be used in conjunction with atropine but should not be used alone.

FIRST AID: Get medical attention immediately. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes and launder before reuse. **Inhalation**, remove to fresh air. **Ingestion**, contact physician before inducing vomiting. Take person and product container to nearest medical emergency treatment center.

EMERGENCY TELEPHONE: 816-242-2582 (Miles Inc.). 800-457-2022 (Valent).

Methanal — see Formaldehyde.

Methanearsonic Acid**Identification**

COMMON NAMES: MAA (WSSA for acid); methylarsonic acid (ISO-E draft).

CODE NUMBER: CAS 124-58-3.

Action/Use

ACTION: Herbicide.

See DSMA, MAMA, MSMA.

Methanol — see Alcohol.

Methaphoxide — see Metepa.

Methar* 30 — see DSMA.

Methasulfocarb — see Kayabest*.

Methavin* — see Methomyl.

Methazole — see Probe*.

Methibenzuron — see Tribunil*.

Methidathion

BP: Ciba (Supracide*)

Ciba, Ltd. (Ultracide*)

Makhteshim-Agan (Suprathion*)

Identification

COMMON NAMES: Methidathion (ISO, ANSI, BSI, ESA); DMTP (JMAF).

EXP. CODE NUMBER: GS-13005 (Ciba Ltd.).

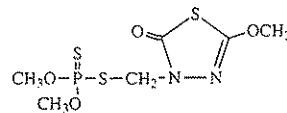
OTHER CODE NUMBERS: CAS 950-37-8; SHA 100301; OMS 844 (WHO); ENT-27193.

ADDITIONAL TRADE NAMES: Ultra* (Chimac-Agriphar S.A.); Suprathion* (Fersol Indústria E Comércio Ltda.); Supracidin*, Ultracidin* (VAPCO).

Chemistry

COMPOSITION: O,O-dimethyl phosphorodithioate, S-ester with 4-(mercaptomethyl)-2-methoxyΔ²-1,3,4-thiadiazolin-5-one (CAS 8CI).

PROPERTIES: Colorless crystals, melting point 39-40°C. Volatility slight. Rapidly metabolized in plants. Readily soluble in acetone, benzene, and methanol.



Methidathion

Action/Use

ACTION: Insecticide, acaricide.

USE: Controls alfalfa weevil and certain other insects in alfalfa, scales in citrus, spider mites, bollworm, budworm, lygus bug, pink bollworm, and whitefly in cotton. For use in sunflower, artichokes, apples, almonds, cherries, apricots, pears, nectarines, plums, prunes, walnuts, peaches and pecans.

FORMULATIONS: Emulsifiable concentrate, wettable powder.

Registration Notes

U.S.: Some or all applications may be classified as RUP. For Banks grass mite in sorghum (Texas only).

OUTSIDE U.S.: For codling moth and other insects in fruit; caterpillars and scale insects in grapevines; aphids in hops.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: Solubility in water 240 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ 44 mg/kg. Dermal 640 mg/kg; Inhalation 3.6 mg/l for 4 hours. (Rabbit): Dermal LD₅₀ 200 mg/kg. Nonirritating to eyes; slightly irritating to skin. 2EC: 65 mg/kg. Corrosive to eye, severe to skin.

HANDLING AND STORAGE CAUTIONS: Store in dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

ANTIDOTE: Atropine. Oxime preparations such as PAM or Toxogonin* under medical supervision.

Methin***Identification**

OTHER NAME: MCPES.

Chemistry

COMPOSITION: Sodium 2-methyl-4-chlorophenoxyethyl sulfate.

Action/Use

ACTION: Herbicide.

Methiocarb

BP: Bayer AG (Draza*, MesuroI*)

Miles Inc. (MesuroI*)

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

Identification

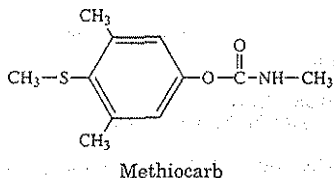
COMMON NAMES: Methiocarb (ISO-E, BSI, CSA, New Zealand, So. Africa, ESA); mercaptodimethur (ISO, France, Germany).
 EXP. CODE NUMBERS: Bay 37344, H 321.
 OTHER CODE NUMBERS: CAS 2032-65-7; SHA 100501; OMS 93 (WHO); ENT-25726; EINECS 217-991-2.
 ADDITIONAL TRADE NAMES: Grandslam* (Olympic Hort.); Methiocarb Fogger* (Whitmire Research Laboratories).
 DISCONTINUED NAME: Mesurol* 50% HBT (Gustafson, Inc.)

Chemistry

COMPOSITION: 3,5-Dimethyl-4-(methylthio)phenyl methylcarbamate (CAS).

FAMILY: Carbamate.

PROPERTIES: Colorless crystals with phenol-like odor. Melting point 119°C. Vapor pressure 0.036 mPa at 25°C. Readily soluble in dichloromethane. Soluble in 2-propanol, toluene. Hardly soluble in n-hexane.

**Action/Use**

ACTION: Nonsystemic insecticide, acaricide, molluscicide, bird repellent when used as seed treatment.

USE: Slug and snail control for home flower gardens, ornamentals. Outside U.S., controls slugs, snails in a wide range of crops; broad-range control of sucking and biting insects (including soil insects) and spider mites in berries, citrus, pome and stone fruit, hops, potatoes, beet, maize, oilseed rape, vegetables and ornamentals; also used as a bird repellent.

FORMULATIONS: Bait; granules, suspension concentrate, wettable powder. Dry seed dressing. Flowable seed treater concentrate.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 4.7 mg/l (96 h) (rainbow trout). Bee: Nontoxic, depending on mode of application. Bird: LC₅₀ No sign of intoxication (birds repelled by Mesurol*) (7 d) (bobwhite quail); LD₅₀ 5-10 mg/kg b.w. (Japanese quail).

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 20 mg/kg b.w.; Dermal >5000 mg/kg b.w.

HANDLING AND STORAGE CAUTIONS: Store in original container, preferably in a locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Administer atropine sulfate in large therapeutic doses. Repeat as necessary to the point of tolerance.

Methiocarb Fogger* — see Methiocarb.

Methiotepa**Identification**

CODE NUMBER: 76-96-0.

TRADE NAMES: MAPS*, Metapside*.

Chemistry

COMPOSITION: 1,1,1'-phosphinothioylidynetris[2-methylaziridine] (CAS).

Action/Use

ACTION: Insect chemosterilant.

Registration Notes

U.S.: EUP.

Methiuron**Identification**

COMMON NAME: Methiuron (ISO, BSI).

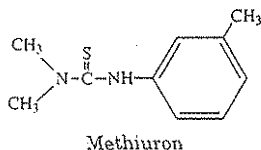
EXP. CODE NUMBER: M.H. 090 (Bayer AG).

OTHER CODE NUMBERS: CAS 21540-35-2; SHA 383100.

DISCONTINUED NAMES: Thiuron* (Bayer AG).

Chemistry

COMPOSITION: N,N-dimethyl-N'-(3-methylphenyl)-thiourea.

**Action/Use**

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2200 mg/kg.

Meth-O-Gas* — see Methyl Bromide.

Métholcarb — see MTMC.

Methometon

(Discontinued by Ciba-Geigy Ltd.)

Identification

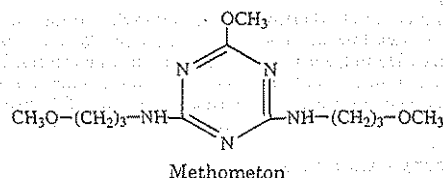
COMMON NAMES: Methometon (ISO-E, BSI), métométon (ISO-F).

EXP. CODE NUMBER: G-34690 (Ciba-Geigy Ltd.).

OTHER CODE NUMBERS: CAS 1771-07-9; SHA 549300.

Chemistry

COMPOSITION: 6-Methoxy-N₂, N₄-bis(3-methoxypropyl)-1,3,5-triazine-2,4-diamine.

**Action/Use**

ACTION: Herbicide.

Methomex* — see Methomyl.

Methomyl

BP: Crystal Chemical Inter-America (Lanox*)

Du Pont Agricultural Products (Lannate*)

Forward International Ltd.

Gilmore, Inc.

Hubei Sanonda Co., Ltd. (Sathomyl*)

Jin Hung Fine Chemicals Co., Ltd. (Tech.)

Kuo Ching Chemical Co., Ltd.

Makhteshim-Agan (Methomex*)

Pilarquin Corp. (Pilarmate*)

PT. INTI Everspring Indonesia

Pyosa S.A. de C.V. (Metox-900*)

Rhone-Poulenc (Kipsin*, Methavin*)

Rotam Group (Kuik*)

Shinung Corp.

Sundat (S) Pte. Ltd.

Taiwan Tainan Giant Industrial Co., Ltd.

Identification

COMMON NAME: Methomyl (ISO, ANSI, BSI, ESA, JMAF).

EXP. CODE NUMBERS: SD 14999; Du Pont 1179.

OTHER CODE NUMBERS: CAS 16752-77-5; SHA 090301; OMS 1196 (WHO).

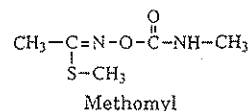
ADDITIONAL TRADE NAMES: Acinate* (Agro Chemicals Industries Ltd.); Methoxyl* (Chimac-Agriphar S.A.); Memilene L* (Diachem S.P.A.); Agrinate* (VAPCO).

DISCONTINUED NAMES: Nudrin* (Du Pont); Nu-Bait II* (Griffin Agricultural Chemicals Group).

Chemistry

COMPOSITION: S-Methyl N-[(methylcarbamoyl)oxy]thioacetimidate (CAS 8CI).

PROPERTIES: White crystalline solid, with slightly sulfurous odor, melting point 78-79°C. Solubility in ethanol, 42 g/100 g; in methanol, 100 g/100 g. Soluble in methanol, 42 g/100 g; in methanol, 100 g/100 g.

**Action/Use**

ACTION: Insecticide.

USE: Broad-spectrum control of insects in vegetables, soybeans, cotton, other field crops, certain fruit crops, and ornamentals (commercial plantings). Stimukil* only for housefly control around the outside of feed lots, broiler houses, food processing plants, etc.

FORMULATIONS: Liquid, low volatility liquid, water-soluble powder. COMBINATIONS: Metofan*, Metofan Forte* (+ endosulfan) (Aragonesas Agro, S.A.); Denka-Flybait* (+ muscalure) (Denka International B.V.); Stimukil* (+ muscalure) (Troy Biosciences, Inc.).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Methoprene

Registration Notes

U.S.: Lannate* applications may be classified as RUP. Use on water-cress voluntarily cancelled.

OUTSIDE U.S.: Lanox*

Environmental Guidelines

HAZARDS: Fish: Toxic. LC₅₀ 3.4 mg/l (96 h) (rainbow trout) 0.8 mg/l (bluegill). Bee: Toxic.

SOIL PARTICLE ADSORPTION: Half life of 3-5 days following leaf application.

SOLUBILITY: Solubility in water, 5.8 g/100 g.

Safety Guidelines

SIGNAL WORD: DANGER—POISON; CAUTION (Stimukil*).

TOXICITY CLASS: I; IV.

TOXICITY: (Rat): Oral LD₅₀ 17 mg/kg (male); 24 mg/kg (female). 24% Liquid (Rabbit): Dermal LD₅₀ 5880 mg/kg.

Inhalation 4 hours, 0.3 mg/l.

PROTECTIVE CLOTHING: Wear protective clothing, goggles, and a mask or respirator suitable for protection against methomyl vapors or dusts.

HANDLING AND STORAGE CAUTIONS: Liquid concentrate may be fatal if swallowed; poisonous if inhaled. Do not breathe dust or spray mist. Do not get in eyes, on skin, or on clothing. Liquid formulations are flammable. Keep away from heat, sparks, and open flame. Do not subject liquid to temperatures below 32°F. Store in original container only. Discarded product is a hazardous waste under RCRA regulations.

Emergency Guidelines

ANTIDOTE: Atropine. Consult physician in all cases of suspected poisoning. Do NOT use morphine or 2-PAM. Except for exposure to methomyl and organophosphorous insecticides, 2-PAM may be used to supplement atropine sulfate treatment. See label.

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Methoprene

BP: Sandoz Agro, Inc. (Altosid*, Altosid* Briquets, Altosid* SR-10, Apex*, Diacon*, Dianex*, Kabat*, Manta*, Minex*, Pharorid*, Precor*)
Sandoz Ltd.

Identification

COMMON NAME: Methoprene.

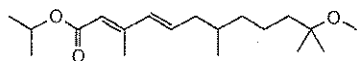
EXP. CODE NUMBER: ZR-515 (Sandoz Agro, Inc.).

OTHER CODE NUMBERS: CAS 40596-69-8; SHA 105401; OMS 1697 (WHO).

Chemistry

COMPOSITION: Isopropyl (E,E)-(RS)-11-methoxy-3,7,11-trimethyl-dodeca-2,4-dienoate (IUPAC).

PROPERTIES: Amber liquid, specific gravity 0.9261 g/ml at 20°C. Boiling at 100°C. at 0.05 mm Hg. Vapor pressure 2.37 × 10⁻⁴ mm Hg at 25°C. or 1.60 × 10⁻⁴ mm Hg at 40°C. Soluble in organic solvents.



Methoprene

Action/Use

ACTION: Insect growth regulator.

USE: For control of Coleoptera, Diptera, Homoptera and Siphonaptera. Inhibits normal molting processes causing mortality or sterility of insects at or before the adult molt. Altosid*: mosquito control. Apex* 5E: Sciarid fly control in mushroom houses. Diacon*: stored product pests on peanuts, birdseed, cereal grains. Dianex*: stored product pests in tobacco processing plants and warehouses. Kabat*: cigarette beetle, tobacco moth control in stored tobacco. Manta* to enhance size of silkworm cocoons. Minex* 5E: leafminers in greenhouse-grown chrysanthemums. Precor*: flea control on animals and premises.

FORMULATIONS: Aerosols, briquets, emulsifiable concentrates, flowables, foggers, ready-to-use.

Registration Notes

U.S.: Pharorid* Bait premix for pharoah's ant control.

Environmental Guidelines

HAZARDS: Fish: Acute static TL₅₀ 4.62 ppm (bluegill), 4.39 ppm (106 ppm in aerated water) (trout), >100 ppm (channel catfish).

SOLUBILITY: Water solubility 1.39 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >34,600 mg/kg.

Inhalation LC₅₀ >210 mg/l. No teratogenic effects at 1000 mg/kg. (Rabbit): Dermal >3000 mg/kg. Non-irritating to skin or eye.

PESTICIDE DICTIONARY

HANDLING AND STORAGE CAUTIONS: No storage or shelf life restrictions for: Altosid* SR-10, Apex* 5E, Kabat* Tobacco Protector, Precor*, Manta*, Minex* 5E, Pharorid* Bait. Storage limitation of one year for Altosid* Briquets.

Methoprotryne

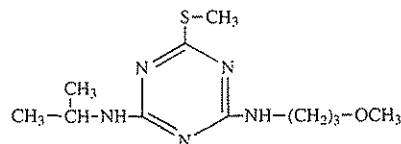
Identification

COMMON NAMES: Methoprotryne (ISO-E, BSI); métoprotryne (ISO-F).

EXP. CODE NUMBER: G 36393.

OTHER CODE NUMBERS: CAS 841-06-5; SHA 509200.

DISCONTINUED NAME: Gesaran* (Ciba-Geigy Ltd.).



Methoprotryne

Methotrexate

Identification

CODE NUMBER: CAS 59-05-2.

ADDITIONAL TRADE NAME: Amethopterin*.

Chemistry

COMPOSITION: N-(p-(2,4-Diamino-6-pteridyl)methyl-methyl[chaminobenzoyl]-L-glutamic acid (IUPAC).

Action/Use

ACTION: Insect chemosterilant.

Methoxone* — see Mecoprop.

Methoxone* M Herbicide (MCP) — Discontinued by ICI Agrochemicals.

Methoxyacrylate Fungicides

This new type of fungicide is under development by several companies (ICI Agrochemicals filed the first patents claiming synthetic methoxyacrylates as fungicides.) Synthetic relatives of natural fungicides, these compounds inhibit respiration at the cellular level within fungi, a novel mode of fungicidal action.

Methoxychlor

BP: Kincaid Enterprises, Inc. (Marlate*)

Identification

COMMON NAME: Methoxychlor (ISO, BSI, ESA, JMAF).

TRIVIAL NAME: DMTD.

CODE NUMBERS: CAS 72-43-5; SHA 034001; OMS 466 (WHO); ENT-1716.

ADDITIONAL TRADE NAMES: Drexel* Methoxychlor (Drexel Chemical); Methoxychlor 300 (Gustafson Inc.); Prentox* Methoxychlor (Prentiss Incorporated).

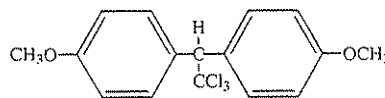
DISCONTINUED NAMES: Moxie* (Ansol Co.); Flo Pro* Mc (Cargill); Chemform* (Chemical Formulators); Alfa-tox* (+ diazinon) (Ciba-Geigy); Higlmetox* (Hightex); Double-M* (Hopkins Agricultural Chemical Co.).

Chemistry

COMPOSITION: 2,2-bis(p-methoxyphenyl)-1,1,1-trichloroethane.

FAMILY: Diphenyl chloride.

PROPERTIES: Pure, crystalline solid. Melting point 89°C. Methoxychlor is very soluble in aromatic chlorinated, or ketonic solvents. Somewhat soluble in paraffinic types.



Methoxychlor

Action/Use

ACTION: Insecticide.

USE: Widely used because of long residual action against many species of insects and low toxicity to humans and warm-blooded animals. For certain insect pests on fruit and shade trees, vegetables, dairy and beef cattle, home gardens, and around farm buildings (except poultry houses). Replacement for DDT where application may constitute a hazard to warm-blooded animals or susceptible plants. Rarely phytotoxic, and injury is usually negligible even on DDT-susceptible crops such as cucurbits. Drexel* Methoxychlor 4L and Methoxychlor 300 controls insects such as cadelle, confused flour beetle, rice weevil, granary weevil, pea weevil, saw tooth grain beetle, angoumois grain moth, and Indian meal moth during preplanting storage of clean seed. FORMULATIONS: Aerosols, dusts, emulsifiable concentrates, oil solutions, wettable powder, flowable.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Environmental Guidelines

HAZARDS: Fish: Toxic. LC_{50} (24 h) 0.052 mg/l (rainbow trout). Bee: Varies with formulations. EC nontoxic. Dusts toxic.

SOLUBILITY: Essentially insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD_{50} 6000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in a cool dry place.

Emergency Guidelines

FLASHPOINT: Nonflammable.

FIRST AID: Get medical aid. Eyes, flush with water for 15 minutes. Skin, wash thoroughly with water. Ingestion, drink 1-2 glasses of water and induce vomiting.

Methoxyethylmercury Acetate

(Discontinued 1969 by Chipman Chemicals)

Identification

CODE NUMBERS: CAS 151-38-2; SHA 041508.

OTHER NAMES: MEA, MEMA.

Action/Use

ACTION: Seed treatment.

Methoxyethylmercury Chloride — see MEMC.

Methoxyethylmercury Silicate — see Ceregam*.

Methoxyli* — see Methomyl.

Methyl Alcohol — see Alcohol.

Methyl Apholate**Chemistry**

COMPOSITION: 2,2,4,4,6,6-Hexahydro-2,2,4,4,6,6-hexakis(2-methyl-1-aziridinyl)-1,3,5,2,4,6 triazatriphosphorine.

Action/Use

ACTION: Insect chemosterilant.

Methyl Aphoxide — see Metepa.

Methyl Bromide

BP: Great Lakes Chemical Corp. (Meth-O-Gas*)
TRICAL, Inc.

Identification

COMMON NAME: Methyl bromide.

CODE NUMBERS: CAS 74-83-9; SHA 053201.

OTHER NAMES: Celfume*, Kayafume, MeBr*.

DISCONTINUED NAMES: Drexel Plant Bed Gas* (+ chloropicrin) (Drexel Chemical); Terr-O-Cide* II, Terr-O-Gel* (+ chloropicrin) (Great Lakes Chemical); Mebrom 50*, Mebrom 67*, Mebrom 75*, Mebrom 98*, Mebrom 100*, (Mebrom N.V.).

Chemistry

COMPOSITION: Bromomethane.

FAMILY: Alkyl bromide.

PROPERTIES: Colorless, odorless gas at normal temperatures and pressures; liquified gas handled as a liquid (14.4 lb/gal) under moderate pressure. Specific gravity at 0°C and 760 mm Hg=1.732; vapor density -3.27; boiling point 3.6°C; vapor pressure at 20°C 1400 mm/Hg, at 40°C 2600 mm/Hg. Viscosity=0.22 centistokes at 0°C. Methyl bromide is readily soluble in lower alcohols, ethers, esters, ketones, halogenated hydrocarbons, aromatic hydrocarbons and carbon disulfide.

Action/Use

ACTION: Fumigant.

USE: Insect and rodent control in space and commodity fumigations. Preplant soil fumigation (only with chloropicrin) to control nematodes, insects, weed seeds and fungi.

COMBINATIONS: Brom-O-Gas*, Brom-O-Sol*, Terr-O-Gas* (all with chloropicrin) (Great Lakes Chemical); TRI-CON* (+ chloropicrin) (TRICAL, Inc.); Bromocoop* (+ chloropicrin) (Vinexport S.A.).

Registration Notes

U.S.: All applications classified as RUP. Only registrant authorized to refill cylinders.

Environmental Guidelines

SOLUBILITY: Solubility in water at 20°C=1.75 g/100g.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD_{50} 214 mg/kg. Inhalation LC_{50} 3120 ppm (15 min.); 302 ppm (8 hrs.). (Human): Inhalation LC_{50} 60,000 ppm (2 hrs.).

Methyl bromide is a poison and can cause respiratory distress, cardiac arrest and central nervous system effects. Overexposure may cause neurotoxic effects from which recovery may be slow. Methyl bromide demonstrates genotoxicity in several test systems at levels above the TLV. In 2 year inhalation cancer bioassay with rats at 3, 30 and 90 ppm, no tumors were observed. In two generation inhalation reproduction study with rats at 3, 30, 90 ppm, the no observed effect level was 3 ppm. At higher doses organ weight variation was observed in some off-spring.

PROTECTIVE CLOTHING: Avoid tight clothing, jewelry, gloves, and boots when handling methyl bromide. Methyl bromide may be trapped inside and cause skin irritation or injury. If full-face respiratory protection is not required, wear goggles or full-face shield for eye protection when handling liquid. Do not reuse contaminated clothing and shoes until thoroughly cleaned and aerated. Respiratory protection for enclosed spaces: If the concentration of methyl bromide in the worker area, as measured by a pump and appropriate detector tubes (for example, Draeger, Kitagawa, MSA, and Sensidyne), does not exceed 5 ppm (20 mg/M³), no respiratory protection is required. If this concentration is exceeded at any time, all persons in the fumigation area must wear a NIOSH/MSHA approved self-contained breathing apparatus (SCBA) or combination air-supplied/SCBA respirator.

HANDLING AND STORAGE CAUTIONS: Store in a locked, dry, cool, well ventilated area. Post as a pesticide storage area. Do not contaminate water, food, or feed by storage. Store cylinders upright, secured to a rack or wall to prevent tipping. Cylinders should not be subjected to rough handling or mechanical shock such as dropping, bumping, dragging, or sliding. Do not use rope slings, hooks, tongs or similar devices to unload cylinders. Transport cylinders using hand truck, fork truck or other device to which the cylinder can be firmly secured. Do not remove valve protection bonnet and safety cap until immediately before use. Replace safety cap and valve protection bonnet when cylinder is not in use. When cylinder is empty, close valve, screw safety cap on to valve outlet, and replace protection bonnet before returning to shipper. Only the registrant is authorized to refill cylinders. Do not use cylinders for any other purpose.

Emergency Guidelines

FIRST AID: Skin, wash thoroughly with soap, water for at least 15 minutes. Remove contaminated clothes, shoes immediately; thoroughly aerate before reuse. Destroy contaminated leather goods. Inhalation, remove to fresh air. Keep warm. Give artificial respiration if breathing has stopped. Get immediate medical aid.

EMERGENCY TELEPHONE: 501-862-5141 (Great Lakes Chemical Corp.).

Methyl Chloroform — see Trichloroethane.

Methyl Decanoate**Action/Use**

ACTION: Plant growth regulator.

USE: An emulsion of this ester will debud chrysanthemums chemically.

Registration Notes

U.S.: Not available commercially.

Methyl Demeton — see Metasystox*.

Methyl Eugenol

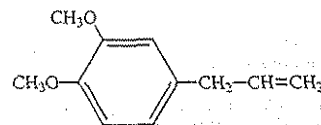
BP: Agri-Pharm Industries Inc.

Identification

CODE NUMBER: CAS 93-15-2.

Chemistry

COMPOSITION: 4-Allyl-1,2-Dimethoxybenzene.



Methyl Eugenol

Action/Use

ACTION: Oriental fruit fly attractant.

Methyl Formate**Identification**

CODE NUMBERS: CAS 107-31-3; SHA 053701.

Chemistry

COMPOSITION: Methyl formate.

Action/Use

ACTION: Fumigant.

USE: Formulated with carbon dioxide for use as a commodity fumigant.

Methyl Fosferno* — see Methyl Parathion.

Methyl Isoamyl Ketone**Identification**

CODE NUMBER: CAS 110123.

Action/Use

ACTION: Solvent.

Methyl Isothiocyanate — see Trapex*; Vorlex*.

Methyl-Mercaptophos — see Demeton-O-Methyl.

Methyl-Mercaptophos Teolovy — see Demeton-S.

Methyl-Mercaptofotiol — see Metasystox*-S.

Methyl Mercaptophos — see Metasystox (1)*.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Methyl Nonyl Ketone

BP: McLaughlin Gormley King Co. (MGK Dog and Cat Repellent*)

Identification

CODE NUMBERS: CAS 112-12-9; SHA 044102.

Chemistry

PROPERTIES: Clear oily liquid at room temperature. Freezes at approximately 50°F. Specific gravity 0.826 ± .015 at 20°C. Stable under usual conditions of storage and use. Miscible in petroleum hydrocarbons and aromatics, alcohol, ether, and most common organic solvents.

Action/Use

ACTION: Repellent.

USE: To prevent damage by stray animals to ornamental plantings.

Anti-cribbing agent for horses; training aid for pets.

FORMULATIONS: Granules, pressurized sprays, regular sprays.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: 50 C (Rat); Oral LD₅₀ 5000-10,000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Ordinary good manufacturing practices and sanitation. Ventilate well. Store in closed drum in cool, dry place.

PROTECTIVE CLOTHING: None.

Methyl Parathion

BP: All India Medical Corp. (Paratox*)
Bayer AG (Bladan* M, Folidol* M, Metacide*)
CHEMIE AG Bitterfeld-Wolfen (Wofatox*)
Cheminova Agro A/S
HELM AG
Hubei Sanonda Co., Ltd. (Prompt*)
Rallis India Ltd. (Parataf*)
Rotam Group (Romethyl-P*)
Shinung Corp.
Velpol, S.A. de C.V. (Metpar*, Paramet*)

Identification

COMMON NAMES: Parathion-methyl (ISO, BSI), methyl parathion (ESA, JMAF), metafos (USSR).

CODE NUMBERS: CAS 298-00-0; SHA 053501; EINECS 206-050-1.

ADDITIONAL TRADE NAMES: Paraton* (Atabay); Cekumethion* (Cequisa); Chimac Par M*, Thionyl*, (Chimac-Agriphar S.A.); Devithion* (Devidayal (Sales) Pvt. Ltd.); Penncap-M* (ELF Atochem Agri B.V., ELF Atochem North America, Inc.); Vegfru Klofos* (Pesticides India); Parasul* (Suipinar Mills Ltd.); E 601, Gearpius*, Kilex Parathion*, Metaphos*, Partron M*, Tekwaisa*.

DISCONTINUED NAMES: Veto* (+ EPN) (Drexel Chemical); Fosferno M50* (ICI Agrochemicals); Metron* (Kerr-McGee); Nitrox* 80 (Mobay Corp.); Sytemp* (+ parathion + toxaphene) (Ring Around Products).

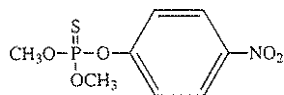
Chemistry

COMPOSITION: O,O-dimethyl O-(4-nitrophenyl) phosphorothioate.

FAMILY: Organophosphate.

PROPERTIES: Colorless crystals.

Melting point 35-36°C. Specific gravity d 20°/4°C = 1.36. Vapor pressure 0.2 mPa at 20°C. Compatible with most other pesticides except alkaline materials. Readily soluble in dichloromethane, 2-propanol, toluene. Hardly soluble in n-hexane.



Methyl Parathion

Action/Use

ACTION: Insecticide.

USE: Boll weevils; many biting, sucking insects in many crops.

FORMULATIONS: Dustable powder, emulsifiable concentrate, encapsulated capsule suspension, ULV liquid, wettable powder.

COMBINATIONS: Taxylone* (+ phosalone) (Rhône-Poulenc).

Registration Notes

U.S.: Some or all applications may be classified as RUP.

OUTSIDE U.S.: A-Gro*, Dygun*, Dypar*, Ekatox*, Folidol* M, Mepaton*, Meptox*, Methyl Fosferno*, Niletar*, Parapest M-50* (Planters Products), Toll*, Thylyar M-50*, Unidol*.

Environmental Guidelines

SOIL PARTICLE ADSORPTION: Believed to have little or no potential to contaminate ground water.

SOLUBILITY: In water (20°C) 55 mg/l.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ approx. 6 mg/kg b.w.; Dermal approx. 45 mg/kg b.w.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, feed, food. Do not heat above 55°C. Decomposes rapidly above 100°C, explosion may be induced.

Emergency Guidelines

FLASHPOINT: (80% in Xylene): 42°C (Pensky-Martens closed tester).

COMBUSTION PRODUCTS: Thermal decomposition (e.g. fire) may produce dimethyl sulfide, sulfur dioxide, carbon monoxide, carbon dioxide, phosphorus pentoxide, nitrogen oxides.

FIRE EXTINGUISHING MEDIA: Dry chemicals, carbon dioxide for small fires. Water spray or foam for large fires.

ANTIDOTE: Atropine, PAM, 2-PAMCI, 2-PAMM.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC); 33-10-4725171 (ELF Atochem Agri B.V.); 800-523-0900 (ELF Atochem North America, Inc.).

Methyl Phencapton**Identification**

EXP. CODE NUMBER: G-30494.

OTHER CODE NUMBERS: CAS 3735-23-7; SHA 362200.

Chemistry

COMPOSITION: O,O-Dimethyl S-(2,5-dichlorophenylthio) methyl phosphorodithioate.

PROPERTIES: Methyl homolog of phencapton.

Action/Use

ACTION: Acaricide, insecticide.

Methyl Potasan***Chemistry**

COMPOSITION: O,O-Dimethyl O-(4-methylumbelliferone) phosphorothioate.

Action/Use

ACTION: Insecticide.

Methyl Trithion*

(Discontinued 1971 by Stauffer Chemical Co.)

Identification

EXP. CODE NUMBER: R-1492 (Stauffer).

OTHER CODE NUMBERS: CAS 953-17-3; OMS 497 (WHO); ENT-25599.

DISCONTINUED NAME: Tri-Me.

Chemistry

COMPOSITION: S-[[[p-Chlorophenyl]thio]methyl] O,O-dimethyl phosphorodithioate (CAS 8CI).

Action/Use

ACTION: Insecticide-acaricide.

Methylated Fatty Acid

Used as pinching agents for woody ornamental plants. This group of chemicals works by killing the actively growing apical meristem, thus releasing the lateral buds along the stem from the dominant effect of the apex. The lateral buds grow and develop normally to produce a more dense, compact plant.

Methyldymron

BP: SDS Biotech K.K. (Stacker*)

Identification

COMMON NAME: Methyldymron (JMAF).

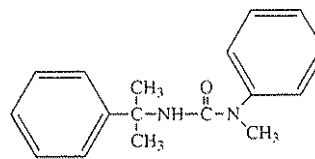
EXP. CODE NUMBERS: K-1441, SK-41 (Showa Denko).

OTHER CODE NUMBER: CAS 42609-73-4.

Chemistry

COMPOSITION: 3-(α,α-Dimethylbenzyl)-1-methyl-1-phenylurea (IUPAC).

PROPERTIES: Odorless, colorless needle crystals, melting point 76°C. Soluble in organic solvents.



Methyldymron

Action/Use

ACTION: Herbicide.

USE: Selective preemergence herbicide in turf, for control of cyperaceous weeds and grasses such as barnyardgrass and annual bluegrass.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Good selectivity with methyl-dymron is obtained on turf, rice, corn, cotton, beans, sunflower, sugarcane, peanut, potato, and strawberry.
 FORMULATIONS: Granules, wettable powder.
 COMBINATIONS: Stacker-D* (+ 2,4 - PA).

Registration Notes

OUTSIDE U.S.: Registered only in Japan.

Environmental Guidelines

SOLUBILITY: 120 ppm in water (20°C).

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 9000 mg/kg. (Mouse): 7700 mg/kg.

HANDLING AND STORAGE CAUTIONS: Stable against heat and light.

Methylene Chloride**Identification**

CODE NUMBER: CAS 75-09-2.

Action/Use

ACTION: Fumigant.

USE: Postharvest fumigation of strawberries, commodity fumigation of grains, with ethylene for degreening citrus fruits.

Methylmercury Acetate/Methylmercury-2,3-dihydroxypropyl**Methylmercury Benzoate**

(Discontinued 1971 by Stauffer Chemical Co.)

Identification

CODE NUMBERS: CAS 3626-13-9; SHA 051904.

Action/Use

ACTION: Liquid seed treatment.

Methylmercury Dicyanodiamide — see Cyano(methylmercuri)-guanidine.

Methylmercury 2,3-Dihydroxypropylmercaptide/Methyl Mercury Acetate**Identification**

CODE NUMBERS: CAS 108-07-6, 2597-95-7; SHA 051905.

Action/Use

ACTION: Seed treatment.

USE: For cotton, flax, small grains, safflower.

Methylmercury Hydroxide**Identification**

CODE NUMBERS: CAS 1184-57-2; SHA 051906.

Action/Use

ACTION: Seed treatment.

USE: For cotton, flax, small grains.

Methylmercury Nitrile

(Discontinued 1970 by Chipman Chemicals Corp.)

Identification

CODE NUMBERS: CAS 2597-97-9; SHA 051907.

DISCONTINUED NAME: Chipcote* (Rhône-Poulenc).

Action/Use

ACTION: Organic mercury seed treatment.

Methylmercury Pentachlorophenate**Action/Use**

ACTION: Fungicide, seed treatment.

Methylmercury Propionate**Identification**

CODE NUMBERS: CAS 5903-10-6; SHA 051908.

Action/Use

ACTION: Slurry seed treatment.

USE: For flax and small grains.

Methylmercury Quinolinolate**Identification**

COMMON NAME: Methylmercury quinolinolate.

CODE NUMBERS: CAS 86-85-1; SHA 051902.

DISCONTINUED NAMES: Metasol* (Merck & Co., Inc.); Ortho LM Apple Spray*, Ortho LM Concentrate*, Ortho LM Seed Protectant* (Chevron Chemical Co.).

Action/Use

ACTION: Fungicide.

Methyl-metiram — Discontinued by BASF AG.

Metildiene K* — see Metam-Sodium.

Metilmerkaptosoksoid — see Metasystox-R*.

Metiltriiazotium — see Azinphos-Methyl.

Metiram

BP: BASF AG (Polyram* DF)

Identification

COMMON NAME: Metiram (JMAF, New Zealand).

EXP. CODE NUMBER: FMC 9102 (FMC Corp.); NIA 9102.

OTHER CODE NUMBERS: CAS 9006-42-2; SHA 0014601.

ADDITIONAL TRADE NAMES: Carbatene* (Procida), Zinc Metiram.

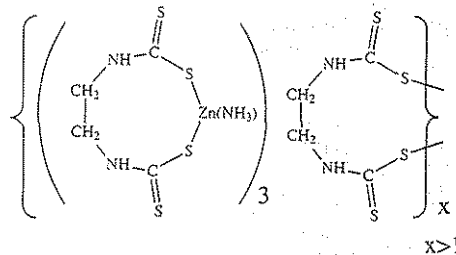
DISCONTINUED NAME: Pallinal* M (+ maneb + nitrothal-isopropyl), Ronilan* ME Combi (+ vinclozolin) (BASF AG).

Chemistry

COMPOSITION: tris[ammine-[ethylen bis(dithiocarbamate)]zinc(II)] [tetrahydro-1,2,4,7-dithiadiazocine-3,8-dithione] polymer.

FAMILY: Ethylene bisdithiocarbamate (EBDC).

PROPERTIES: Light yellow solid; dithiocarbamate odor. Nonsoluble in organic solvents.



Metiram

Action/Use

ACTION: Fungicide (contact).

USE: Polyram* DF and Polyram* Combi are broad spectrum organic fungicides for prevention of downy mildews, Anthracnose, rusts, leaf spots, seedling damping off among other diseases for fruits, grapes, hops, tea, cacao, nuts, oil palm, vegetables, ornamentals, field crops, tobacco.

FORMULATIONS: Wettable powder, water dispersible granules.

COMBINATIONS: Aviso* DF, Aviso* S (+ cymoxanil), Aviso* Combi (+ ofurace), Aviso* Cup (+ cymoxanil + copper oxychloride), Pallinal* and Pallitop* (+ nitrothal-isopropyl), Polyram* Combi (all BASF AG).

Registration Notes

U.S.: Limited to potatoes and roses.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bird: Oral LD₅₀ >2150 mg/kg body wt. (bob-white). Bee: Nontoxic.

SOLUBILITY: In water g/a.i./100g solvent at 20°C ca. 2.10⁴.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >6810 mg/kg. Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Impermeable gloves, goggles, long-sleeved shirt and pants.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, clothing, foodstuffs.

SPILL CONTROL/CLEANUP: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. Symptomatic treatment. Ingestion, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC).

See Dithiocarbamates.

Metobromuron

BP: Ciba, Ltd.

Makhteshim-Agan (Pattonex*)

Identification

COMMON NAME: Metobromuron (ISO, ANSI, BSI, WSSA).

EXP. CODE NUMBER: C 3126 (Ciba-Geigy Ltd.).

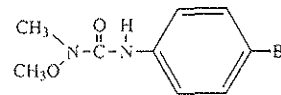
OTHER CODE NUMBERS: CAS 3060-89-7; SHA 035901; EINECS 221-301-5.

DISCONTINUED NAMES: Patoran* (BASF AG).

Chemistry

COMPOSITION: 3-(4-bromophenyl)-1-methoxy-1-methylurea (IUPAC).

PROPERTIES: Colorless crystals, melting point 95-96°C. Readily soluble in acetone, chloroform, and ethanol.



Metobromuron

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Selective herbicide.

USE: Preemergence for annual grasses and broadleaf weeds. Used in beans, potatoes, soybeans, flax, sunflowers, transplanted crops such as tobacco, tomatoes.

FORMULATIONS: Suspension concentrate, wettable powder.

COMBINATIONS: Galex[®] 500 EC (+ metolachlor); Igrater[®] 50 WP (+ terbutryn).

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 43 mg/l (trout). Bird: LD₅₀ 565 mg/kg body wt (quail). Bee: Nontoxic.

SOLUBILITY: Soluble 330 ppm in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 2000 mg/kg (male); 3000 mg/kg (female). (Rabbit): Dermal LD₅₀ >10,200 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, clothing, foodstuffs.

SPILL CONTROL/CLEANUP: Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: Tolonium chloride.

FIRST AID: Get medical aid. Ingestion, treat symptomatically, get medical aid.

EMERGENCY TELEPHONE: 41-61-6963333 (Ciba-Geigy, Switzerland).

Metofan[®] — see Endosulfan; Methomyl.

Metofan Forte[®] — see Endosulfan; Methomyl.

Metolachlor

BP: Ciba (Dual[®], Dual II[®], Pennant[®])

Ciba Ltd. (Dual[®], Dual S, *Dualor[®])

Identification

COMMON NAMES: Metolachlor (ISO, ANSI, BSI, WSSA); métolachlore (ISO-F).

EXP. CODE NUMBER: CGA-24705 (Ciba-Geigy).

OTHER CODE NUMBERS: CAS 51218-45-2; SHA 108801; EINECS 257-060-8.

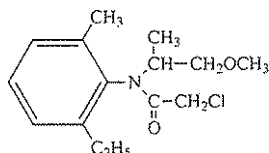
DISCONTINUED NAMES: Milocep[®] (+ propazine), Ontrack[®] 8E (both Ciba-Geigy).

Chemistry

COMPOSITION: 2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl)acetamide (CAS). Dual II[®] contains the safener benoxacor.

FAMILY: Chloracetanilide.

PROPERTIES: Odorless white to tan liquid, boiling point 100°C at 0.001 mm/Hg. Miscible with most organic solvents.



Metolachlor

Action/Use

ACTION: Selective herbicide.

USE: Preemergence and preplant incorporated weed control in corn, soybeans, peanuts, grain sorghum (seed treated with safener Concep[®] II or III), potatoes, pod crops, cotton, safflower, and woody ornamentals.

FORMULATIONS: Emulsifiable concentrate, granules.

COMBINATIONS: Pyrasur[®] (+ lenacil) (BASF AG); Pyracur[®] FL (+ chloridazon), Pyracur[®] L (+ chloridazon + lenacil) (BASF Corp.); Bicep[®], Bicep II[®], Bicep Lite[®] (all with atrazine), Cycle[®] (+ cyanazine), Derby[®] (+ simazine) (all Ciba); Codal[®] (+ prometryn), Primagram[®] and Primextra[®] (+ atrazine), Cotoran Multi[®] (+ fluometuron) (all Ciba, Ltd.); Broadstrike[®] + Dual[®] (+ flumetsulam) (DowElanco); Turbo[®] (+ metribuzin) (Miles Inc.); Galex[®] 500EC (+ metobromuron).

Registration Notes

OUTSIDE U.S.: Dual S[®] for use outside of North America; Dualor[®] for use in France.

Environmental Guidelines

HAZARDS: Bird: Oral >2510 mg/kg (mallard). Dietary >10,000 ppm (mallard).

SOIL PARTICLE ADSORPTION: Data incomplete, but indicates essentially stable in loamy sand over 64 days. Mobile in sandy clay loam, loam soil.

SOLUBILITY: Solubility in water, 530 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 2780 mg/kg. Inhalation LC₅₀ (4 h) >1.75 mg/l. (Rabbit): Dermal LD₅₀ >10,000 mg/kg. Nonirritating to eye, mildly irritating to skin.

Dual[®] 8E: 2534 mg/kg. Inhalation (4 h) >6.0 mg/l. (Rabbit): >5009 mg/kg. Moderately irritating to eye, skin.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Metolachlore — see Metolachlor.

Metolcarb — see MTMC.

Métométon — see Methometon.

Métoprotryne — see Methoprotryne.

Metox-900[®] — see Methomyl.

Metoxuron

BP: Sandoz Agro Ltd. (Dosanex[®])

Identification

COMMON NAME: Metoxuron (ISO, BSI).

CODE NUMBERS: CAS 19937-59-8; SHA 294600.

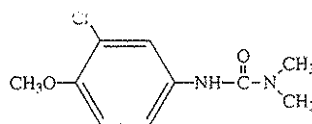
ADDITIONAL TRADE NAMES: Deftor[®], Dosaflo[®], Purivel[®], Sulere[®].

DISCONTINUED NAMES: Dosanex[®] MG, Dosagran[®].

Chemistry

COMPOSITION: N'-(3-chloro-4-methoxyphenyl)-N,N-dimethylurea. Made by the reaction of 3-chloro-4-methoxyphenyl isocyanate with dimethylamine.

PROPERTIES: Colorless, odorless, crystalline powder. Melting point 126-127°C; vapor pressure 3.2 × 10⁻⁶ Torr at 20°C. Stable upon storage and in water. Soluble in acetone, cyclohexanone, hot ethanol. Moderately soluble in toluene, cold ethanol. Practically insoluble in light petroleum.



Metoxuron

Action/Use

ACTION: Selective herbicide.

USE: Metoxuron for use in cereals and carrots, particularly against black grass, silky bent grass, wild oats, ryegrass, and most annual broadleaf weeds. Applied to winter and some spring wheats, winter barley at early postemergence, or at late postemergence. Most winter wheats, winter barley, and some spring wheat varieties show a high tolerance. Used pre and postemergence on carrots; so far as is known, all varieties are tolerant. Purivel[®] for preharvest defoliation of hemp, flax, potatoes and tomatoes.

FORMULATIONS: Flowable suspension concentrate, water dispersible granules, wettable powder.

COMBINATIONS: Dosamix[®], Savirad[®].

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bee: Nontoxic.

SOLUBILITY: Solubility in water at 24°C is 678 mg/l.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3200 mg/kg. Dermal >2000 mg/kg. No toxic symptoms for dogs fed daily levels of 100, 500, and 2500 ppm or rats fed 50, 250, and 1250 ppm for 90 days. No significant abnormalities for chicks fed at 50, 250, and 1250 ppm for six weeks.

Metpar[®] — see Methyl Parathion.

Metriben — see Banvel T[®].

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Metribuzin

BP: Bayer AG (Sencor*, Sencoral*, Sencorex*)
Du Pont Agricultural Products (Lexone*)
Miles Inc. (Sencor*)

Identification

COMMON NAMES: Metribuzin (ISO-E, BSI, WSSA); métribuzine (ISO-F).

EXP. CODE NUMBERS: Bay 94337, Bay DIC 1468.

OTHER CODE NUMBERS: CAS 21087-64-9; SHA 101101; EINECS 241-209-7.

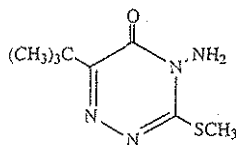
Chemistry

COMPOSITION: 4-Amino-6-(1,1-dimethylethyl)-3-(methylthio)-1,2,4-triazin-5(4H)-one (CAS).

FAMILY: Triazinone.

PROPERTIES: White crystalline solid. Melting point 126.2°C.

Vapor pressure 5.8×10^{-3} hPa at 20°C. Soluble in methanol, ethanol and glycol ether acetate.



Metribuzin

Action/Use

ACTION: Herbicide.

USE: Controls a large number of grass and broadleaf weeds infesting agricultural crops.

FORMULATIONS: Liquid suspension, water dispersible granules, dry flowable.

COMBINATIONS: Salute* (+ trifluralin), Turbo* (+ metolachlor) (Miles Inc.); Sencuron* (+ isoproturin) (Bayer AG).

Registration Notes

U.S.: For alfalfa, asparagus, barley, carrots, dry field peas, field corn, garbanzo beans, lentils, potatoes, sainfoin, soybeans, sugarcane, tomatoes, wheat, fallow land (noncrop), turfgrasses.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 64 mg/l (96 h) (rainbow trout). Bee: Nontoxic. Bird: LD₅₀ 168 mg/kg body weight (Japanese quail), LC₅₀ >4000 mg/kg (bobwhite quail).

SOLUBILITY: In water 1200 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ ca. 2000 mg/kg b.w.; Dermal LD₅₀ >20,000 mg/kg b.w.

PROTECTIVE CLOTHING: (Lexone*) Avoid contact with skin, eyes, and clothing. Remove contaminated clothing and wash with soap and hot water before reuse.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry area. Minimum temperature none, and maximum temperature not to exceed 100°F average for 30 days. Store in an area designated specifically for pesticides. Do NOT store near any materials intended for use or consumption by humans or animals. Store away from hormone-type herbicides and insecticides. Consult label for further instructions and directions for disposal of containers and waste.

Emergency Guidelines

EMERGENCY TELEPHONE: 49-2173-38-3030 (Bayer AG); 800-441-3637 (Du Pont); 816-242-2582 (Miles Inc.).

Métribuzine — see Metribuzin.

Metron* (methyl parathion) — Discontinued by Kerr-McGee Chemical Corp.

Metsulfuron-methyl

BP: Du Pont Agricultural Products (Allie*, Ally*, Escort*)

Identification

COMMON NAME: Metsulfuron-methyl (ISO, ANSI, BSI, WSSA).

EXP. CODE NUMBER: DPX T6376.

OTHER CODE NUMBERS: CAS 74223-64-6; SHA 122010.

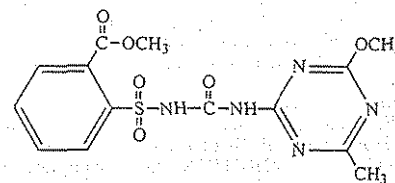
ADDITIONAL TRADE NAMES: Brush-Off*, Gropper*.

DISCONTINUED NAME: Harmony-M (+ thifensulfuron-methyl) (Du Pont).

Chemistry

COMPOSITION: Methyl 2-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]benzoate (CAS).

PROPERTIES: Faint, sweet ester-like, white-to-pale yellow solid, melting point 158°C. Soluble in acetone, methanol and methylene chloride. Slightly soluble in hexane.



Metsulfuron-methyl

Action/Use

ACTION: Herbicide.

USE: Postemergence for most broadleaf weeds, some annual grass weeds in barley, rye, triticale, wheat, rangeland and pastures, and noncropland areas.

FORMULATIONS: Dry flowable.

COMBINATIONS: Finesse* (+ chlorsulfuron) (Du Pont).

Registration Notes

U.S.: Except 20% dry flowable. Ally* selective control of broadleaf weeds in grasses on acreage enrolled in the Conservation Reserve Program (C.R.P.).

OUTSIDE U.S.: Allie* for use in Australia and Europe.

Environmental Guidelines

SOIL PARTICLE ADSORPTION: pKa is 3.3 (in water at 25°C) and K_d value is 1.4, Flanagan silt loam (pH = 6.5, 4.02% organic matter).

SOLUBILITY: Water solubility 1750-9500 ppm at 25°C, pH 5.4-6.7.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, or clothing. Wash thoroughly after handling. Store product in original container only. Do not contaminate water, other pesticides, fertilizer, food or feed in storage, disposal or cleaning of equipment.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Meturon* — see Fluometuron.

Mevidrin* — see Mevinphos.

Mevinox* insecticide (mevinphos) — Discontinued by Crystal Chemical Inter-America.

Mevinphos

BP: Amvac Chemical Corp. (Duraphos*, Phosdrin*)
Comlets Chemical Industrial Co., Ltd.
Hui Kwang Chemical Co., Ltd. (Mevidrin*)

Identification

COMMON NAMES: Mevinphos (ISO, BSI, ESA).

EXP. CODE NUMBER: OS-2046 (Shell Chemical Co.).

OTHER CODE NUMBERS: CAS 7786-34-7; SHA 015801; ENT-22374; EINECS 232-095-1.

ADDITIONAL TRADE NAMES: Phosdrin* (American Cyanamid); Menite*, OS-2046, Phosfene*.

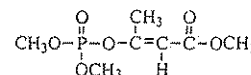
DISCONTINUED NAMES: Apavinphos* (KenoGard); Gesfid* (Celamerck); Mevinox* (Crystal Chemical Inter-America).

Chemistry

COMPOSITION: Alpha isomer of 2-carbomethoxy-1 methylvinyl dimethyl phosphate (typical 63%). Beta isomer of 2-carbomethoxy-1 methylvinyl dimethyl phosphate (typical 25%). Inert ingredients (typical 12%). Decrease in percentage of total a.i. from 100% to 88% is due to redesignation of the manufacturing impurities from active (related) ingredients to inert ingredients.

FAMILY: Organophosphate.

PROPERTIES: Pale yellow liquid boiling at 99-103°C (0.03 mm Hg). Miscible in most organic solvents.



Mevinphos

Action/Use

ACTION: Contact and systemic insecticide-acaricide.

USE: Controls aphids, mites, grasshoppers, cutworms, leafhoppers, caterpillars, and many other insects on a broad range of field, forage, vegetable and fruit crops. Dissipates quickly; application before harvest interval 1-10 days, depending on crop and dosage.

FORMULATIONS: Concentrate, liquid.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Registration Notes

U.S.: Amvac markets Phosdrin* in the U.S. On June 30, 1994, Amvac voluntarily cancelled all U.S. registrations of mevinphos. Existing stock can be used through February 28, 1995.

OUTSIDE U.S.: Phosdrin* (mevinphos) is marketed by Amvac Chemical Corp.

Environmental Guidelines

HAZARDS: Tech highly toxic. Fish: LC₅₀ 11.9 ppb (96 h) (rainbow trout), 22.5 ppb (bluegill) Bird: Tech highly toxic.

SOIL PARTICLE ADSORPTION: Data incomplete, but indicates very mobile in sandy loam, silt loam, loam, clay loam soils.

SOLUBILITY: Miscible in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 3-12 mg/kg. Inhalation LC₅₀ 9.8 mg/m₃/1 hr. (Rat): Dermal LD₅₀ 51-60 mg/kg. Mild skin, slight temporary eye irritation.

PROTECTIVE CLOTHING: Coverall over long sleeved shirt and long pants, chemical resistant gloves and footwear. Goggles or face shield. NIOSH or MSHA approved respiratory protective device. Chemical resistant headgear for overhead exposure. Chemical resistant apron for mixing, loading and cleaning equipment.

HANDLING AND STORAGE CAUTIONS: Poisonous if swallowed, inhaled or absorbed through skin. Rapidly absorbed through skin. Repeated inhalation or skin contact may, without symptoms, progressively increase susceptibility to mevinphos insecticide poisoning. Do not swallow or get in eyes, on skin or on clothing. Do not breathe vapors. Do not contaminate food or feed products. Keep away from heat or open flame.

Emergency Guidelines

FLASHPOINT: 83°C (TCC). Formulations: 30°C.

FIRE EXTINGUISHING MEDIA: CO₂, alcohol-resistant foam or powder.

ANTIDOTE: Atropine is the emergency antidote for mevinphos poisoning. 2-PAM is also antidotal and may be used in conjunction with atropine. Morphine is contraindicated.

FIRST AID: Call physician immediately. Eyes, flush with copious amount of clear, cool water for at least 15 minutes. Skin, immediately wash with soap and plenty of clean water. Remove contaminated clothing and wash before reusing. Ingestion, if conscious, induce vomiting immediately by giving two glasses of water, and touching back of throat with finger. Have person sit up while vomiting to help prevent aspirative of the vomitus. Inhalation, remove to fresh air. Keep affected person lying down and quiet. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

EMERGENCY TELEPHONE: Medical: 800-228-5635 Ext. 169 (Hazard Information Services); Transportation: 800-426-9300 (CHEMTREC).

Mexacarbate

(Discontinued by Dow Chemical Co.)

Identification

COMMON NAME: Mexacarbate (ISO, ANSI, BSI, ESA).

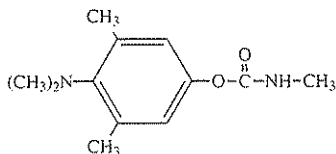
CODE NUMBERS: CAS 315-18-4; SHA 044201.

DISCONTINUED NAME: Zectran*.

Chemistry

COMPOSITION: 4-Dimethylamino-3,5-xyllyl methylcarbamate.

PROPERTIES: Readily soluble in xylene, benzene, acetone. Hydrolyzes rapidly in alkaline solutions.



Action/Use

ACTION: Insecticide, molluscicide, acaricide.

Environmental Guidelines

SOLUBILITY: In water at 25°C, 100 ppm.

Safety Guidelines

SIGNAL WORD: DANGER (2E, 25W); WARNING (DB).

TOXICITY CLASS: I (2E, 25W); II (DB).

TOXICITY: Tech (Rat): Oral LD₅₀ 24 mg/kg. (Dog): Oral 22 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine sulfate. Do NOT use 2-PAM, opiates, or cholinesterase inhibiting drugs.

Mextrol* — see Ioxynil; Mecoprop.

Mezene* — see Ziram.

Mezopur* — see Probe*.

MF-344 — see Etridiazole.

Mg/kg

Abbreviation for dose in milligrams per kilogram of body weight of animal.

MGK* 264

BP: McLaughlin Gormley King Co.

Identification

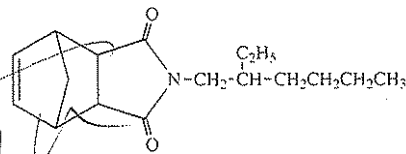
CODE NUMBERS: CAS 113-48-4; SHA 057001; ENT-8184.

DISCONTINUED NAMES: Octacide 264*, Van Dyk 264*.

Chemistry

COMPOSITION: N-(2-Ethylhexyl)-5-norbornene-2,3,-dicarboximide; often shortened to N-octyl bicycloheptene dicarboximide.

PROPERTIES: Very light, yellow colored liquid with typical reading 1 on Gardner scale. Specific gravity 1.050 ± .010 at 20°C. Nitrogen content 5%. Stable in all but very acidic or alkaline conditions. Miscible with most organic solvents including petroleum distillates.



Action/Use

ACTION: Synergist.

USE: Synergist for pyrethrins, allethrin, pyrethroids, and rotenone. Often used in combination with piperonyl butoxide in aerosols, household and industrial sprays. Stabilizes and prolongs the active life of pyrethrins, allethrin, and MGK* Repellent 874.

Registration Notes

U.S.: Mixtures containing MGK* 264 are not approved for use in poultry houses, directly on stored grain, or food crops.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4980 mg/kg.

PROTECTIVE CLOTHING: None.

HANDLING AND STORAGE CAUTIONS: Ordinary good manufacturing practices and sanitation. Ventilate well. Store in closed drum in cool, dry place.

See Allethrin, d-trans.

MGK* Allethrin Concentrate Insecticide (pynamin-forte) —

Discontinued by McLaughlin Gormley King Co.

MGK* Dog/Cat Repellent — see Methyl Nonyl Ketone.

MGK* Repellent 1207

(Discontinued 1970 by McLaughlin Gormley King Co.)

Action/Use

ACTION: Insect repellent.

MH — see Maleic Hydrazide.

MH 2P* Plant Growth Regulator (maleic hydrazide) — Discontinued 1989 by Drexel Chemical Co.

M.H. 090 — see Methiuron.

Micofume* Fungicide/Herbicide/Nematicide/Slimicide (da-

zomet) — Discontinued by Miller Chemical & Fertilizer Corp.

Micosin F30* — see Ziram.

Micro DDT 75* — Discontinued by Rumianca S.p.A.

Microbial Insecticides

Preparations based on disease organisms which normally cause insect diseases.

See *Bacillus thuringiensis* listings; Milky Disease Spores.

Micro-Cel* — see Dusts; Silicates (Synthetic Dry).

Microgranule F — see Karphos.

Micromite* — see Diflubenzuron.

Microsulf — see Sulfur.

Micro-Tech* — see Alachlor.

Microthiol Special* — see Sulfur.

Microthiol Special Liquide* — see Sulfur.

Microzol* — see Chlorophacinone.

Midox*

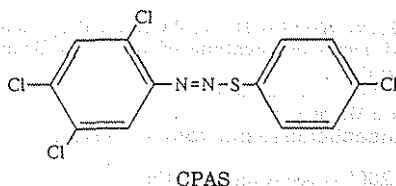
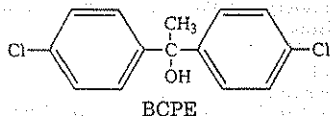
Former name for Chlorbenside.

See Chlorbenside.

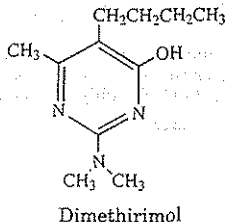
Mightikill* — see Propargite.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Mikahtop* — see Fenvalerate.
Mikal* — see Fosetyl-Aluminum.
Mikasin* Insecticide (chlorfensulphide/oxythane/bis (4-chlorophenyl) disulphide) — Discontinued 1974 by Nippon Soda Co., Ltd.
Milagro* — see Nicosulfuron.
Milban* Fungicide (dodemorph acetate) — Discontinued 1993 by Grace-Sierra Crop Protection Co.
Milbex* (Discontinued 1974 by Nippon Soda Co., Ltd.)
Identification
 CODE NUMBERS: CAS 80-06-8, EINECS 2012463 (BCPE); CAS 2274-74-0, EINECS 2012746 (CPAS).
Chemistry
 COMPOSITION: BCPE (chlorfenethol) + CPAS (chlorfensulphide).



Action/Use
 ACTION: Insecticide.
Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: III.
 TOXICITY: 50 WP (Mouse): Oral LD₅₀ 3000 mg/kg.
Milcap* Fungicide (ethirimol + captan) — Discontinued 1989 by ICI Agrochemicals.
Milcol* Fungicide (drazoxolon) — Discontinued by ICI Agrochemicals.
Milcurb*
 BP: ZENECA Agrochemicals
Identification
 COMMON NAMES: Dimethirimol (ISO-E, BSI, JMAF); diméthirimol (ISO-F).
 EXP. CODE NUMBER: PP 675.
 OTHER CODE NUMBER: CAS 5221-53-4.
Chemistry
 COMPOSITION: 5-butyl-2-dimethylamino-6-methyl pyrimidin-4-ol (IUPAC).
 PROPERTIES: White odorless needles, melting point 102°C, vapor pressure 11 × 10⁻⁶ torr at 30°C. Stable to heat and alkaline solutions. Solubilities: ethanol 6.5%; xylene 36%.



Action/Use
 ACTION: Systemic eradicator fungicide.
 USE: For powdery mildew on cucumbers, melons and certain ornamentals. One soil application can give protection for six weeks or more and may give adequate protection for a whole season.
 FORMULATIONS: Aqueous liquid, concentrate for dilution.
 COMBINATION: Hydrochloride solution compatible with Solufeed.
Environmental Guidelines
 HAZARDS: Fish: LC₅₀ 42 mg/l (24 h) (rainbow trout). Bee: Nontoxic.
 SOLUBILITY: Water solubility 0.12% (1.2 g/l water), but forms a soluble salt in aqueous solutions of strong acids.
Safety Guidelines
 SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 2350 mg/kg.
HANDLING AND STORAGE CAUTIONS: Wash hands and exposed skin before meals and after work. Do not contaminate ponds, waterways, and ditches with chemical or used container. Store in original container, tightly closed, in a safe place. Wash out container thoroughly and dispose of safely. Stable for at least 2 years under normal storage conditions in unopened containers.
Milcurb Super* Fungicide (ethirimol) — Discontinued by ICI Agrochemicals.
Mildane* — see Dinocap.
Mildew
 A plant disease characterized by a thin, whitish coating of mycelial growth and spores on the surface of infected plant parts (downy and powdery mildews); also on organic matter such as paper or cloth.
Mildewproof
 A substance when used to treat fabrics, paints, paper, etc., prevents the growth of mildew for a relatively long time or for the life of the material.
Mildin* — see Fenpropidin.
Mildofix* — see Fenpropimorph.
Mildothane* — see Thiophanate-Methyl.
Milifar* — see Imugan*.
Milgo* Fungicide (ethirimol) — Discontinued by ICI Agrochemicals.
Milky Disease Spores
 BP: Fairfax Biological Laboratory, Inc. (Doom*, Japidemic*)
Identification
 DISCONTINUED NAMES: Grub Attack*, Milky Spore Powder (Ringer Corp.).
Chemistry
 COMPOSITION: Culture of *Bacillus popilliae* or *Bacillus lentimorbus*.
 PROPERTIES: White powder. Inert.

Action/Use
 ACTION: Selective biological insecticide (larvae of Japanese Beetles), Oriental beetles, Rose chafers, and certain May and June beetles, including *Phyllophaga ancica*, *P. congrua*, *P. ephelida*, *P. fraterna* and *P. fulvipes*.
 USE: Controls grub stage of Japanese beetle. Only one application is needed for lasting control. Improves with time.
 FORMULATIONS: Spore powder ready-to-use.
Environmental Guidelines
 HAZARDS: Fish: Nontoxic. Bird: Nontoxic.
Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: III.
 TOXICITY: No known toxicity to man; no health problems. Considered harmless to mammals, birds, fish, plant life, and beneficial insects. No toxic effects for rats fed 50 million spores/day or Rhesus monkeys fed 250 million spores/day.
 PROTECTIVE CLOTHING: Dust mask for closed-in areas.
HANDLING AND STORAGE CAUTIONS: Store in dry area (10°F-105°F) to maintain spore viability. Wash hands after use.

Emergency Guidelines
 FLASHPOINT: Nonflammable.
Milky Spore Powder
Identification
 DISCONTINUED NAMES: Grub Attack* (Ringer Corp.).
Chemistry
 COMPOSITION: *Bacillus popilliae dutky*.
Action/Use
 ACTION: Selective insecticide.
 USE: For Japanese beetle larvae and grubs, certain May and June beetle grubs and grubs of the Oriental beetle and Rose chafer. Grub Attack* powder, granules for lawn, high value turf treatment, pastures.
 FORMULATIONS: Granular, powder.
Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: III.
 TOXICITY: Very low toxicity to man; no health problems. No toxic effects for rats at .5 g/day (50 million spores/day); Rhesus monkeys at 2.5 g/day (1250 million spores/day).
Registration Notes
 U.S.: Temporarily suspended 1992 by Ringer Corp.
Miller 531* Fungicide (cadmium-calcium copper zinc chromate complex) — Discontinued by Miller Chemical & Fertilizer Corp.
Miller 658* Fungicide (copper zinc chromate) — Discontinued by Miller Chemical & Fertilizer Corp.
Miller-Aide* Sticker — Discontinued by Miller Chemical & Fertilizer Corp.

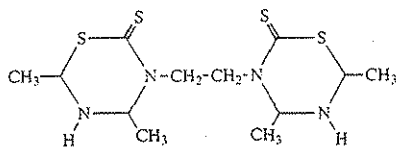
Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Milneb**Identification**

COMMON NAMES: Milneb (ANSI, BSI); thiadiazine (JMAF).
 EXP. CODE NUMBER: Du Pont 328.
 OTHER CODE NUMBERS: CAS 3773-49-7; SHA 579400.
 DISCONTINUED NAME: Sanipa* (Du Pont).

Chemistry

COMPOSITION: 3,3'-Ethylene-bis (tetrahydro-4, 6-dimethyl)-2H-1,3,5-thiadiazine-2-thione (CAS 8CI).



Milneb

Action/Use

ACTION: Fungicide.

Milocep*

(Discontinued 1986 by Ciba-Geigy).

Chemistry

COMPOSITION: Metolachlor + propazine.

Action/Use

ACTION: Selective herbicide.

Safety Guidelines

SIGNAL WORD: DANGER (eye).

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 3868 mg/kg. Inhalation LC₅₀ >0.19 mg/l (4 hr.). (Rabbit): Dermal LD₅₀ >5000 mg/kg. Corrosive to eye, moderate skin irritation.

Milogard* — see Propazine.

Milogard* Maxx — see Propazine.

Milo-Pro — see Propazine.

Milstern* Seed Dressing Fungicide (ethirimol) — Discontinued by ICI Agrochemicals.

Miltox*

BP: Sandoz Agro Ltd.

Identification

CODE NUMBERS: CAS 1332-65-6 (Copper Oxychloride), 12122-67-7 (Zineb).

ADDITIONAL TRADE NAME: Miltox* (77).

Chemistry

COMPOSITION: Zineb, copper oxychloride.

PROPERTIES: Green powder.

Action/Use

ACTION: Fungicide.

USE: Controls downy mildew (*Plasmopara*) and Brenner disease (*Pseudopeziza*) in grapes, and other diseases in most crops.

FORMULATIONS: Wettable powder.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (copper oxychloride): 20-30 ppm (trout); (Zineb): >10 ppm (carp).

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3630 mg/kg (male); 3430 mg/kg (female). Dermal 2000 mg/kg (male). Slight eye, skin irritation.

HANDLING AND STORAGE CAUTIONS: Keep away from food stuffs, beverages and feed. 2-3 year shelf-life in unopened containers.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water, foam, carbon dioxide, dry chemical.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water, remove contaminated clothing. Ingestion, drink water to induce vomiting. Inhalation, remove to fresh air.

Miltox* (77) — see Miltox*.

Mimic*

BP: Rohm and Haas Co. (Mimic*)

Identification

COMMON NAME: Tebufenozide.

EXP. CODE NUMBER: RH-5992 (Rohm and Haas).

Action/Use

ACTION: Insect growth regulator.

USE: An ecdysone agonist which is highly specific to lepidopteran pests. For use on vines, apples, rice.

Registration Notes

OUTSIDE U.S.: Registration pending in France on vines and apples; in Japan on rice.

Minalith***Action/Use**

ACTION: Wood preservative.

Mineral Oil — see Petroleum Oils; Refined Petroleum Distillate.

Mineral Spirits**Identification**

ADDITIONAL TRADE NAME: Varsol*.

DISCONTINUED NAMES: Chartersol* 300 (Charter Chemical). Herbitor* (BASF).

Chemistry

COMPOSITION: Petroleum distillate boiling 90% at <200°C (between gasoline/kerosene).

Action/Use

ACTION: Solvent, herbicide.

USE: Applied to celery postemergence to crop and weeds.

Safety Guidelines

SIGNAL WORD: CAUTION (Volatile).

TOXICITY CLASS: III.

TOXICITY: American Conference of Governmental Industrial Hygienists has listed "Stoddard Solvent" to have a Threshold Limit Value of 100 ppm (or 1150 mg/cubic meter.) This figure refers to vapor concentration.

HANDLING AND STORAGE CAUTIONS: Avoid prolonged or repeated contact with skin and breathing of the vapors. Do not use or store near open flame.

See Petroleum Oils; Stoddard Solvent.

Minex* — see Methoprene.

Mintacol* Insecticide (paraoxon) — Discontinued 1984 by Bayer AG.

Min-U-Gel 200* — see Attapulgitte Clay.

Mipafox**Identification**

COMMON NAME: Mipafox (ISO, BSI).

CODE NUMBERS: CAS 371-86-8; SHA 356300.

DISCONTINUED NAMES: Isopestox* and Pestox XV* (Fisons Ltd.).

Chemistry

COMPOSITION: N,N'-Diisopropylphosphorodiamidic fluoride (CAS).

Action/Use

ACTION: Insecticide.

MIPC

BP: Jiu Hong Fine Chemicals Co., Ltd.

Kuo Ching Chemical Co., Ltd.

Mitsubishi Kasei Corp. (Mipc*)

Planters Products (Hytox*)

PT. Petrosida Gresik

Shinung Corp.

Taiwan Tainan Giant Industrial Co., Ltd.

Identification

COMMON NAMES: Isoprocarb (ISO-E, BSI); isoprocarbe (ISO-F); MIPC (JMAF).

EXP. CODE NUMBER: KHE 0145.

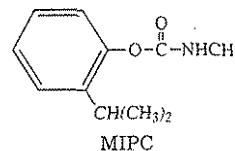
OTHER CODE NUMBERS: CAS 2631-40-5; OMS 32 (WHO); ENT-25670; EINECS 220-114-6.

DISCONTINUED NAMES: Etrifolan* (Bayer AG).

Chemistry

COMPOSITION: 2-(1-methylethyl)phenyl methylcarbamate.

PROPERTIES: White crystalline, melting point 88-93°C. Vapor pressure 3.8×10^{-4} mbar at 20°C. Readily soluble in acetone, methanol.

**Action/Use**

ACTION: Insecticide.

USE: Controls leafhoppers, planthoppers and bugs in rice and cacao; aphids, leafhoppers, capsid bugs and other pests of deciduous fruit.

FORMULATIONS: Dust, emulsifiable concentrate, granule, hot fogging concentrate, wettable powder.

Environmental Guidelines

HAZARDS: Fish: TLM 32 ppm (24 h) (gold fish); 39 ppm (carp).

SOLUBILITY: Insoluble in water.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: DANGER.
TOXICITY CLASS: I.
TOXICITY: (Rat): Oral LD₅₀ 450 mg/kg. Dermal >500 mg/kg.
HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, feed, food.
Emergency Guidelines
ANTIDOTE: Atropine.
Mipcin* — see MIPC.
Mipcin*/Hytox* 50WP — see MIPC.
Miracle* — see 2,4-D.
Mirage* — see Prochloraz.
Miral* — see Isazofos.

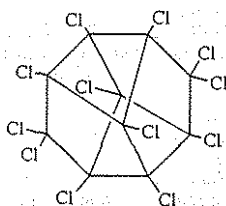
Mirex

Identification

COMMON NAME: Mirex (ESA).
EXP. CODE NUMBER: GC-1283 (Allied Chemical).
OTHER CODE NUMBERS: CAS 2385-85-5; SHA 039201; ENT-25719.
DISCONTINUED NAMES: Dechlorane*, Mirex* (both Allied Chemical Corp).

Chemistry

COMPOSITION: Dodecachlorooctahydro-1,3,4-metheno-2H-cyclobuta(c,d)pentalene.



Mirex

Action/Use

ACTION: Stomach insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.
TOXICITY CLASS: II.
TOXICITY: (Rat): Oral LD₅₀ 306 mg/kg. (Rabbit): Dermal 800 mg/kg.
Mirex* Bait Insecticide (mirex) — Discontinued 1977 by Allied Chemical Corp.

Miro* — see Fenpyroximate.

Miscible Liquids

Two or more liquids capable of being mixed which, then, will remain mixed under most conditions. Water and ethyl alcohol are miscible; water and oil are not.
 See Water Dispersible Liquid.

Mist

Liquid particles measuring 500 to 40 microns, that are formed by condensation of vapor. By comparison, "fog" particles are smaller than 40 microns.

Mist Blower

Spray equipment in which hydraulic atomization of the liquid at the nozzle is aided by an air blast past the source of the spray. The hydraulic pressure need not be high because the air blast from a blower aims and carries the mist to the target. The Speed Sprayer* is a mist blower with banks of nozzles for orchard spraying. Mist blowers can apply evenly much less gallonage per acre than was possible with the old heavy plunger pumps.

Mist-Control*

BP: Miller Chemical & Fertilizer Corp. (Mist-Control*)

Chemistry

COMPOSITION: Polyvinyl polymer.
PROPERTIES: Slightly turbid liquid, odorless.

Action/Use

USE: Drift retardant, deposition agent for pesticide sprays.

Environmental Guidelines

SOLUBILITY: In water soluble.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Keep container closed in storage and do not allow water to come in contact with contents until added in spray solution.

Mistral* — see Fenpropimorph; Nicosulfuron.

Mitac* Insecticide (amitraz) — Discontinued by FBC Ltd.

Mite

Mites are tiny organisms closely related to ticks in the group Acarina. They have eight legs (as do spiders) except the newly hatched mites,

which have only six. Some mites, such as the chicken mite and the chigger, are parasitic on higher animals. A large family of mites known as the spider mites derive their name from the habit of spinning a web on undersides of leaves where they feed. Spider mites are often pests of agricultural crops.

Mite Spray* — see Trichlorfon.

Mitecidin* B — see BPMC; Polynactins Complex.

Mitedown* — see Fenbutatin-oxide; Polynactins Complex.

Miticide

A material used primarily for the control of mites.

See Acaricide.

Mitigan* — see Dicofol.

Mitis Green (Paris green) — Discontinued by Los Angeles Chemical Co.

Mitoxur* — see Propoxur.

Mitran*

(Discontinued 1987 by Nippon Soda Co., Ltd.)

Chemistry

COMPOSITION: CPCBS (chlorfenson) + BCPE (chlorfenethol).

Action/Use

ACTION: Miticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: CPCBS: (Rat): Oral LD₅₀ 2000 mg/kg. BCPE: 926-1391 mg/kg.

Mitrol CCA* (chromated copper arsenate) — Discontinued 1989 by Chapman Chemical Co.

Mitrol G-ST* — see Sodium Pentachlorophenate.

Mitrol PQ* (Copper 8-Quinolinate) — Discontinued 1992 by Chapman Chemical Co.

Mitrothal-isopropyl — see Dodine.

Mix*

BP: Drexel Chemical Co.

Action/Use

ACTION: Stabilizing agent.

USE: For liquid fertilizer/pesticide applications.

Mix-Aid*

(Discontinued 1990 by Agway, Inc.)

Chemistry

COMPOSITION: Anionic polyglycol phosphate surfactants, butyl alcohol.

Action/Use

ACTION: Compatability agent, pH buffer, acidifying agent.

Environmental Guidelines

SOLUBILITY: Completely water soluble.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Mizol* — see Amitrole.

MK-23 — see Fluoromide.

MK-616 — see Diamate*.

MK-936 — see Abamectin.

MLD — see LD₅₀.

MLT* — see Malathion.

MNFA

Identification

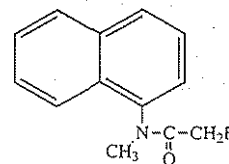
COMMON NAME: MNAF (JMAF).
CODE NUMBERS: CAS 5903-13-9; ENT-27403.

ADDITIONAL TRADE NAMES: FAM*.

DISCONTINUED NAME: Nissol* (Nippon Soda Co., Ltd.).

Chemistry

COMPOSITION: N-Methyl-N-(1-naphthyl)fluoroacetamide.



MNFA

Action/Use

ACTION: Acaricide-insecticide with little effect upon predators and other useful insects.

Safety Guidelines

SIGNAL WORD: WARNING.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 115 mg/kg.

MO* — see CNP.

Mobam***Identification**

CODE NUMBERS: CAS 1079-33-0; SHA 090401.

ADDITIONAL TRADE NAME: MCA-600*.

Chemistry

COMPOSITION: 4-Benzothienyl N-methyl-carbamate.

Action/Use

ACTION: Experimental contact insecticide.

Registration Notes

U.S.: Not actively developed by Mobil Chemical Co.

Mobilawn* Insecticide (dichlorfenthion) — Discontinued by Mobil Chemical Co.**Mocap*** — see Ethoprop.**Mocap* Plus 4-2 EC** — see Disulfoton; Ethoprop.**Modown*** — see Bifenox.**Mogeton G***

BP: Agro-Kanesho Co., Ltd.

Identification

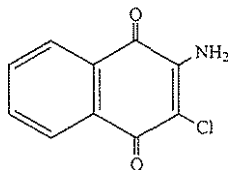
COMMON NAME: Quinoclamine (ISO, BSI); ACN (Japan).

TRIVIAL NAME: ACNQ.

CODE NUMBER: CAS 2797-51-5.

Chemistry

COMPOSITION: 2-amino-3-chloro-1,4-naphthoquinone.



ACN

Action/Use

ACTION: Herbicide, moss killer, algicide.

USE: For floating weeds (*Lemna paucicostata*, *Spirodela Polyrhiza*, *Azolla Japonica*); *Hydrodictyon reticulatum*; *Potamogeton distinctus*; and *Sagittaria pygmaea*.

FORMULATIONS: Granular, wettable powder.

COMBINATIONS: Granules in triple combinations (1.5% simetryne, 5% quinoclamine, 0.8% MCPB).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Mouse): Oral LD₅₀ 1350 mg/kg (male); 1260 mg/kg (female). (Rat): 1360 mg/kg (male); 1600 mg/kg (female).

PROTECTIVE CLOTHING: None. Because of its chemically characterized color, whitish clothes are tainted.

HANDLING AND STORAGE CAUTIONS: Store in cool, dark place.

Mold

Any fungus with conspicuous profuse, or wooly, growth (mycelium or spore masses). Occurs most commonly on damp or decaying matter and on surface of plant tissues.

Mole and Gopher Bait* — see Zinc Phosphide.**Molinam*** — see Molinate.**Molinate**

BP: Chemol Trading Ltd. Co. (Sakkimol*)

HELM AG

Herbex Productos Quimicos, Lda. (Molinato Herbex*)

OXON Italia S.p.A. (Molinam*)

ZENECA Ag Products (Ordram*)

Identification

COMMON NAME: Molinate (ISO, BSI, WSSA, JMAF).

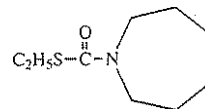
EXP. CODE NUMBER: R-4572 (ZENECA Ag Products).

OTHER CODE NUMBERS: CAS 2212-67-1; SHA 041402; OMS 1373 (WHO).

ADDITIONAL TRADE NAMES: *Molinex** (Atabay); *Malerbane Giavoni L** (Diachem S.P.A.).DISCONTINUED NAMES: *Hydram**; *Molinate Estrella** (Quimica Estrella).**Chemistry**

COMPOSITION: S-Ethyl hexahydro-1H-azepine-1-carbothioate (CAS).

PROPERTIES: Amber liquid, specific gravity 1.0626-1.0669 at 20°/20°C. Miscible with acetone, ethanol, kerosene, 4-methylpentan-2-one, xylene.



Molinate

Action/Use

ACTION: Selective herbicide.

USE: Controls watergrass in rice.

FORMULATIONS: Emulsifiable liquid, granules.

COMBINATIONS: Arrosolo* (+ propanil).

Environmental GuidelinesHAZARDS: Fish: Toxic. LC₅₀ 1.3 mg/l (96 h) (rainbow trout); 30 mg/l (goldfish).

SOIL PARTICLE ADSORPTION: Half life in soil, 3 weeks.

SOLUBILITY: In water 880 mg/l at 20°C.

Safety Guidelines

SIGNAL WORD: WARNING (8E). CAUTION (10G).

TOXICITY CLASS: II (8E). IV (10G).

TOXICITY: 10G (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ 3536 mg/kg. 8E: Oral LD₅₀ 549-955 mg/kg.

PROTECTIVE CLOTHING: Chemical safety glasses or goggles, impervious gloves and apron.

HANDLING AND STORAGE CAUTIONS: Avoid contact and inhalation. Wash hands and exposed skin before eating, drinking or smoking and after work. Store away from food and feedstuffs and out of reach of children.

Emergency Guidelines

FLASHPOINT: Ordram* Tech: >200°F, 93°C (Tac CC).

ANTIDOTE: Atropine.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Ingestion, drink one or two glasses of water and induce vomiting. Inhalation, remove to fresh air.**Molinate Estrella* Herbicide (molinate)** — Discontinued by Quimica Estrella.**Molinato Herbex*** — see Molinate.**Molinex*** — see Molinate.**Molluscicide**A material used primarily for the control of slugs and snails (mollusks) which are crop and garden pests. Snails are also intermediate hosts of parasites of medical importance to man. These pests belong to the mollusk group *Gastropoda*; hence the name gastropicide is sometimes applied to molluscicides when used especially against slugs and snails. See PCP.**Molting Hormone**

A hormone (ecdysone) produced by insects regulates the growth process. Because the insect cuticle ("skin") becomes rigid soon after formation, an insect must molt (shed) its cuticle periodically during growth as to permit a new one to form. This process known as ecdysis involves the molting hormone. Research is underway to develop compounds which will interfere with cuticle formation, prevent the process of ecdysis, and thus preclude the development of the mature adult insect.

Moly-Co-Thi* — Discontinued 1987 by Kalo, Inc.**Molynoctin* L**

(Discontinued 1991 by Gustafson Inc.)

Chemistry

COMPOSITION: Molybdenum + nitrogen-fixing bacteria.

Action/Use

ACTION: Seed fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Moly-Stand* — see Thiram.**Moly-T*** — see Thiram.**MON 14437** — see Wallop* Herbicide.**Monalide** — see Potablan*.**Monamex*** — see Butralin.**Monarch*** — see Moncut*.**Monceren*** — see Penycuron.**Moncide*** — see Cacodylic Acid; MSMA; Sodium Cacodylate.**Moncut***

BP: Nihon Nohyaku Co., Ltd. (Iota*, Monarch*, Moncut*, Protar*, Symphonie*)

Identification

COMMON NAME: Flutolanil (ISO, BSI).

EXP. CODE NUMBER: NNF-136.

Information is presented herein for preliminary planning only.

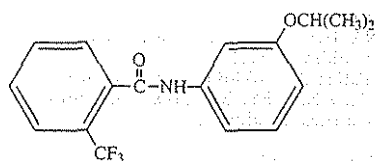
Exclusive reliance must be placed on information/directions supplied by manufacturer.

OTHER CODE NUMBER: CAS 66332-96-5.

Chemistry

COMPOSITION: 3'-isopropoxy-2-(trifluoromethyl)benzanilide (IUPAC).

PROPERTIES: Pure flutolanil is colorless crystalline solid, melting point 102-103°C, vapor pressure 1.33×10^{-5} mm/Hg 20°C. Solubility in water at 20°C is 9.6 mg/l; in n-hexane, 3 g/l; in toluene, 65 g/l; in chloroform, 238 g/l; in methanol, 606 g/l.



Flutolanil

Action/Use

ACTION: Systemic fungicide.

USE: For rice sheath blight, peanut white mold, potato black scurf, turf diseases and other Rhizoctonia diseases.

FORMULATIONS: Wettable powder.

Environmental Guidelines

SOLUBILITY: In water 0.74 mg/l.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 10,000 mg/kg. Dermal LD₅₀ >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid skin and eye contact and inhalation. Not flammable or autoignitable. Store in cool place.

Mondak* Herbicide (dicamba + MCPA) — Discontinued 1994 by Sandoz Agro, Inc.

M-One* Insecticide (*Bacillus thuringiensis* var. *tenebrionis*) — Discontinued 1992 by Mycogen Corp.

Monex* 3 Herbicide (MSMA/diuron) — Discontinued 1980 by Anul Co.

Monguard*

BP: Sankyo Co., Ltd.

Identification

COMMON NAME: Diclomezine (ISO draft, BSI).

EXP. CODE NUMBERS: F-850; SF-7531.

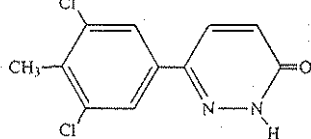
OTHER CODE NUMBERS: CAS 62865-36-5.

Chemistry

COMPOSITION: 6-(3,5-dichloro-4-methylphenyl)-3(2H)-pyridazinone (CAS).

FAMILY: Pyridazinone.

PROPERTIES: Odorless, colorless, solid crystal; melting point 250.5-253.5 °C; vapor pressure $>1 \times 10^{-7}$ mmHg at 0-60°C. Stable to light; slowly decomposed by sunlight. Solubility in water 0.74 mg/l at 25°C; in acetone 3.4 g/l at 23°C; in methanol 2.0 g/l at 23°C.



Diclomezine

Action/Use

ACTION: Fungicide.

USE: Protective and eradicated fungicide for rice sheath blight caused by *Rhizoctonia solani* and other sclerotial diseases caused by *R. solani*, *R. oryzae*, *Sclerotium oryzae-sativae* and *S. fumigatum*.

FORMULATIONS: 1.2% DP, 20% WP, 20% SC.

Registration Notes

U.S.: Not registered.

OUTSIDE U.S.: First marketed in Japan in 1988.

Environmental Guidelines

HAZARDS: Fish: 11.91 ppm (48 h) (carp); >300 ppm (daphnia). Bee: LD₅₀ 100 ug (honeybee). Bird: LC₅₀ 7000 ppm (bobwhite quail).

SOLUBILITY: Solubility in water 0.74 mg/l at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >12,000 mg/kg. Dermal >5000 mg/kg.

Inhalation LC₅₀ 821 mg/m³ (4 h).

HANDLING AND STORAGE CAUTIONS: Stable under acidic, neutral and alkaline conditions.

Monitor* — see Methamidophos.

Monkil* WP — see Rhizoctol*.

Monoaammonium Methaneuronate — see MAMA.

Monobor-Chlorate — see BareSpot* Monobor-Chlorate.

Monobor-Chlorate Granular D* — see BareSpot* Weed & Grass.

Mono-Calcium Arsenite — see Calcium Arsenite.

Monochlorobenzene — see Squadron*.

Monocil* — see Monocrotophos.

Monoclonal Antibodies (MABs/MCAs)

Molecules of living organisms that selectively find and attach to other molecules to which their structure conforms exactly. This could also apply to equivalent activity by chemical molecules.

Monocron* — see Monocrotophos.

Monocrotophos

- BP: American Cyanamid Co. (Azodrin*); Bharat Pulverising Mills Ltd. (Monophos*); Ciba, Ltd. (Nuvacron*); Comlets Chemical Industrial Co., Ltd.; Crystal Chemical Inter-America (Crisodrin*); Forward International Ltd. (Magic*); Gilmore, Inc.; Hindustan Insecticides Ltd. (Hilcron*); Hui Kwang Chemical Co., Ltd. (Monodrin*); Khatau Junker Ltd. (Khatau Mono*); Lupin Agrochemicals (I) Ltd.; Makhteshim-Agan (Monocron*); National Organic Chemical Ind. Ltd. (Monocil*); Pesticides India (Vegfru Kadett*); Pilarquim Corp. (Pilarodrin*); Q.E.A.C.A. S.A. (Susvin*); Rallis India Ltd. (Balwan*, Monotaf*); Shinung Corp.; Sudarshan Chemical Industries, Ltd. (Sufos*); Sundat (S) Pte. Ltd. (Suncrotophos*); Taiwan Tainan Giant Industrial Co., Ltd.; United Phosphorus Ltd. (Phoskill*); Voltas Ltd., Chemicals & Agro Products (Monovol* 36% SL)

Identification

COMMON NAME: Monocrotophos (ISO, BSI, ESA, JMAF).

EXP. CODE NUMBER: C 1414 (Ciba-Geigy); SD 9129.

OTHER CODE NUMBERS: CAS 6923-22-4; OMS 834 (WHO); ENT-27129.

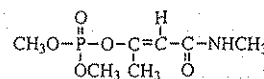
ADDITIONAL TRADE NAMES: Rapid X* (Agsin Pte. Ltd.); Aimocron* (All India Medical Corp.); Anocron* (Atabay); Agrodin* (Inquiport, S.A.); Monocil* (National Organic Chemical Industries Ltd.); Monolex* (Paushak Ltd.); Plantdrin* (Planters Products, Inc.); Monosul* (Sulphur Mills Ltd.); Monocron*, Vacron* (VAPCO).

DISCONTINUED NAMES: Ulvair* (Ciba-Geigy); Azodrin* (Du Pont); Hazodrin* (Hui Kwang Chemical Co.); Apadrin* (KenoGard AB).

Chemistry

COMPOSITION: Dimethyl (E)-1-methyl-2-(methylcarbamoyl)vinyl phosphate.

PROPERTIES: Reddish-brown, ester odor. Incompatible with alkaline compounds. Soluble in acetone, and alcohol; very slightly soluble in kerosene and diesel fuel.



Monocrotophos

Action/Use

ACTION: Contact and systemic insecticide-acaricide.

USE: Azodrin* 5 on cotton for bollworms, fleahoppers, boll weevil, loopers, pink bollworm, plant bugs (lygus), beet armyworm, white flies, thrips and mites. On peanuts for mites, granulate cutworms, and lesser cornstalk borers. On tobacco for tobacco hornworm, vegetable weevil, green peach aphid and tobacco budworm.

FORMULATIONS: Water miscible, soluble concentrate, technical concentrate, ULV, water soluble concentrate.

Registration Notes

U.S.: All applications of Azodrin* have been discontinued. California, Florida, Hawaii, and Texas have special (24C) labels. Use on potatoes, tomatoes withdrawn 1985.

OUTSIDE U.S.: Crisodrin*, Nuvacron*.

Environmental Guidelines

HAZARDS: Fish: Moderately toxic. Bee: Highly toxic. Bird: Highly toxic.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

SOIL PARTICLE ADSORPTION: Inherently biodegradable by hydrolysis. Does not accumulate. May be decomposed chemically.

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 8-23 mg/kg. (Rabbit): Dermal LD₅₀ 354 mg/kg.

PROTECTIVE CLOTHING: When dealing with product, wear clean rubber gloves, waterproof clothing, and goggles. Replace gloves frequently and destroy used gloves.

HANDLING AND STORAGE CAUTIONS: Poisonous if swallowed, inhaled or absorbed through the skin. Repeated inhalation or skin contact may without symptoms progressively increase susceptibility to Azodrin* poisoning. Stable in simple alcohols and glycols at room temperature. Stable when stored in glass or polyethylene containers. Relatively stable in sunlight. Unstable above 100 °F. Do not contaminate feed or foodstuff. Do not drink any alcoholic beverages before or during spraying since alcohol promotes absorption of organic phosphates. Azodrin* 5 is extremely flammable; do not store below 70°F or above 80°F for prolonged periods.

Emergency Guidelines

FLASHPOINT: Above 200°F., closed cup.

ANTIDOTE: Atropine combined with oxime preparation, e.g. PAM or Toxogonin. Atropine is the emergency antidote for Azodrin* poisoning. 2-PAM is also antidotal and may be used in conjunction with atropine. Do NOT use morphine.

FIRST AID: **Eyes,** flush well with water. **Skin,** remove contaminated clothing immediately, wash skin with soap, water. **Inhalation,** remove to fresh air. Get medical aid if symptoms occur. **Ingestion,** get immediate medical aid. If conscious, induce vomiting. Do NOT give saltwater or any other emetic.

Monodrin* — see Monocrotophos.

Monolan* Dispersant — Discontinued 1994 by Henkel Corp.

Monolex* — see Monocrotophos.

Monolinuron

BP: Hoechst Schering AgrEvo GmbH (Aresin*)

Identification

COMMON NAME: Monolinuron (ISO, BSI, WSSA).

EXP. CODE NUMBER: Hoe 002747.

OTHER CODE NUMBERS: CAS 1746-81-2; SHA 207500.

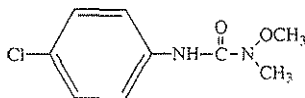
ADDITIONAL TRADE NAME: Aresin*.

DISCONTINUED NAME: Premalin* (+ linuron) (Rhône-Poulenc).

Chemistry

COMPOSITION: N-(4-chloro-phenyl)-N-methoxy-N-methylurea (CAS).

PROPERTIES: Solid crystalline, melting point 80-83° C (pure a.i.). Solubility at 20°C in acetone, methanol 200 g/l (both pure a.i.).



Monolinuron

Action/Use

ACTION: Preemergence, postemergence selective herbicide.

USE: For asparagus, berries, cereals, dwarfbeans, grapes, ornamentals, ornamental trees, potatoes, and certain other crops.

FORMULATIONS: Emulsifiable concentrate, wettable powder.

COMBINATIONS: Gramonol* (+ paraquat) (ZENECA Agrochemicals).

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

SOLUBILITY: At 25°C in water approx. 735 ppm (pure a.i.).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech in starch mucilage: (Rat): Oral LD₅₀ 2100-2215 mg/kg (female).

Emergency Guidelines

FIRST AID: Symptomatic treatment.

Monophagous

Limited to a single kind of food, as in the case of the boll weevil which restricts its feeding to the cotton plant.

Monophos* — see Monocrotophos.

Sodium Methanearsonate — see Cacodylic Acid; Herb-All*; MSMA.

Monosul* — see Monocrotophos.

Monotaf* — see Monocrotophos.

Monovol* 36% SL — see Monocrotophos.

Monox* Fungicide (polyoxin) — Discontinued by Nihon Nohyaku Co., Ltd.

Monoxone* Herbicide (sodium monochloroacetate) — Discontinued by ICI Agrochemicals.

Montar* — see Cacodylic acid; Sodium Cacodylate.

Montmorillonite — see Clay.

Monurex* Herbicide (monuron) — Discontinued 1984 by Makhteshim-Agan.

Monuron

Identification

COMMON NAMES: Monuron (ISO, ANSI, BSI, WSSA); CMU

(JMAF); chlorfenidim (USSR).

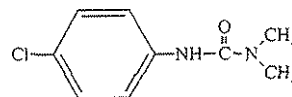
CODE NUMBERS: CAS 150-68-5; SHA 035501.

DISCONTINUED NAMES: Monurex* (Makhteshim-Agan); Telvar* (Du Pont Agricultural Products).

Chemistry

COMPOSITION: 3-(4-Chlorophenyl)-1,1-dimethylurea.

PROPERTIES: Very low in hydrocarbon solvents.



Monuron

Action/Use

ACTION: Herbicide.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

SOLUBILITY: Very low in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3600 mg/kg.

Monuron-TCA — see Urox*.

Monzet* — see Urbacid*.

MOPA

Chemistry

COMPOSITION: α-Methoxyphenylacetic acid.

Action/Use

ACTION: Herbicide, plant growth regulator.

Mor-Act* — see Foaming Adjuvant.

MorCran* — see Chlorpropham; Naptalam.

More*

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: Polyacrylamide, polyvinyl polymer.

Action/Use

ACTION: Drift retardant, deposition aid.

USE: Controls drift, improves swath width and amount of spray deposited on the target. Reduces water loss and amount of spray mist which is drift prone.

FORMULATION: Liquid concentrate.

See Drift Control Agents.

More LC*

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: Polyacrylamide, polyvinyl polymer (low anionic charge).

Action/Use

ACTION: Controls drift, improves swath width and amount of spray deposited on target. Reduces water loss and amount of spray mist which is drift prone. Low charge allows ease in mixing with glyphosates.

FORMULATION: Liquid concentrate.

See Drift Control Agents.

More-Phos* 73% — see Monocrotophos.

Morestan*

BP: Bayer AG (Morestan*)
Miles Inc.

Identification

COMMON NAMES: Oxythioquinox (Australia, ESA), chinomethionat (E-ISO), chinomethionate (F-ISO), quinomethionate (BSI).

EXP. CODE NUMBERS: Bay 36205, SAS 2074 (Bayer AG).

OTHER CODE NUMBERS: CAS 2439-01-2 (chinomethionat); SHA 054101; EINECS 219-455-3.

ADDITIONAL TRADE NAME: Joust* (Olympic Hort.).

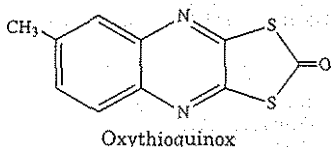
Chemistry

COMPOSITION: 6-Methyl-1,3-dithiol[4,5-b]quinoxalin-2-one.

FAMILY: Dithiocarbonate.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

PROPERTIES: Yellow crystalline powder. Melting point 170°C; vapor pressure approx. 0.026 mPa at 20°C. In late spring or summer applications some phytotoxicity may occur when Morestan* is used with most fungicides and insecticides. Morestan* is incompatible with petroleum based oils (phytotoxic). Moderately soluble in organic solvents.



Action/Use
ACTION: Acaricide, fungicide, fumigant.
USE: Residual control of mites, mite eggs, and powdery mildew. Pre-bloom spray on most deciduous fruits. For multiple applications to citrus, vegetable, walnuts, ornamentals.
FORMULATIONS: Dustable powder, suspension concentrate, flowable wettable powder.
COMBINATIONS: Hicombi* (+ triadimefon) (Bayer AG).
Environmental Guidelines
HAZARDS: Fish: LC₅₀ (96 h) 0.13 mg/l (rainbow trout). Bird: LD₅₀ 196 mg/kg, LC₅₀ 2409 mg/kg (diet) (bobwhite quail). Bee: Nontoxic.
SOLUBILITY: Practically insoluble in water.

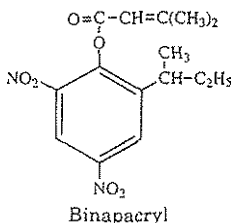
Safety Guidelines
IGNAL WORD: DANGER (Tech.); WARNING (25 WP); CAUTION (4F).
TOXICITY CLASS: I (Tech.); II (25WP); III (4F).
TOXICITY: Tech (Rat): Oral LD₅₀ approx. 1500 mg/kg. Dermal LD₅₀ >5000 mg/kg.
PROTECTIVE CLOTHING: Natural rubber gloves and goggles, face shield or safety glasses.
HANDLING AND STORAGE CAUTIONS: Store in a cool dry area designated specifically for pesticides. Do not store near any material intended for use or consumption by humans or animals.

Emergency Guidelines
EMERGENCY TELEPHONE: 49-2173-38-3030 (Bayer AG).
Morfamquat
Identification
COMMON NAME: Morfamquat (ISO, BSI).
E.P. CODE NUMBER: PP745 (ZENECA Agrochemicals).
OTHER CODE NUMBERS: CAS 7411-47-4; CAS 4636-83-3 (for dichloride); SHA 29400.
DISCONTINUED NAME: Morfoxone* (ICI Agrochemicals).

Chemistry
COMPOSITION: 1,1'-Bis(3,5-dimethylmorpholinocarbonylmethyl)-4,4'-bipyridylium; usually as the dichloride (morfamquat dichloride).
Action/Use
ACTION: Herbicide.
Safety Guidelines
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 368-690 mg/kg.
Morfoxone* Herbicide (morfamquat) — Discontinued 1974 by ICI Agrochemicals.

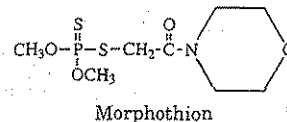
Morkit* — see Anthraquinone.
Mormon Cricket Spore* Insecticide (Nosema locustae Canring) — Discontinued 1987 by Reuter Laboratories.
Morocide*
 (Discontinued 1987 by Hoechst AG).

Identification
COMMON NAME: Binapacryl (ISO, ANSI, BSI, ESA, JMAF).
EXP. CODE NUMBERS: Hoe 2784; FMC 9044 and NIA 9044 (both FMC Corp.).
OTHER CODE NUMBERS: CAS 485-31-4; SHA 102201; OMS 571 (WHO); ENT- 25793.
OTHER NAME: Dinoseb methacrylate.
DISCONTINUED NAMES: Acracid*, Ambox*, Dapacryl*, Endosan*, Morrocid* (all Hoechst AG).



Action/Use
ACTION: Nonsystemic acaricide, contact miticide, fungicide.
Safety Guidelines
TOXICITY: Tech in starch mucilage (Rat): Oral LD₅₀ 421 mg/kg (female).
Morpholines
 A group of systemic fungicides active against powdery mildew of cereals, including dodemorph and tridemorph (Calixin*).

Morphothion
 (Discontinued by Sandoz Ltd.)
Identification
COMMON NAME: Morphothion (ISO, BSI, ESA).
CODE NUMBERS: CAS 144-41-2; SHA 371100.
ADDITIONAL TRADE NAME: Morphotox*.
Chemistry
COMPOSITION: O,O-Dimethyl S-morpholinocarbonylmethyl phosphorodithioate.



Action/Use
ACTION: Insecticide.
Morphotox* — see Morphothion.
Morroid* Acaricide/Fungicide (binapacryl) — Discontinued 1987 by Hoechst AG.
Morsodren* — see Cyano (methylmercury) Guanidine.
Morwet*
 BP: Witco Corp., Oleo Surfactants Group.

Action/Use
ACTION: Series of wetting agents.
Safety Guidelines
TOXICITY CLASS: IV.
TOXICITY: Nontoxic.
 See Wetting Agent.

Morzid
Identification
OTHER NAME: OPSPA.
CODE NUMBER: CAS 2168-68-5
Chemistry
COMPOSITION: Bis(1-aziridinyl) morpholinophosphine sulfide (IUPAC).

Action/Use
ACTION: Insect chemosterilant.
Registration Notes
 U.S.: EUP.
Mosquito Attack* (Bacillus thuringiensis var. israelensis) — Discontinued 1993 by Ringer Corp.
Mosquito Attack Rings* (Bacillus thuringiensis var. israelensis) — Discontinued by Ringer Corp.
Moss & Algae Killer* — see Soaps, Pesticidal.
Mostar* — see Quizalofop-P-ethyl.

Mothproofor
 A substance which, when used to treat woollens and other materials liable to attack from fabric pests, protects the material from insect attack. Contrasted with fumigants which kill infestations but provide no continuing protection.
Motivel* — see Nicosulfuron.

Motox* Insecticide (toxaphene) — Discontinued.
Mouse-Out* — see Chlorophacinone.
Moxie* Insecticide (methoxychlor) — Discontinued by Ansul Co.
Moazan* Fungicide (alginate acid) — Discontinued by Mitsubishi Kasei Corp.
M-Pede* Insecticide — see Fatty Acids, Pesticidal; Soaps.
M-Peril* — see *Bacillus thuringiensis* var. *hurstahi*; *Bacillus thuringiensis* var. *hurstahi* encapsulated delta endotoxin.
MPMC — see Meobal.
MPMT — see Lambast*.
MPP — see Fenthion.

MSMA
 BP: Drexel Chemical Co. (Diumate*, Drexar* 530, Drexel* MSMA)
 ISK Biosciences Corp. (Ansar* 6.6, Arsonate Liquid*, Bueno* 6, Daconate* 6, Daconate* Super, Super Arsonate*)
 Luxembourg Industries (Pamol) Ltd. (Target* MSMA 6.6, Target* MSMA 6 Plus)

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

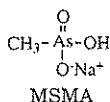
PBI/Gordon
Sanachem (Pty) Ltd. (Mesanate*)
Sanex Inc.
Shinung Corp.

Identification

COMMON NAME: MSMA (WSSA for monosodium salt).
CODE NUMBERS: CAS 2163-80-6; SHA 013803.
ADDITIONAL TRADE NAMES: Mesamate* (Crystal Chemical Inter-America); Herb-All* (Luxembourg Industries (Pamol) Ltd.).
DISCONTINUED NAMES: Monex* 3 (+ diuron), Phyban* H.C., Silvisar* 550 (Ansul Co.); Broadside* (+ cacodylic acid) (Drexel Chemical); Merge 823* (Harcros Chemicals); Vegabate* I (+ ammonium sulfamate) (Stull Chemical); Trans-Vert* (Union Carbide Corp.); Check-Mate* (+ sodium cacodylate), Dal-E-Rad*, Weed-E-Rad*, Weed-Hoe* (Vineland Chemical).

Chemistry

COMPOSITION: Monosodium methanearsonate (CAS 8CI).
FAMILY: Organic arsenical.
PROPERTIES: Pure: white crystalline solid, melting point 132-139°C. Non-volatile. Vapor pressure $<7.5 \times 10^{-6}$ mmHg (25°C). (Target* MSMA): clear liquid. (Ansar 6.6*): clear liquid; boiling point 110°C; density 1.55 g/ml at 20°C.
SOLUBILITY: (25°C): 16 g/100 ml in methanol; 0.005g/100 ml in hexane. Log K_{ow} is <1 .



Action/Use

ACTION: Herbicide.
USE: Postemergent for johnsongrass, other grassy weeds and cocklebur in noncropland. Preplant in cotton, bearing citrus (except Florida), nonbearing orchards. For crabgrass, broadleaf control in turf.
FORMULATIONS: Liquid, liquid plus surfactants.
COMBINATIONS: Croak* (+ fluometuron) (Drexel Chemical); Fortex* (+ diuron) (Herbitécnica Defensivos Agrícolas Ltda.); Herb-All* (+ sodium cacodylate + cacodylic acid) (Luxembourg Industries (Pamol) Ltd.); Monicide* (+ cacodylic acid + sodium cacodylate) (Monterey Chemical); Trimec* Plus (+ 2,4-D + MCPP + dicamba) (PBI/Gordon).

Registration Notes

U.S.: Ansar* 529, Bueno* 6, and Drexel* MSMA 6 on bearing, non-bearing citrus (except in Florida).
OUTSIDE U.S.: Postemergence in many countries for grass, broadleaf and sedge control in sugarcane.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ <100 mg/l (bluegill, rainbow trout). Bee: 68 µg/bee.
SOLUBILITY: (25°C): 104 g/100 ml in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2833 mg/kg.
Arsonate Liquid* (Rat): Oral LD₅₀ 1738 mg/kg. Inhalation LC₅₀ >20 mg/l. (Rabbit): Dermal LD₅₀ 2500 mg/kg. Mildly irritating to eyes, skin.
Bueno* 6 (Rat): Oral LD₅₀ 2270 mg/kg. Inhalation LC₅₀ >20 mg/l. (Rabbit): Dermal LD₅₀ 3150 mg/kg. Mildly irritating to eyes, skin.
Daconate* 6 (Rat): Oral LD₅₀ 2630 mg/kg. Inhalation LC₅₀ >20 mg/l. (Rabbit): Dermal LD₅₀ 2973 mg/kg. Mildly irritating to eyes, skin.
Target* MSMA (Rat): Oral LD₅₀ 2833 mg/kg. Skin irritation nonexistent or very mild.

PROTECTIVE CLOTHING: Long pants, long-sleeved shirt, impermeable gloves, boots for handling or applying. Mixer-loaders should wear an apron and full-face shield for handling, mixing concentrate. Flagmen should be fully protected during spray operations or use mechanical flagmen. Pilots and ground spray rig applicators should wear a mask or approved respirator.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. Target* MSMA mildly corrosive.

Emergency Guidelines

FLASHPOINT: Nonflammable.

FIRST AID: Ingestion, induce vomiting, drink lots of water.

MTD

(Discontinued 1971 by R.T. Vanderbilt Co., Inc.)

Chemistry

COMPOSITION: Morpholine thiuram sulfide.

Action/Use

ACTION: Fungicide.

MTD* — see Methamidophos.

MTDD — see Juvenile Hormone.

MTI-732

BP: Mitsui Toatsu Chemicals, Inc. (Aniverse*, Cyprene*, Danibon*, Sirbon*)

Identification

COMMON NAME: halfenprox (proposed ISO).
EXP. CODE NUMBER: MTI-732 (Mitsui Toatsu Chemicals, Inc.).

Chemistry

COMPOSITION: 2-(4-bromodifluoromethoxyphenyl)-2-methylpropyl 3-phenoxybenzyl ether.
EMPIRICAL FORMULA: C₂₁BrF₂H₂₃O₃.
MOLECULAR WEIGHT: 477.34.
PROPERTIES: Pale yellow liquid. Boiling point: 291.2°C (decomposed). Soluble in common organic solvents.

Action/Use

ACTION: Acaricide, insecticide.

USE: For various mite species, including Panonychus spp. and Tetranychus spp.

FORMULATIONS: EC, CS.

Registration Notes

U.S.: Not registered.

OUTSIDE U.S.: France: provisional registration in 1993 (Cyprene*). Japanese registration pending (Aniverse*, Danibon*, Sirbon*).

Environmental Guidelines

HAZARDS: Fish: TLM48; 3.5ppb (carp). Bird: LD₅₀ 1884 mg/kg (bobwhite quail). Earthworm: LC₅₀ 218 ppm (7d).
SOLUBILITY: Hardy soluble in water.

MTMC

BP: Jin Hung Fine Chemicals Co., Ltd.
Mitsubishi Kasei Corp. (MTMC)

Identification

COMMON NAMES: Metolcarb (ISO-E, BSI); métholcarb (ISO-F); MTMC (JMAF).

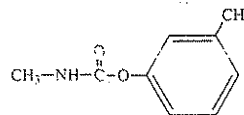
CODE NUMBER: CAS 1129-41-5.

ADDITIONAL TRADE NAMES: Metacrate* (Sumitomo Chemical Co., Ltd.), Tsumacide*.

DISCONTINUED NAME: Dolmix* (+ BHC) (Nihon Nohyaku Co., Ltd.).

Chemistry

COMPOSITION: m-Tolyl methylcarbamate.
PROPERTIES: Colorless crystalline solid melting point 76-77°C. Vapor pressure at 25°C is 1×10^{-4} mm/Hg. Soluble in polar solvents. Hardly soluble in nonpolar solvents.



Metolcarb

Action/Use

ACTION: Insecticide.

USE: Controls rice leafhoppers and planthoppers, codling moth, citrus mealybug, onion thrips, Mediterranean fruit fly, pink bollworm, and cotton aphid.

FORMULATIONS: Dust, emulsifiable concentrate, wettable powder.

Environmental Guidelines

SOLUBILITY: Solubility at 30°C is 2.6 g/l water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): LD₅₀ 268 mg/kg; (Mouse): 109 mg/kg. (Rat): Dermal LD₅₀ 6000 mg/kg. Inhalation LC₅₀ 475 mg/m³.

PROTECTIVE CLOTHING: Gloves, gas mask or respirator, goggles and clothing.

HANDLING AND STORAGE CAUTIONS: When handling, wear a respirator with gas absorbent. Avoid skin and eye contact. Neither flammable nor autoignitable. Storage under cool conditions preferable.

Emergency Guidelines

ANTIDOTE: Atropine sulfate.

M-Trak* — see *Bacillus thuringiensis* var. *tenebrionis*, encapsulated delta endotoxin.

Mucochloric Anhydride

Identification

TRIVIAL NAME: Mucochloric anhydride.

EXP. CODE NUMBER: GC-2466 (Allied Chemical Corp.).

OTHER CODE NUMBERS: CAS 4412-09-3; SHA 584200.

Chemistry

COMPOSITION: Bis(3,4-dichloro-2(5H)-furanonyl ether (IUPAC).

Action/Use

ACTION: Fungicide.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2000 mg/kg.

Mugibon* — see Thiophanate-Methyl.

Multamat* — see Bendiocarb.

Multicide* — see Tetramethrin.

Multi-Film L* Adjuvant — Discontinued by Kalo, Inc.

Multilure — see Hercon* Luretape*.

Multiprop* Growth Regulator (chlorflurenol) — Discontinued 1991 by Shell Agrar GmbH & Co. KG.

Murfotox* (mecarbam) — Discontinued by Murphy Chemical Ltd.

Murganic RPB*
(Discontinued by Murphy Chemical Products)

Chemistry

COMPOSITION: Vitavax* + organic mercurial.

Action/Use

ACTION: Systemic fungicide.

Muritan*

(Discontinued 1993 by Bayer AG)

Identification

ADDITIONAL TRADE NAME: Promurit* (Bayer AG).

Chemistry

COMPOSITION: 3,4-Dichlorobenzene diazothiocarbamid.

Action/Use

ACTION: Rodenticide.

Registration Note

Muritan* trade name reused by Bayer AG for a cholecalciferol rodenticide.

See Cholecalciferol.

Murvesco* — see Fenson.

Muscalure

BP: Denka International B.V. (Denka-Flylure*)

Identification

COMMON NAME: Muscalure (ESA).

CODE NUMBERS: CAS 27519-02-4; SHA 103201.

Chemistry

COMPOSITION: Z-9-tricosene (CAS).

PROPERTIES: Colorless to amber liquid. Specific gravity 0.87 at 20°C. Boiling point (0.5mm) 190°C.

Action/Use

ACTION: Sex and aggregation pheromone for musca domestica. Stimukil* only for housefly control around the outside of feed lots, broiler houses, food processing plants, etc.

USE: Fly attractant in baits, electrocution traps.

FORMULATIONS: Attractant mixture for fly control; spray cans for use in electrocution traps.

COMBINATIONS: Denka-Flybait* (+ methomyl) (Denka International B.V.); Stimukil* (+ methomyl) (Troy Biosciences, Inc.).

Environmental Guidelines

SOLUBILITY: Stimukil* soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION (Stimukil*).

TOXICITY CLASS: III (Stimukil*).

TOXICITY: Stimukil* (Rat): Oral 2760-3840 mg/kg. (Rabbit): Dermal 10,000 mg/kg. Inhalation 4 hrs. <200 mg/l. Nontoxic.

HANDLING AND STORAGE CAUTIONS: Store in cool place. Stimukil*: Do not contaminate food, feed or water by storage or disposal.

Emergency Guidelines

FLASHPOINT: >230°F.

ANTIDOTE: Stimukil*: Atropine; methomyl is a cholinesterase inhibitor.

FIRST AID: Stimukil*: Get medical aid as necessary. Eyes, flush with water for at least 15 minutes. Skin, remove contaminated clothing and wash skin immediately with soap and water. Wash clothing before reuse. Ingestion, drink water, induce vomiting.

Mus-Do-Kill* — see DDVP.

Mutagenic

The property of a substance or agent to produce genetic changes in living cells.

Mustang* — see Fury*.

MVP* — see *Bacillus thuringiensis* var. *hurstaki*, encapsulated delta endotoxin.

Mycar*

(Discontinued 1991 by Abbott Laboratories)

Identification

COMMON NAME: *Hirsutella thompsonii*.

CODE NUMBER: SHA 113401.

Action/Use

ACTION: Acaricide, mycoacaricide.

Safety Guidelines

TOXICITY: Initial evidence indicates a lack of mammalian toxicity.

Mycelium — see Germination.

Myclobutanil — see Systhane*.

Mycodifol* Fungicide (captafol + folpet) — Discontinued by SOPRA, France.

Mycoherbicide

A biological weed control agent. Usually live fungal spores.

Mycoplasma

A microorganism intermediate in size between viruses and bacteria possessing many virus-like properties and not visible with a light microscope.

Mycoshield*

BP: Merck Ag Vet (U.S. Sales)
Pfizer Inc. (Outside U.S.)

Chemistry

COMPOSITION: Contains 17% oxytetracycline.

Action/Use

ACTION: Antibacterial, antibiotic.

USE: Controls bacterial spot on peaches, fire blight on pears, and bacterial wilt of bentgrass.

Mycotal* — see *Verticillium lecanii*.

Mycotox*

Identification

CODE NUMBER: CAS 5393-75-9.

ADDITIONAL TRADE NAME: Seedox*.

Chemistry

COMPOSITION: 2,4,5-Trichlorophenyl acetate (IUPAC).

Action/Use

ACTION: Fungicide.

Mylone* Fumigant — see Dazomet.

Mylone* Herbicide — see Ioxynil; Mecoprop.

Mylox*

(Discontinued 1993 by Cumberland International Corp.)

Chemistry

COMPOSITION: Homogenized sulfur + appropriate compatible mite pheromone.

Action/Use

ACTION: Miticide, fungicide, nutrient.

FORMULATIONS: Flowable.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Relatively nontoxic. May slightly irritate skin.

Myprozine — see Pimaricin.

Myri*

BP: ICI Surfactants

Action/Use

ACTION: Series of surfactants.

USE: Used as emulsifier in formulation of pesticides.

MYX 1806 — see *Bacillus thuringiensis* var. *tenebrionis*.

N-521 — see Dazomet.

N-2790 — see Dyfonate*.

NA-73 — see Hexythiazox.

NAA — see Alpha-Naphthylacetic Acid; 1-Naphthaleneacetic Acid.

NAA 800 — see 1-Naphthaleneacetic Acid.

NAAm — see Naphthaleneacetamide.

Nabac* Fungicide (hexachlorophene) — Discontinued by Webb Wright Corp.

Nabam

Identification

COMMON NAMES: Nabam (ISO-E, BSD); nabame (ISO-F).

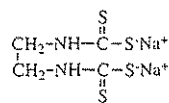
CODE NUMBERS: CAS 142-59-6; SHA 014503.

ADDITIONAL TRADE NAMES: Chem Bam*, DSE, Parzate*, Spring-Bak*.

DISCONTINUED NAMES: Nabasan* (Rhône-Poulenc); Dithane* D-14 (Rohm and Haas Co.).

Chemistry

COMPOSITION: Disodium ethylene-1,2-bisdithiocarbamate.



Nabam

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 395 mg/kg.**Nabasan* Fungicide (nabam)** — Discontinued 1989 by Rhone-Poulenc.**Nabu*** — see Sethoxydim.**Nac*** — see Carbaryl.**NACA** — see ACPA.**Naftil* Insecticide/Acaricide (carbaryl + ovex)** — Discontinued by Pechiney Progil.**Nafusaku*** — see 1-Naphthaleneacetic Acid.**Naja*** — see Fenpyroximate.**Nakar*** — see Oncol*.**Nalco* 2151**

BP: Nalco Chemical Co. (Nalco* 2151)

Chemistry

PROPERTIES: Highly concentrated, water based.

Action/Use

ACTION: Antifoam.

USE: For pesticide makeup tanks, spray nozzle orifice.

FORMULATION: Emulsified silicones in water.

Emergency GuidelinesFIRST AID: Get medical aid. Eyes, flush with water for 15 minutes. Skin, wash with a mild soap and rinse with water. Ingestion, do NOT induce vomiting.**Nalco* 2190 Soil Anticrustant**

BP: Nalco Chemical Co.

Identification

DISCONTINUED NAME: Naltex*.

Chemistry

COMPOSITION: Blend of polymeric agents.

Action/Use

ACTION: Soil anticrustant/seedling emergence aid.

USE: Reduces crusting in problem soils, improves seedling emergence.

Emergency GuidelinesFIRST AID: Get medical aid. Eyes, flush with water for 15 minutes.Skin, wash with water for 15 minutes. Inhalation, no hazard. Ingestion, drink water, do NOT induce vomiting.**Nalco-Trol***

BP: Nalco Chemical Co. (Nalco-Trol*, Sta-Put*)

Identification

ADDITIONAL TRADE NAMES: Nalco-Trol*, Sta-Put* (Helena Chemical Co.).

Chemistry

PROPERTIES: Polyvinyl polymer.

Action/Use

ACTION: Drift control agent.

USE: Improves deposition and canopy penetration of emulsifiable concentrates, wettable powders, flowables and water soluble pesticides, desiccants and defoliants. For use in all aerial and ground applications of pesticides. Nalco-Trol* not for use with Accelerate*, Maneb, Roundup*, Sevin*.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

See Drift Control Agents.

Nalco-Trol II*

BP: Nalco Chemical Co. (Nalco-Trol II*)

Identification

ADDITIONAL TRADE NAME: Nalco-Trol II* (Helena Chemical Co.).

Action/Use

ACTION: Precision spray adjuvant.

USE: Retards misting and drift and improves deposition in spraying operations employing Roundup* and Accelerate*.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Ingestion may cause nausea and gastric distress.

See Drift Control Agents.

NaledBP: Amvac Chemical Corp.
Quimica Lucava, S.A. de C.V. (Lucanal*)
Valent U.S.A. Corp. (Dibrom*)**Identification**

COMMON NAMES: Naled, (ISO, ANSI, BSI, ESA), bromchlophos (South Africa).

EXP. CODE NUMBER: RE 4355.

OTHER CODE NUMBERS: CAS 300-76-5; SHA 034401; OMS 75 (WHO); ENT-24988.

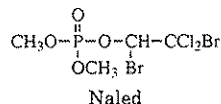
DISCONTINUED NAME: Bromex* (Makhteshim-Agan).

Chemistry

COMPOSITION: 1,2-dibromo-2,2-dichloroethyl dimethyl phosphate.

FAMILY: Organophosphate ester.

PROPERTIES: White solid. Soluble in methylene chloride, relatively soluble in acetonitrile, ethyl acetate, acetone and methanol. Slightly soluble in aliphatic solvents. Readily soluble in aromatic solvents. Low melting point 27°C.

**Action/Use**

ACTION: Insecticide/acaricide (non-systemic), with some short residual fumigant action.

USE: For numerous crops, generally up to 1 day of harvest or less. For flies in barns and in and around food processing plants. Liquids can be applied to greenhouse heating pipes to kill insects by vapor action. For municipal and other large area mosquito control by ULV or conventional application methods.

FORMULATIONS: Emulsion concentrate, liquid, LVC.

COMBINATION: Cybrom* (+ cypermethrin) (Vinexport S.A.).

Environmental GuidelinesHAZARDS: Dibrom*: Fish: (96h) LC₅₀ 132-195 ppb (rainbow trout).*Daphnia magna*: (48h) EC₅₀ 0.3 ppb. Bird: LD₅₀ 52.2 mg/kg (mallard duck), LC₅₀ 2724 ppm (mallard duck). Bee: Highly toxic.

DEGRADATION AND METABOLISM: Dissipates very rapidly (half-life 1-2 days) under normal environmental conditions. Primary routes of dissipation include volatilization, photodegradation and hydrolysis.

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 191 mg/kg (male); 92 mg/kg (female). (Rabbit): Dermal LD₅₀ 1100 mg/kg. 390 mg/kg (male), 360 mg/kg (female).

PROTECTIVE CLOTHING: Impervious protective clothing including respirator, gloves, apron, overshoes, chemical goggles and face shield when handling concentrate

HANDLING AND STORAGE CAUTIONS: Corrosive. Causes skin damage. Causes irreversible eye damage. May be fatal if swallowed, inhaled or absorbed through the skin. May cause an allergic skin reaction. Do not get in eyes, on skin, or on clothing. Do not breathe vapor or spray mist. Keep out of reach of children. Do not store or transport near food or feed. Store in cool, dry place, out of direct sunlight.

Emergency Guidelines

FLASHPOINT: Fly Killer D*, 100°F; Dibrom* Fly and Mosquito, 134°F; Dibrom* 8 Emulsive, 127°F; Dibrom* Concentrate, 132 °F.

FIRE EXTINGUISHING MEDIA: Dry chemical, carbon dioxide, water fog or foam.

ANTIDOTE: Naled is a cholinesterase inhibitor. Measurement of blood cholinesterase activity may be useful in monitoring exposure. If signs of cholinesterase inhibition appear, atropine sulfate is antidotal. 2-PAM (Protopam*) is also antidotal and may be used in conjunction with atropine but should not be used alone.

FIRST AID: Get medical attention immediately. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes and launder before reuse. Emergency personnel should exercise precaution in not contaminating themselves during medical treatment. Inhalation, remove to fresh air. Ingestion, contact physician before inducing vomiting. Take person and product container to nearest medical emergency treatment center.**Nalquatic***

BP: Nalco Chemical Co.

Action/Use

ACTION: Aquatic adjuvant.

USE: Improves sinking, confinement, and contact properties.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Ingestion may cause nausea and gastric distress. If splashed on skin or eyes, redness and irritation may occur.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush with water for 15 minutes. Skin, wash with soap and plenty of water. Ingestion, induce vomiting, give water.

See Drift Control Agents.

Naltex* (Nalco* 2190 Soil Anticrustant) — Discontinued by Nalco Chemical Co.

Namate* — see DSMA.

Name, Common — see Common Name.

Namekil* — see Metaldehyde.

Namilan* Insecticide (chlordane + lindane) — Discontinued by Tamogian Ltd.

Nanate* — see DSMA.

Nankor* — see Ronnel*.

Napclor G* — see Sodium Pentachlorophenate.

Naphtha

Identification

CODE NUMBER: CAS 8030-30-6.

Chemistry

COMPOSITION: Light oil fraction from petroleum distillation; some naphthas are derived from coal-tar distillation and from the gas industry.

Action/Use

ACTION: Selective herbicide.

USE: Postemergence spray on cotton stem. For small weeds (<1-2 in.), except for nutgrass or very succulent grasses.

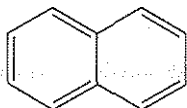
Naphthalene

Identification

CODE NUMBERS: CAS 91-20-3; SHA 055801.

Chemistry

PROPERTIES: Colorless flakes; melting point 80°C. Soluble in organic solvents except ethanol.



Naphthalene

Action/Use

ACTION: Insecticidal fumigant.

USE: Long known but now little used for the control of clothes moths, carpet beetles. As greenhouse fumigant for gladiolus thrips.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Low toxicity to warm-blooded animals.

Naphthaleneacetamide

BP: Agri-Pharm International Inc.

Amvac Chemical Corp. (Amid-Thin*, Thin-It*)

Inchema, Inc.

Identification

COMMON NAME: 2-(1-Naphthyl)acetamide (ISO-E, BSI draft).

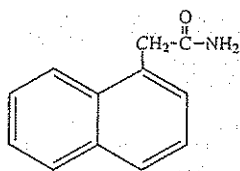
TRIVIAL NAMES: NAD, NAAM.

CODE NUMBERS: CAS 86-86-2; SHA 056001.

DISCONTINUED NAMES: Adrop Polvere* (Diachem S.P.A.); Transplacone* (+ naphthaleneacetic acid) (Rhône-Poulenc).

Chemistry

PROPERTIES: Melting point 182-184°C.



Naphthaleneacetamide

Action/Use

ACTION: Plant growth regulator.

USE: Thins apple, pear blossoms; prevents premature fruit fall in apple cherries. Stimulates root formation in cuttings and transplants.

FORMULATIONS: Wettable powder.

Safety Guidelines

SIGNAL WORD: DANGER (eye). CAUTION (Amid-Thin*, Thin-It*).

TOXICITY CLASS: I, III (Amid-Thin*, Thin-It*).

TOXICITY: (Rat): Oral LD₅₀ 1690 mg/kg. (Rabbit): Dermal >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Causes irreversible eye damage.

Emergency Guidelines

FIRST AID: Eyes, Hold eyelids open and flush with a steady, gentle stream of water for 15 minutes. Skin, Immediately wash skin with plenty of soap and water.

EMERGENCY TELEPHONE: Medical: 800-228-5635 Ext. 169 (Hazard Information Services); Transportation: 800-424-9300 (CHEMTREC).

1-Naphthaleneacetic Acid

BP: Agri-Pharm International Inc.

Amvac Chemical Co. (Fruit Fix* 200, Fruit Fix* 800, Fruite*,

Fruitone* N, K-Salt Fruit Fix* 200, K-Salt Fruit Fix* 800,

NAA-800*, Olive Stop*, Stop-Sprout*, Trecit*, Tre-Hold*)

Burlington Bio-Medical & Scientific Corp.

Inchema, Inc.

Identification

COMMON NAMES: 1-Naphthaleneacetic acid, 1-naphthyl-acetic acid (ISO-E, BSD); acide naphtylacétique (ISO-F).

TRIVIAL NAME: NAA.

CODE NUMBERS: CAS 86-87-3; SHA 056002.

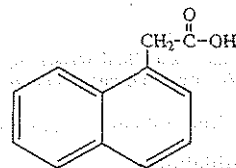
ADDITIONAL TRADE NAMES: Fruit Fix*, Liqui-Stik*, Thin'n Stop-Drop* (Platte Chemical Co.); Nafusaku*, Primacol*, Tekkam*.

DISCONTINUED NAMES: Planofix*, Plucker* (both ICI Ltd.); Stik* (FMC Corp.); Tipoff* (Midox Ltd.); Celmone* (Excel Industries Ltd.); Transplantone* (+ naphthaleneacetamide) (Rhône-Poulenc).

Chemistry

COMPOSITION: 2-(1-naphthyl)acetic acid (IUPAC and CAS).

PROPERTIES: Melting point 130°C. White odorless crystals, soluble in acetone, ether, and chloroform.



1-Naphthaleneacetic Acid

Action/Use

ACTION: Plant growth regulator.

USE: Stimulates root formation in cuttings of woody, herbaceous plants, vines. Prevents premature flower, fruit drop in apples, pears, grapes, guavas, mangoes, watermelons, pawpaws, pineapples, citrus, aubergines, cucumbers, cotton, soya. Controls regrowth of tree sprouts after trimming of apple, fig, lemon, olive, pear, pomegranate, prune, pyracantha, walnut. Inhibits sprouting in stored potato, sweet potato, turnip, ornamental bulbs. Thins fruit set of apples, pears, citrus, olives to increase fruit size and quality.

FORMULATIONS: Powder, aqueous liquid, aerosol, liquid spray concentrate.

COMBINATIONS: Rootone* (+ indole-3-butyric acid) (Rhône-Poulenc).

Registration Notes

OUTSIDE U.S.: Hormofix* to reduce dropping of flowers, buds, and bolls in apples, chilies, cotton, grapes, mangos, vegetables.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Acid (Rat): Oral LD₅₀ 2520 mg/kg.

PROTECTIVE CLOTHING: Safety glasses, rubber gloves, shoes or boots, long sleeved shirt and long pants recommended. Face shield or goggles if there is a strong chance of splashing.

HANDLING AND STORAGE CAUTIONS: Do not get on skin or in eyes. Always store in a cool, dry, dark place. Do not spray in strong sunlight; preferably spray in late afternoon, evening, or at dusk.

Emergency Guidelines

ANTIDOTE: Activated charcoal or egg white solutions (gastric lavage).

FIRST AID: Eyes, flush with clear, cool water for at least 15 minutes. Call physician immediately. Skin, wash with mild soap and clear, cool water. Rinse well. Monitor skin for adverse reactions and call physician if symptoms are observed. Wash contaminated clothing before re-use.

Ingestion, induce vomiting and call physician immediately. **Inhalation**, remove to fresh air. Monitor breathing; administer artificial respiration if breathing stops. Call physician immediately.

EMERGENCY TELEPHONE: Medical: 800-228-5635 Ext. 169 (Hazard Information Services); Transportation: 800-424-9300 (CHEMTREC).

2-Naphthol — see Beta-naphthol.

Naphthyl Phthalamic Acid — see Naptalam.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

2-(1-Naphthyl)acetamide

PESTICIDE DICTIONARY

2-(1-Naphthyl)acetamide — see Naphthaleneacetamide.

1-Naphthyl-acetic Acid — see 1-Naphthaleneacetic Acid.

Naphthylthiourea — see Antu*.

Naproanilide — see Uribest*.

Naproguard* — see Napropamide.

Napropamide

BP: Gharda Chemicals Ltd. (Naproguard*)
ZENECA Ag Products (Devrinol*)

Identification

COMMON NAME: Napropamide (ISO, BSI, JMAF, WSSA).

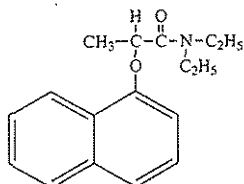
EXP. CODE NUMBER: R-7465 (ZENECA Ag Products).

OTHER CODE NUMBERS: CAS 15299-99-7; SHA 103001.

Chemistry

COMPOSITION: (RS)-N,N-diethyl-2-(1-naphthoxy)propionamide (IUPAC).

PROPERTIES: Brown solid.



Napropamide

Action/Use

ACTION: Selective herbicide.

USE: For several grass, broadleaf weeds in orchards, vineyards, direct-seeded tomatoes, strawberries, tobacco, peppers, ornamentals, and other crops.

FORMULATIONS: Emulsifiable concentrate, granules, wettable powder.

Environmental Guidelines

HAZARDS: Fish: Slight. Bee: Nontoxic.

SOLUBILITY: 73 ppm at 20°C in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat, male): Oral LD₅₀ >500 mg/kg. 50WP: >4640 mg/kg. 10G: >5000 mg/kg.

PROTECTIVE CLOTHING: Chemical safety glasses or goggles, impervious gloves, footwear, long-sleeved clothing and wide brimmed hat.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry well-ventilated area away from flammable materials, sources of heat and flame, children, food, and feed.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion**, drink one or two glasses of water. **Inhalation**, remove to fresh air.

Naptalam

BP: Uniroyal Chemical Co., Inc. (Alanap*-L, Rescue*)

Identification

COMMON NAMES: Naptalam (ISO, BSI, WSSA); naptalame (ISO-F); alanap (Turkey).

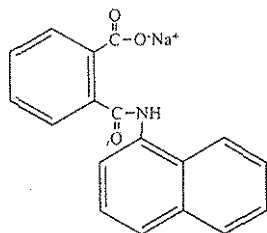
EXP. CODE NUMBER: ACP 322.

OTHER CODE NUMBERS: CAS 132-66-1 (naptalam); SHA 030702; CAS 132-67-2 (naptalam-sodium).

DISCONTINUED NAMES: Ancrack* (Drexel); Dyanap* and Klean Krop* (+ dinoseb) (Uniroyal Chemical Co., Inc.); Naptro* (Cumberland International); NPA-3* (TH Agriculture & Nutrition); Premerge* Plus (+ dinoseb) (Vertac Chemical).

Chemistry

COMPOSITION: Sodium 2-[(1-naphthalenylamino)carbonyl]benzoate.



Naptalam, Sodium Salt

Action/Use

ACTION: Herbicide.

USE: For numerous broadleaf weeds on cucurbits and nursery stock.

FORMULATIONS: Granules, liquid.

COMBINATIONS: MorCran* (+ chlorpropham).

Registration Notes

U.S.: Uniroyal Chemical Co. has voluntarily cancelled pre- and post-emergence use of Alanap*-L, and postemergence use of Rescue* for soybeans and peanuts.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Acid (Rat): Oral LD₅₀ 8200 mg/kg. Sodium salt: 1770 mg/kg. The 90-day feeding tests were done on the sodium salt of NPA. No-effect level (rat, beagle dog), 1000 ppm.

Naptalame — see Naptalam.

Napto* (naptalam) — Discontinued by Cumberland International Corp.

Naramycin — see Acti-dione*.

Nasiman 73* — see Hydrolyzed Protein.

NaTA* Herbicide (TCA) — Discontinued 1992 by Hoechst AG.

National Pesticide Telecommunications Network (NPTN)

A nationwide pesticide information hotline. Can provide pesticide product information, safety, health and environmental effects, clean-up procedures, disposal, information on recognition and for management of poisonings, toxicology and symptomatic reviews, plus referrals for laboratory analysis, investigation of pesticide incidents, specific human or animal treatment. NPTN is funded through the EPA Office of Pesticide Programs and is located at Texas Tech University Health Sciences Center in Lubbock, Texas (800-858-7378). Hotline is operated between 8 a.m. and 6 p.m. (Central Standard Time), Monday-Friday.

Natrin*

Identification

CODE NUMBERS: CAS 3570-61-4; SHA 398200.

Chemistry

COMPOSITION: Sodium 2-(2,4,5-trichlorophenoxy) ethyl sulfate.

Action/Use

ACTION: Herbicide.

Natriphene*

Chemistry

COMPOSITION: Sodium salt of o-hydroxydiphenyl.

Action/Use

ACTION: Fungicide.

USE: Controls damping-off of seedlings.

Natur-Gro R-50* — see Ryania.

Natur-Gro R-100* Insecticide (ryania) — Discontinued 1994 by AgriSystems International.

Natur-Gro Triple Plus* — see Ryania.

Navadel* Insecticide (dioxathion) — Discontinued by NOR-AM Chemical Co.

Navigate* (formerly Weedtrine-II*) — see 2,4-D.

Navron* — see Fluoroacetamide.

NC-129 — see Sanmite*.

NC-319

BP: Nissan Chemical Industries, Ltd.

Identification

COMMON NAME: Halosulfuron-methyl (ISO draft, BSI).

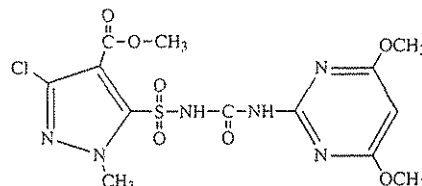
EXP. CODE NUMBER: MON 12000 (Monsanto); NC-319 (Nissan Chemical Industries, Ltd.).

OTHER CODE NUMBER: CAS 100784-20-1.

Chemistry

COMPOSITION: Methyl 3-chloro-5-(4,6-dimethoxyppyrimidin-2-ylcarbonylsulfamoyl)-1-methylpyrazole-4-carboxylate.

PROPERTIES: Odorless, white, crystalline solid. Melting range 175.5-177.2°C. Soluble in methylene chloride and dioxane. Slightly soluble in methanol and toluene.



Halosulfuron-methyl

Information is presented here for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Herbicide.
USE: Pre and postemergence control of annual broadleaf weeds and nutsedge spp. in corn, sugarcane, and turf.
FORMULATIONS: Dry flowable and wettable powder.

Environmental Guidelines

SOLUBILITY: Water solubility 0.0015 g/100 ml pH 5 at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 8865 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling. Store in original container in secure area out of reach of children, away from food or feed. Do not contaminate drinking water, lakes, streams or ponds by cleaning of equipment or disposal of wastes.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes.

NC 302 — see Quizalofop-ethyl.

NC 311 — see Pyrazosulfuron-ethyl.

NC 2962 — see Lythidathion.

NC 5016 — see Fenazaflor.

NC 6897 — see Bendiocarb.

NC 8438 — see Ethofumesate.

NCI-129 — see Sanmite*.

NCI-96683 — see Quizalofop-ethyl.

Neburea — see Neburon.

Neburex* — see Neburon.

Neburon

BP: Makhteshim-Agan (Neburex*, Noruben*)
 Rhone-Poulenc (Granurex*, Propuron*)

Identification

COMMON NAMES: Neburon (ISO, ANSI, BSI, WSSA), neburea (So. Africa).

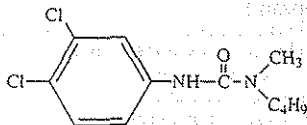
CODE NUMBERS: CAS 55-53-7-3; 012001.

ADDITIONAL TRADE NAME: Neburyl* (Chimac-Agriphar S.A.).

DISCONTINUED NAMES: Herbait* (Rhone-Poulenc); Kloben* (Du Pont).

Chemistry

COMPOSITION: 1-Butyl-3-(3,4-dichlorophenyl)-1-methylurea (IUPAC).
PROPERTIES: White crystals; melting point 102-103°C. Solubility in hydrocarbon solvents very low.



Neburon

Action/Use

ACTION: Herbicide.
USE: Selective weed control in cereals; nursery plantings of certain woody ornamentals; annual weeds in dichondra, garlic, pear, beans.
FORMULATIONS: Flowable, wettable powder.
COMBINATIONS: Foxta* (+ isoproturon + bifenox), Premium* (+ terbutryne), Prodix* (+ isoproturon) (all Rhone-Poulenc).

Registration Notes

OUTSIDE U.S.: Winter cereals in Europe.

Environmental Guidelines

HAZARDS: Bee: Low toxicity.
SOLUBILITY: Solubility in water very low (4.8 ppm).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): LD₅₀ >11,000 mg/kg.

Neburyl* — see Neburon.

Neem Extract — see Margosan-O*

Neguvon* Insecticide (trichlorfon) — Discontinued 1994 by Bayer AG.

Nekal* Dispersants — see Rhodacal* Dispersants.

Nellite*

(Discontinued by Dow Chemical Co.)

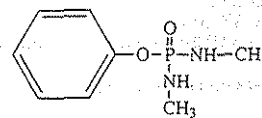
Identification

COMMON NAME: Diamidafos (ISO, ANSI, BSI).

CODE NUMBERS: CAS 1754-58-1; SHA 102101.

Chemistry

COMPOSITION: Phenyl N,N'-dimethylphosphorodiamidate.



Diamidfos

Action/Use

ACTION: Nematicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 140 mg/kg. (Rabbit): Dermal LD₅₀ 100-200 mg/kg. Slight skin irritant.

Nemacur*

BP: Bayer AG (Nemacur*)
 Miles Inc. (Nemacur*)

Identification

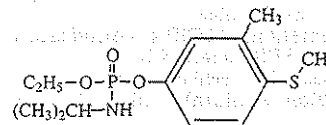
COMMON NAMES: Fenamiphos (ISO-E, BSI); phenamiphos (ISO-F).
EXP. CODE NUMBERS: Bay 68138, SRA 3886.

OTHER CODE NUMBER: CAS 22224-92-6 (fenamiphos); EINECS 244-848-1.

Chemistry

COMPOSITION: Ethyl 3-methyl-4-(methylthio)phenyl (1-methylethyl)phosphoramidate (CAS).

PROPERTIES: Colorless crystals; Tech, tan waxy solid. Melting point 49.2°C. Vapor pressure 0.12 mPa at 20°C. Readily soluble in dichloromethane, 2-propanol, toluene. Hardly soluble in n-hexane.



Fenamiphos

Action/Use

ACTION: Systemic nematicide.

USE: Applied broadcast, in-the-row, in band, by drench, before or at planting time, or to established plants. For many field, vegetable, fruit, turf, and ornamental crops. Controls the major genera of nematodes attacking cotton, peanuts, certain vegetables, deciduous fruit, citrus, pineapple, tobacco, turf and certain ornamentals.

FORMULATIONS: Emulsifiable concentrate, granule, oil-in-water emulsion.

COMBINATIONS: Curater* Forte (+ carbofuran), Disyston* N (+ disulfoton), Nemacur* O (+ isofenphos) (Bayer AG).

Registration Notes

U.S.: Some or all applications of Nemacur* may be classified as RUP.
OUTSIDE U.S.: For bananas, cocoa, coffee, potato, sugar beet and tomato.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ .0096 mg/l (96 h) (bluegill). Bird: Dietary: LC₅₀ 38 mg/kg (bobwhite quail); LC₅₀ 316 mg/kg (mallard).

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ approx. 6 mg/kg b.w.; Dermal approx. 80 mg/kg b.w.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in locked area, away from children, food, feed.

Emergency Guidelines

FLASHPOINT: EC Form: 102°F (TCC).

ANTIDOTE: Administer atropine sulfate in large therapeutic doses. Repeat as necessary to the point of tolerance. 2-PAM is antidotal and may be administered in conjunction with atropine.

EMERGENCY TELEPHONE: 49-2173-38-3030 (Bayer AG); 816-242-2582 (Miles Inc.).

Nemacur* O — see Isofenphos; Nemacur*.

Nemafene* — see D-D* Soil Fumigant.

Nemafos — see Zinophos*.

Nemafume* — see Dibromochloropropane.

Nemagon* Fumigant (dibromochloropropane) — Discontinued by Shell Chemical.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Nemamort*

BP: SDS Biotech K.K. (Nemamort*)

Identification

TRIVIAL NAME: DCIP.

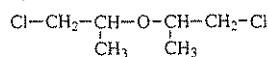
CODE NUMBER: CAS 108-60-1.

DISCONTINUED NAMES: Nematrate* (+ methyl isothiocyanate).

Chemistry

COMPOSITION: Dichlorodiisopropyl ether; bis (2-chloroisopropyl) ether (IUPAC).

PROPERTIES: Light brown oily liquid. Vapor pressure, 0.56 mm/Hg at 20°C. Boiling point, 187.0°C.



Dichlorodiisopropyl Ether

Action/Use

ACTION: Nematicide.

USE: Apply without aeration during plant growing stage.

FORMULATIONS: Emulsifiable concentrate, granule.

COMBINATIONS: Rootect Oil* (+ chloropicrin) (SDS Biotech K.K.).

Registration Notes

OUTSIDE U.S.: Registered in Japan and Taiwan.

Environmental Guidelines

SOLUBILITY: 0.17 wt % in water.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 536 mg/kg. (Mouse): 503 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dark place, away from food. Avoid handling near open flame.

Emergency Guidelines

FLASHPOINT: 85°C.

Nemanax* — see Dibromochloropropane.

Nemaphos* — see Zinophos*.

Nematrate* Nematicide (DCIP + methyl isothiocyanate) — Discontinued 1995 by SDS Biotech K.K.

Nemaset* — see Dibromochloropropane.

Nemasol* (metam-sodium) — Discontinued by Inchema, Inc.

Nem-A-Tak*

(Discontinued by American Cyanamid Co.)

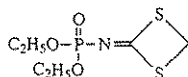
Identification

COMMON NAME: Fosthietan (ISO, ANSI, BSI, ESA).

EXP. CODE NUMBERS: AC 64,475, CL 64,475.

OTHER CODE NUMBERS: CAS 21548-32-3; SHA 113301.

ADDITIONAL TRADE NAMES: Acconem*, Geofos*.



Fosthietan

Action/Use

ACTION: Soil nematicide, insecticide.

Safety Guidelines

SIGNAL WORD: DANGER (Nem-A-Tak* 15G, 2L, 4L).

TOXICITY CLASS: I (Nem-A-Tak* 15G, 2L, 4L).

TOXICITY: Tech (Rat): Oral LD₅₀ 4.7-7.7 mg/kg (male); 6.9 mg/kg (female).**Emergency Guidelines**

ANTIDOTE: Atropine.

Nematicide

A material, often a soil fumigant, used primarily for the control of root-infesting nematodes on crop plants. A classification of nematicides is as follows:

1. Halogenated compounds: D-D* Soil Fumigant, ethylene dibromide, dibromochloropropane, methyl bromide.
2. Organophosphates: dichlofenthion (Nemacide*), disulfoton (Disyston*), prothos (Mocap*), fensulfthion (Dasanit*), phorate (Thimet*), thionazin (Zinophos*).
3. Isothiocyanates: dazomet (Mylone*), metam-sodium (Vapam*), Vorlex*.
4. Carbamates: aldicarb (Temik*), carbofuran (Furadan*).

Nematocide* Fumigant (dibromochloropropane) — Discontinued 1987 by Amvac Chemical Corp.**Nematode**

A member of a large group (phylum Nematoda), also known as threadworms, roundworms, etc. Some larger kinds are internal parasites of man and animals. Nematodes, sometimes called eelworms, injurious to plants are microscopic, slender, wormlike organisms in the soil, feeding on or within plant roots or even plant stems, leaves, and flowers.

Nemathorin — see Fosthiazate.

Nemex***Identification**

CODE NUMBERS: CAS 78-87-5; SHA 029002.

Chemistry

COMPOSITION: D-D* + chloropicrin.

Action/Use

ACTION: Soil insecticide, fumigant.

Nemifest* — see Linuron; Trifluralin.

Nemispor* — see Mancozeb.

Nendrin — see Endrin.

Neo So Sin Gin* — see MAFA, MAF.

Neo Voronit* Fungicide (fuberidazole + P 666) — Discontinued by Bayer AG.

Neo-Asozin* — see MAFA, MAF.

Neoban* Herbicide (barban) — Discontinued by Schering AG.

Neobyne* Herbicide (barban) — Discontinued by Schering AG.

Neochek-S — see Preserve*.

Neocid* Insecticide (DDT) — Discontinued by Ciba-Geigy Ltd.

Neocidol* — see Diazinon.

Neo-decanoic Acid**Identification**

CODE NUMBERS: CAS 26896-20-8; SHA 097501.

Chemistry

COMPOSITION: Mixture of 10-carbon trialkylacetic acids.

Action/Use

ACTION: Desiccant-defoliant.

USE: Formerly for cotton.

Neodiprion Sertifer**Identification**

DISCONTINUED NAME: Virox* (Novo Biokontrol).

Chemistry

PROPERTIES: Insoluble in organic solvents.

Action/Use

ACTION: Larvicide.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

TOXICITY: Selectively toxic to target species. Harmless to non-target species and environment.

Neo-Fat*

BP: Akzo Nobel Chemicals Inc. (Neo-Fat*)

Chemistry

PROPERTIES: Fatty acids.

Neonatal — see Neonate.

Neonate (neonatal)

Defined as newborn, sometimes used in connection with early stages (newly hatched) larvae or nymphs of insects.

Neo-Nicotine — see Anabasine.

Neopybuthrin — see Permethrin.

Neo-Pynamin* — see Tetramethrin.

Neo-Pynamin Forte*

BP: Sumitomo Chemical Co., Ltd.

Identification

COMMON NAME: d-Tetramethrin.

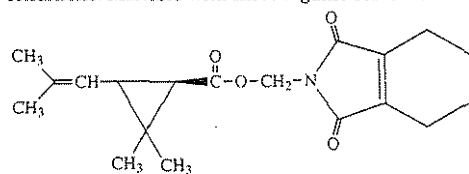
EXP. CODE NUMBER: SP 1103 Forte.

OTHER CODE NUMBERS: CAS 7696-12-0; SHA 069003; OMS 3035 (WHO).

Chemistry

COMPOSITION: 3,4,5,6-Tetrahydrophthalimidomethyl (1R)-cis, trans-chrysanthemate.

PROPERTIES: Clear viscous liquid or crystalline solid, yellow or brown in color. Relatively thermostable; gradually decomposes in light; avoid alkaline conditions. Miscible with most organic solvents at 20-25°C.



d-Tetramethrin

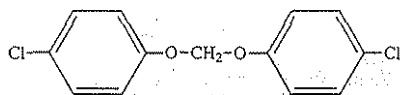
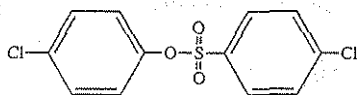
Action/Use

ACTION: Insecticide.

USE: Flying and crawling insect control for household, industrial locations and outdoor use.

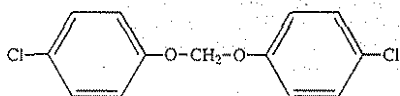
Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

FORMULATIONS: Aerosol, oil liquid, emulsifiable concentrate.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: IV.
TOXICITY: (Rat): Oral LD₅₀ > 5000 mg/kg. Dermal LD₅₀ > 5000 mg/kg.
HANDLING AND STORAGE CAUTIONS: Ordinary good manufacturing practices and sanitation. Ventilate well. Store in closed drum in a cool, dry place.
Neoram* — see Copper Oxychloride.
Neoram blu* — see Copper Oxychloride.
Neoron* — see Acarol*.
Neosappiran*
 (Discontinued 1974 by Nippon Soda Co., Ltd.)
Identification
OTHER NAMES: CPCBS, DCPM.
Chemistry
COMPOSITION: p-Chlorophenyl p-chlorobenzensulfonate (or ovex) mixed with bis(p-chlorophenoxy) methane (or Neotran*).



(CPCBS) Neosappiran* (DCPM)

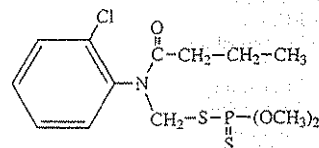
Action/Use
ACTION: Acaricide.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: CPCBS (Mouse): Oral LD₅₀ 2000 mg/kg.
 Tech DCPM (Mouse): Oral LD₅₀ 5800 mg/kg.
Neosorex* — see Ratak*
Neotran*
 (Discontinued by Dow Chemical Co.)
Identification
COMMON NAMES: DCPM (JMAF).
TRIVIAL NAME: Oxythane.
DISCONTINUED NAME: Mikasin* (+ chlorfensulphide + bis(4-chlorophenyl) disulphide) (Nippon Soda Co., Ltd.).
CODE NUMBER: CAS 555-89-5.
Chemistry
COMPOSITION: Bis(4-chlorophenoxy)methane (CAS-8CI).



DCPM

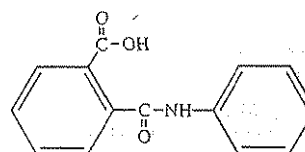
Action/Use
ACTION: Acaricide.
Nephis* — see Ethylene Dibromide.
Neptune*
 (Discontinued 1992 by HACO, Inc.)
Identification
EXP. CODE NUMBER: HA-527.
Chemistry
COMPOSITION: Alkylaryl polyoxyethylene alcohols, propyl carbinol.
Action/Use
ACTION: All purpose wetting, spreading agent.
Environmental Guidelines
SOLUBILITY: Completely soluble in water.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
Nespor* Fungicide (maneb) — Discontinued 1984 by Agrimont S.p.A.
Netagrone 600* — see 2,4-D.
Nevibes*
 BP: Chemol Trading Ltd. Co. (Nevibes*)
Identification
COMMON NAME: Quinine hydrochloride.

Chemistry
PROPERTIES: Water-based stable suspension.
Action/Use
ACTION: Wild game repellent.
USE: Young tree, shrub protection in afforestations, nurseries, orchards.
FORMULATIONS: Flowable suspension in water.
Safety Guidelines
TOXICITY CLASS: III.
TOXICITY: Tech (Rat): Oral LD₅₀ 620 mg/kg. Nevibes*: 2116 mg/kg.
PROTECTIVE CLOTHING: Personal protection for preparing spray.
Protective clothing, hat, goggles, rubber gloves for applying.
HANDLING AND STORAGE CAUTIONS: Store under dry, cool, frostfree conditions for shelf life of two years.
Emergency Guidelines
FIRST AID: Immediate general first aid. Get medical aid.
Nevifos*
 (Discontinued 1991 by Chemol Trading Ltd. Co.)
Identification
COMMON NAMES: Fosmethilan (ISO-E, BSI); fosméthilane (ISO-F).
CODE NUMBER: CAS 83733-82-8.
Chemistry
COMPOSITION: S-[N-(2-chlorophenyl)butyramidomethyl] O,O-dimethyl phosphordithioate (IUPAC).



Fosmethilan

Action/Use
ACTION: Insecticide.
Safety Guidelines
SIGNAL WORD: WARNING.
TOXICITY CLASS: II.
TOXICITY: (Rat): Oral LD₅₀ 39-88 µl/kg. Dermal 4970-8880 µl/kg.
Neviken* — see Lime Sulfur.
Nevirol*
 BP: Chemol Trading Ltd. Co.
Identification
TRIVIAL NAME: Phthalanilic acid.
CODE NUMBER: CAS 4727-29-1.
Chemistry
COMPOSITION: N-phenylphthalamic acid.
PROPERTIES: White odorless powder.



N-phenylphthalamic Acid

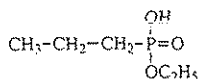
Action/Use
ACTION: Fruit setter.
USE: For alfalfa, bean, grape, orchards, paprika, pea, rape, rice, soybean, sunflower, tomato, white lupine.
FORMULATIONS: Wettable powder.
COMBINATIONS: Incompatible with alkalines. Compatible with fungicides, insecticides, foliar fertilizers.
Environmental Guidelines
HAZARDS: Fish: Nontoxic. Bee: Nontoxic.
SOLUBILITY: 2 mg in 100 cm³ water.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: IV.
TOXICITY: (Rat): Oral LD₅₀ 8836.9 mg/kg.
PROTECTIVE CLOTHING: Overalls, hat, rubber gloves when handling concentration. Overalls, hat when spraying.
HANDLING AND STORAGE CAUTIONS: Avoid eye, skin contact, inhalation. Wash well and change clothing after use. Store in dry, cool place. Shelf life in original container, 2 years.
New Improved Ceresan* Seed Treatment (ethylmercury phosphate) — Discontinued by Du Pont Agricultural Products.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

New Improved Granosan* Seed Treatment (ethylmercury phosphate) — Discontinued by Du Pont Agricultural Products.
New Lawn* Weeder — see Bromoxynil.
New Legumex* Herbicide (MCPA) — Discontinued 1984 by FBC Ltd.
New Mel* Fungicide (ethylmercury sulfate) — Discontinued by Nihon Nohyaku Co., Ltd.
Nexagan* Insecticide (bromophos-ethyl) — Discontinued by Shell Agrar GmbH & Co. KG.
Nexion* Insecticide (bromophos) — Discontinued by Shell Agrar GmbH & Co. KG.
Nexit* Insecticide (lindane) — Discontinued by Shell International Chemical Co. Ltd.
Nexter* — see Sanmite*.
Nezitec* — see Simazine.
NF 35 — see Thiophanate.
NF 44 — see Thiophanate-Methyl.
NF 48 — see Thiophanates.
NF 114 — see Triflumizole.
N-Hib* Foliar Premix
 BP: Stoller, Inc.

Chemistry
 FAMILY: Organic salt mixture.
NIA 1137 — see Phostex*.
NIA 1240 — see Ethion.
NIA 4512 — see Pentachlor.
NIA 4556 — see Dicyl.
NIA 5462 — see Endosulfan.
NIA 5488 — see Tetradifon.
NIA 5767 — see Endothion.
NIA 5996 — see Dichlobenil.
NIA 9044 — see Morocide*.
NIA 9102 — see Metiram.
NIA 9260 — see Tetramethrin.
NIA 10242 — see Carbofuran.
NIA 10637

Identification
 CODE NUMBER: CAS 21921-96-0.
Chemistry
 COMPOSITION: Ethyl hydrogen propylphosphonate.
 PROPERTIES: Liquid.

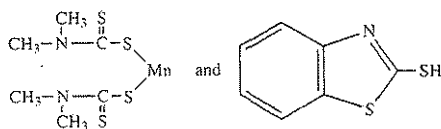


NIA 10637

Action/Use
 ACTION: Herbicide.
 USE: Tree and brush control.
Safety Guidelines
 TOXICITY CLASS: III.
 TOXICITY: Oral LD₅₀ 2300 mg/kg.
 From "Synthesis of Commercial Herbicides."
 11092 — see Tandex*.
 17370 — see Resmethrin.

Niacide*
 (Discontinued by FMC Corp.)

Chemistry
 COMPOSITION: Manganous dimethyl dithiocarbamate + mercapto-benzothiazole.

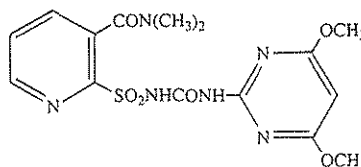


Niacide*

Action/Use
 ACTION: Fungicide.
Niagaramite* Acaricide (aramite) — Discontinued by FMC Corp.
Niagrathal* Herbicide/Plant Growth Regulator (endothall) — Discontinued by FMC Corp.
Nialate* Insecticide/Acaricide (ethion) — Discontinued by FMC Corp.
Nichino* Insecticide/Larvicide (buprofezin) — Discontinued by Nihon Nohyaku Co., Ltd.

Nichlorfos — see Phosnichlor.
Niclosamide — see Bayluscid*.
Nicosulfuron
 BP: Du Pont Agricultural Products (Accent*, Accent* SP)
 Ishihara Sangyo Kaisha, Ltd. (Dasul*, Lama*, Milagro*,
 Mistral*, Motivel*, Nisshin*, Sanson*)

Identification
 COMMON NAME: Nicosulfuron (ISO-E draft, BSI).
 EXP. CODE NUMBERS: SL-950, MU-495 (Ishihara Sangyo Kaisha, Ltd.); DPX-V9360 (Du Pont).
 CODE NUMBERS: CAS 111991-09-4; SHA 129008.
Chemistry
 COMPOSITION: 2-(4,6-dimethoxypyrimidin-2-ylcarbamoylsulfamoyl)-N,N-dimethylnicotinamide (IUPAC); 1-(4,6-dimethoxypyrimidin-2-yl)-3-(3-diemthylcarbamoyl-2-pyridylsulfonyl)urea (CAS).
 PROPERTIES: Tan colored, water dispersable granule and 4% suspension concentrate. Bulk density 45 lb./cu. ft. (loose).



Nicosulfuron

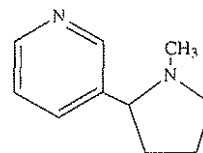
Environmental Guidelines
 HAZARDS: Fish: LC₅₀ >1000 ppm (96h) (bluegill); LC₅₀ >1000 ppm (96h) (rainbow trout); EC₅₀ >1000 ppm (48h) (*Daphnia magna*). Bird: Oral LD₅₀ >2250 mg/kg (bobwhite quail); Dietary LC₅₀ >5620 ppm (mallard duck).

Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: IV
 TOXICITY: (Rat) Oral LD₅₀ >5000 mg/kg body weight. (Rabbit) Dermal LD₅₀ >2000 mg/kg.
 PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.
 HANDLING AND STORAGE CAUTIONS: Do NOT store this product with food. Store in cool, dry well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines
 FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water for at least 15 minutes. Skin, wash thoroughly with soap and water. Remove and wash contaminated clothing and shoes. Inhalation, remove to fresh air.

Nicotine
Identification
 COMMON NAME: Nicotine (ISO, BSI, ESA).
 CODE NUMBERS: CAS 54-11-5; SHA 056702.
 DISCONTINUED NAME: Black Leaf 40* (Black Leaf Products Co., Div. of Wilbur-Ellis Co.)

Chemistry
 COMPOSITION: (S)-3-(1-methyl-2-pyrrolidyl)pyridine.
 PROPERTIES: Colorless liquid alkaloid which darkens slowly on exposure to light and air. Nicotine forms mono- and dibasic salts with many acids and metallic salts. Miscible with most organic solvents.



Nicotine

Action/Use
 ACTION: Insecticide.
 USE: Organophosphate insecticides have largely replaced nicotine. Two basic types of nicotine products have been marketed: the alkaloid and the sulfate. Nicotine alkaloid is relatively volatile and acts both by contact and by fumigant action. Had former use in greenhouse as a fumigant. The sulfate is usually marketed as an aqueous solution containing 40% nicotine equivalent. When added to alkaline water or to soap solution the alkaloid is liberated, being then more active than the sulfate alone.

Environmental Guidelines
 SOLUBILITY: Miscible with water at ordinary dilutions.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 50-60 mg/kg.

Nicouline — see Rotenone.

Niletar — see Methyl Parathion.

Nimitex* — see Temephos.

Nimrod*

BP: ZENECA Agrochemicals

Identification

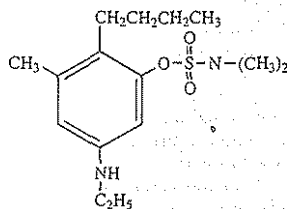
COMMON NAME: Bupirimate (ISO, ANSI, BSI).

EXP. CODE NUMBER: PP 588 (ICI Agrochemicals).

OTHER CODE NUMBER: CAS 41483-43-6.

Chemistry

COMPOSITION: 5-Butyl-2-ethylamino-6-methylpyrimidin-4-yl dimethylsulfamate (IUPAC).

PROPERTIES: Pale tan waxy solid. Melting point 50-51°C, vapor pressure 0.5 × 10⁻⁶ torr at 20°C. Soluble in most organic solvents except paraffin hydrocarbons.

Bupirimate

Action/Use

ACTION: Systemic fungicide.

USE: Controls powdery mildew of fruit and ornamentals.

FORMULATIONS: Emulsifiable concentrate, wettable powder.

Environmental GuidelinesHAZARDS: Fish: Harmful. LC₅₀ 3 mg/l (24 h) (rainbow trout). Bee:

Nontoxic.

SOLUBILITY: Water, 22 mg/l.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >4000 mg/kg.

PROTECTIVE CLOTHING: Wear protective gloves and goggles when handling the concentrate.

HANDLING AND STORAGE CAUTIONS: When using do not eat, drink or smoke. Wash hands and exposed skin before meals and after work. Keep away from food, drink and animal feeding-stuffs. Keep out of the reach of children. Do not contaminate ponds, waterways, or ditches with chemical or used container. Store in original container, tightly closed, in a safe place. Wash out container thoroughly, empty washings into spray tank, and dispose of safely. Stable for at least 2 years under normal storage conditions in unopened containers.

Niomil* Insecticide (bendiocarb) — Discontinued by Schering AG.

NIP* — see Nitrofen.

Nip-A-Thin* Herbicide (naptalam) — Discontinued by Crystal

Chemical Inter-America.

Nipsan* — see Diazinon.

Niptan* — see EPTC.

Niptite*

Chemistry

COMPOSITION: 1-(o-Methylphenyl)-1-(p-tert-butyl-phenoxy) 2-butyl sulfite.

PROPERTIES: Liquid.

Action/Use

ACTION: Acaricide.

Niran* Insecticide (chlordane + parathion) — Discontinued 1987 by Monsanto Agricultural Co.

Nirit*

Discontinued by Atochem Agri BV)

Chemistry

COMPOSITION: 2,4-Dinitrophenyl thiocyanate; or 2,4-dinitro-1-thiocyanobenzene.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: 50% WP (Mouse): Oral LD₅₀ 2750 mg/kg.

Nirmul* — see Butachlor.

Nirosan* Insecticide — Discontinued.

Nissin* — see Nicosulfuron.

Nissol* Acaricide/Insecticide (MNFA) — Discontinued 1974 by Nippon Soda Co., Ltd.

Nissorun — see Hexythiazox.

Nitacid* Herbicide (propachlor) — Discontinued by Nitrokemia Ltd.

Nitrador* (DNOC) — Discontinued 1993 by FMC Corp.

Nitralin — see Planavin*.

Nitrapyrin

BP: DowElanco (N-Serve*)

Identification

COMMON NAMES: Nitrapyrin (ISO-E, ANSI, BSI); nitrapyrine (ISO-F).

EXP. CODE NUMBER: Dow 163 (Dow Chemical Co.).

OTHER CODE NUMBER: CAS 1929-82-4.

Chemistry

COMPOSITION: 2-Chloro-6-(trichloromethyl)pyridine (CAS).

PROPERTIES: White crystalline solid. Soluble in anhydrous ammonia, xylene, methylene chloride.

Action/Use

ACTION: Nitrification inhibitor through selective activity against Nitrosomonas bacteria.

USE: Delays nitrification of ammonium ions in soil when applied with ammonical fertilizers (urea, anhydrous ammonia, UAN, etc.), liquid animal wastes. For land to be planted to corn, wheat, and sorghum; corn postplant application.

FORMULATIONS: Emulsifiable liquid concentrate, nonemulsifiable liquid concentrate.

Safety Guidelines

SIGNAL WORD: DANGER (24E). CAUTION (24).

TOXICITY CLASS: I (24E). III (24).

TOXICITY: (Rat, female): Oral LD₅₀ 2140 mg/kg.

HANDLING AND STORAGE CAUTIONS: Do not store in unlined containers, or pump undiluted product with equipment containing aluminum, magnesium or their alloys. Do not store product diluted in nitrogen fertilizer materials in such containers.

Emergency GuidelinesFIRST AID: Get immediate medical aid. Eyes, flush with plenty of water. Skin, wash with soap and water. Ingestion, do NOT induce vomiting.

Nitrochloroform — see Chloropicrin.

Nitrofen

Identification

COMMON NAMES: Nitrofen (ISO-E, BSI, WSSA); nitrofen (ISO-F); nitrophen.

EXP. CODE NUMBER: FW-925.

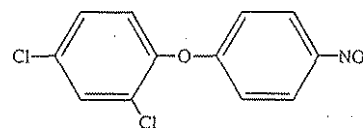
OTHER CODE NUMBERS: CAS 1836-75-5; SHA 038201.

ADDITIONAL TRADE NAMES: Nip*, Tok*, Tok* E-25, Tok* WP-5, Trizilin 25*.

DISCONTINUED NAME: Trizilin* (Chemiekombinat Bitterfeld B.V.).

Chemistry

COMPOSITION: 2,4-dichlorophenyl 4-nitrophenyl ether (IUPAC).



Nitrofen

Action/Use

ACTION: Pre or postemergence herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2630 mg/kg.

Nitrofen — see Nitrofen.

Nitrogil*

Identification

TRIVIAL NAME: Dinoseb-ammonium.

Chemistry

COMPOSITION: 2-sec-Butyl-4,6-dinitrophenol, ammonium salt.

Action/Use

ACTION: Herbicide.

Nitrolime — see Cyanamid*.

Nitrophen — see Nitrofen.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Nitropono C (dinoseb) — Discontinued by FMC Corp.
Nitro-Surf*

BP: Drexel Chemical Co. (Nitro-Surf*)

Chemistry

COMPOSITION: Urea ammonium nitrate/nonionic surfactant blend.

Action/Use

ACTION: Surfactant.

USE: With postemergent herbicides.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: CO₂, foam or water.

Nitrothal-isopropyl

Identification

COMMON NAME: Nitrothal-isopropyl (ISO, BSI); nitrothale-isopropyl (France).

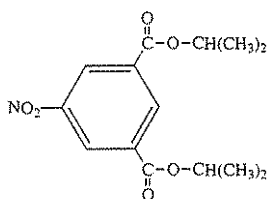
CODE NUMBERS: CAS 10552-74-6; EINECS 234-139-5.

DISCONTINUED NAMES: Meltatox Combi* (+ dodine), Pallinal* M (+ maneb + metiram), Pallitop* S (+ sulfur) (BASF AG).

Chemistry

COMPOSITION: di-isopropyl 5-nitroisophtalate (IUPAC).

PROPERTIES: Tech, yellow crystals. Soluble in most organic solvents.



Nitrothal-isopropyl

Action/Use

ACTION: Fungicide.

USE: For powdery mildew on apples. Mixed with metiram-complex for scab and mildew on apples.

FORMULATIONS: Wetttable powder.

COMBINATIONS: Kumulan* (+ sulfur), Pallinal* and Pallitop* (+ metiram) (BASF AG).

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic. Bird: Nontoxic.

DEGRADATION AND METABOLISM: Rapid degradation.

SOIL PARTICLE ADSORPTION: High adsorption.

SOLUBILITY: <0.1/100g in water.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >6400 mg/kg. Dermal >2500 mg/kg.

Non-irritating to skin, eyes.

PROTECTIVE CLOTHING: Protective clothing and boots when handling the undiluted and diluted product. Impermeable gloves and goggles when handling the undiluted product.

HANDLING AND STORAGE CAUTIONS: Avoid eye and skin contact.

SPILL CONTROL/CLEANUP: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: Unknown.

FIRST AID: Eyes, wash immediately with plenty of water. Ingestion, induce vomiting.

EMERGENCY TELEPHONE: During working hours: 800-832-4357 (BASF U.S.). After working hours: 800-424-9300 (CHEMTREC - Request BASF Emergency Response).

Nitrothale-isopropyl — see Nitrothal-isopropyl.

Nitrox* 80 Insecticide (methyl parathion) — Discontinued 1984 by Mobay Corp.

Nix-Scald* — see Ethoxyquin.

N-Metatolyl Phthalamic Acid

Identification

CODE NUMBER: CAS 85-72-3.

Chemistry

Composition: N-m-tolylphthalamic acid (IUPAC).

Action/Use

ACTION: Plant growth regulator.

USE: Increases flowering in greenhouse tomatoes.

NMP — see AgsolEx*.

N-m-t — see Tomaset*.

N,N-Diethylbenzamide

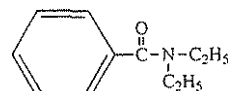
Identification

CODE NUMBER: CAS 1696-17-9.

DISCONTINUED NAME: Rep* (Quimica Estrella).

Chemistry

COMPOSITION: N,N-Diethylbenzamide.



N,N-diethylbenzamide

Action/Use

ACTION: Insect repellent.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY (Rat): Oral LD₅₀ 2000 mg/kg.

NNF-109 — see Isoprothiolane.

NNF-136 — see Moncut*.

NNI-750 — see Applaud*.

NNI-850 — see Fenpyroximate.

No Foam — see Foam Suppressant.

Nobormide — see Raticate*.

No-Bunt* — see Hexachlorobenzene.

Nocilon* — see Isoproturon.

No-Crab* Herbicide (calcium propanearsonate) — Discontinued 1970 by Amchem Products.

Nofar* — see Brodifacoum.

Nogos* — see DDVP.

Noita-koisumu* Insecticide (DDT + lindane) — Discontinued by Kemira Oy.

NOLO-Bait* Insecticide (Nosema locustae Canning) — Discontinued 1993 by Evans Biocontrol Inc.

NOLO-BB* Insecticide (Nosema locustae Canning) — Discontinued 1993 by Evans Biocontrol Inc.

NOLO-C* Insecticide (Nosema locustae Canning) — Discontinued 1993 by Evans Biocontrol Inc.

NoMate* Chokeygard* Pheromone (Z-11-hexadecenal) — Discontinued 1991 by Scentry Inc.

NoMate* Gusano A.T. — see NoMate* TPW Fibers.

NoMate* PBW Fibers

BP: Ecogen Inc. (NoMate* PBW Fibers)

Identification

DISCONTINUED NAME: Attract'n Kill* PBW (Scentry Inc.).

Chemistry

COMPOSITION: Pheromones in hollow microtube dispenser release system.

FAMILY: Pheromone.

PROPERTIES: (A.I.): Yellow liquid. Soluble in most organic solvents.

Action/Use

ACTION: Mating disruptant.

USE: To control pink bollworm. Improves performance of conventional pesticides when applied synergistically.

FORMULATIONS: Hollow microtube controlled release.

COMBINATIONS: Tank mix with conventional insecticides.

Environmental Guidelines

SOLUBILITY: (A.I.) Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (A.I.): (Rat): Oral LD₅₀ >15 g/kg.

HANDLING AND STORAGE CAUTIONS: Store in a cool place.

Emergency Guidelines

FLASHPOINT: Flammable.

ANTIDOTE: Toxic effect unlikely.

NoMate* PBW MEC

BP: Ecogen Inc. (NoMate* PBW MEC, NoMate* PWB Spiral)

Identification

COMMON NAME: Hexadecadien acetate.

TRIVIAL NAME: Gossyplure.

CODE NUMBERS: CAS 530-42-79-8; SHA 114101.

Chemistry

COMPOSITION: (Z-Z) and (Z,E)-7,11-hexadecadien-1-yl acetate (IUPAC).

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Pheromone communication disruptant.
USE: To control pink bollworm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (a.i.) (Rat): Oral LD₅₀ >5g/kg.

NoMate* PBW Spiral — see NoMate* PBW MEC.

NoMate* TABM Spiral

BP: Ecogen Inc. (NoMate* TABM Spiral)

Identification

COMMON NAME: Tetradeceen acetate.

Chemistry

COMPOSITION: E-11-tetradeceen-1-yl acetate and E-11-tetradeceen-1-ol (IUPAC).

Action/Use

ACTION: Pheromone communication disruptant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

NoMate* TPW Fibers

BP: Ecogen Inc. (NoMate* TPW Fibers)

Identification

COMMON NAME: Trideceen acetate.

ADDITIONAL TRADE NAME: NoMate* Gusano A.T.

DISCONTINUED NAME: Attract'n Kill* Tomato Pinworm (Ecogen Inc.).

Chemistry

COMPOSITION: Pheromones in fiber.

FAMILY: Pheromone.

PROPERTIES: (a.i.): Light straw-color to colorless liquid. Soluble in most organic solvents.

Action/Use

ACTION: Pheromone mating disruptant.

USE: For tomato pinworm.

FORMULATIONS: Hollow microtube controlled release.

Environmental Guidelines

SOLUBILITY: (a.i.): Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (a.i.) (Rat): Oral LD₅₀ >5 g/kg. (Rabbit): Dermal LD₅₀ >2 g/kg.

HANDLING AND STORAGE CAUTIONS: Store in a cool place.

Emergency Guidelines

FLASHPOINT: Flammable.

ANTIDOTE: Toxic effect unlikely.

NoMate* TPW MEC

BP: Ecogen Inc. (NoMate* TPW MEC)

COMMON NAME: Trideceen acetate.

Chemistry

COMPOSITION: Microencapsulated pheromone release system.

FAMILY: Pheromone.

Action/Use

ACTION: Pheromone mating disruptant.

USE: For tomato pinworm.

FORMULATIONS: Water soluble liquid.

Emergency Guidelines

FIRST AID: Eyes, flush with plenty of water. Skin, wash affected areas.

NoMate* TPW Spiral

BP: Ecogen Inc. (NoMate* TPW Spiral)

COMMON NAME: Trideceen acetate.

Chemistry

COMPOSITION: Pheromone incorporated in a polymer matrix release system.

FAMILY: Pheromone.

Action/Use

ACTION: Pheromone mating disruptant.

USE: For tomato pinworm.

FORMULATIONS: Polymer spiral.

Environmental Guidelines

SOLUBILITY: (a.i.): Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (a.i.) (Rat): Oral LD₅₀ >5 g/kg. (Rabbit): Dermal LD₅₀ >2 g/kg.

HANDLING AND STORAGE CAUTIONS: Store in a cool place.

Nomersan* — see Thiram.

Nomolt* — see Teflubenzuron.

Nonachlor**Chemistry**

COMPOSITION: 1,2,3,4,5,6,7,8,8-Nonachloro-3a,4,7,7a-tetra[chhydro-4,7-methanoindan.

Action/Use

ACTION: Insecticide.

Registration Notes

U.S.: First produced in 1948.

Nonblas* — see Ferimzone.

Nonionic

A surfactant that does not ionize is classed as nonionic, in contrast to anionic and cationic compounds.

Nonisols* Emulsifier — Discontinued by Ciba-Geigy, Dyestuffs and Chemical Div.

NONIT*

BP: Chemol Trading Ltd. Co. (NONIT*)

Identification

COMMON NAMES: Sodium dioctyl sulfosuccinate (INN); docusate sodium (USAN, USP).

Chemistry

COMPOSITION: Sodium bis(2-ethylhexyl) sulfosuccinate.

PROPERTIES: Slightly yellow liquid of characteristic odor.

Action/Use

ACTION: Wetting agent.

USE: Liquid wetting agent to increase the wettability of pesticide sprays. Mainly recommended in mixture with sulphur spray preparation to be used in orchards or with phenoxy-type hormone based herbicide sprays on grazing land.

COMBINATIONS: Do not mix with alkaline spray liquids (e.g., Bordeaux Mixture).

Environmental Guidelines

HAZARDS: Fish: Moderately toxic. Bee: Moderately toxic.

Safety Guidelines

TOXICITY: (Rat): Oral LD₅₀ 10,400-11,200 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air.

Nonpersistent Pesticide

A pesticide that does not remain active in the environment more than one growing season.

Non-Point Source

Pollution sources which are diffuse and do not have a single point of origin or are not introduced into a receiving stream from a specific outlet. The pollutants are generally carried off the land by stormwater runoff. The commonly used categories for non-point sources are agriculture, forestry, urban, mining, construction, dams and channels, land disposal and saltwater intrusion.

Nonselective Pesticide

A pesticide that is toxic to a wide range of plants or animals without regard to species. Example: A nonselective herbicide may kill or damage all plants.

Nopaicol* Dispersant — Discontinued 1994 by Henkel Corp.

Nopcosant* Dispersant — Discontinued 1993 by Henkel Corp.

Nopcosperse* — see Dispersants.

No-Pest* Strips — see DDVP.

Norazine**Identification**

EXP. CODE NUMBER: G-30026.

Chemistry

COMPOSITION: 2-Chloro-4-isopropylamino-6-methylamino-s-triazine.

Action/Use

ACTION: Herbicide.

Norbormide — see Raticate*.

Nordox* — see Copper Oxide.

Norea — see Herban*.

Norex* Herbicide (chloroxuron) — Discontinued by NOR-AM Chemical Co.

Norflurazon

BP: Sandoz Agro. Inc. (Evital*, Predict*, Solicam*, Zorial*)

Identification

COMMON NAME: Norflurazon (ISO-E, ANSI, BSI, WSSA); norflurazone (ISO-F).

EXP. CODE NUMBER: SAN 9789 H (Sandoz Ltd.)

OTHER CODE NUMBERS: CAS 27314-13-2; SHA 105801.

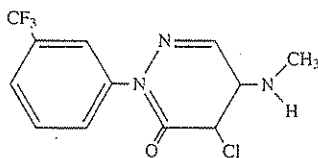
Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: 4-chloro-5-methylamino-2-(α,α,α -trifluoro-m-tolyl)pyridazin-3(2H)-one.

PROPERTIES: White odorless crystalline solid, melting point $177 \pm 3^\circ\text{C}$, vapor pressure 2×10^{-6} torr at 20°C . Stable under alkaline and acid conditions, non-corrosive, but susceptible to light. Moderately soluble in acetone and hot ethanol, sparingly soluble in hydrocarbons.



Norflurazone

Action/Use

ACTION: Selective herbicide.

USE: Soil-applied herbicide for preplant incorporated, preemergence, or split applications (ppi and preemergence) to control grasses and broadleaf weeds in tree, nut and vine crops, peanuts, and cotton. Soil-applied for preemergence control of grasses, sedges, and broadleaf weeds in cranberries.

FORMULATIONS: Dry flowable, granular. U.S.: 80% instant dry flowable.

Environmental Guidelines

HAZARDS: Bird: $\text{LD}_{50} > 1250$ mg/kg (bobwhite quail, mallard duck); Fish: $\text{LC}_{50} > 200$ ppm. (catfish, goldfish).

SOLUBILITY: Solubility in water at 23°C is 28 mg/l.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral $\text{LD}_{50} > 8000$ mg/kg. (Rabbit): Dermal $\text{LD}_{50} > 20,000$ mg/kg. In 90-day feeding tests, the "no-effect" level (rats) was 50 mg/kg/day. (Dogs) 12.5 mg/kg/day.

Norflurazone — see Norflurazone.

Norlig* — see Dispersant; Lignosulfonates.

Normal (n)

Preceding the name of a compound, this notation indicates that the chain is continuous (not branched; no side chain).

See Isomer.

Nerosac* — see Dichlobenil.

Nortron* Leyclene — see Bromoxynil; Ethofumesate; Ioxynil.

Nortron* SC — see Ethofumesate.

Noruben* — see Neburon.

Norunil* — see Linuron.

Noruron — see Herban*.

No-Scald DPA* — see Coraza*.

Nosema locustae Canning**Identification**

CODE NUMBER: SHA 117001.

ADDITIONAL TRADE NAMES: Locucide*.

DISCONTINUED NAMES: NOLO-Bait*, NOLO-BB* and NOLO-C* (all Evans Biocontrol); Cricket Attack*, Grasshopper Spore* and Mormon Cricket Spore* (all Reuter Laboratories); Grasshopper Attack* (Ringer Corp.); Hopper-Stopper* (Sandoz Crop Protection).

Action/Use

ACTION: Selective biological insecticide. Microsporidial pathogen infects only grasshoppers and Mormon crickets; honey bees and beneficial organisms are not affected.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: *Nosema locustae* spore (Rat): Oral $\text{LD}_{50} > 5$ g/kg (4.49×10^9 spores/kg). Very low toxicity to mammals.

No-Till

Planting crop seed directly into stubble or sod with no more soil disturbance than is necessary to get the seed into the soil.

Nova* — see Systhane*.

Novabac*3 Insecticide (Bacillus thuringiensis var. kurstaki) — Discontinued 1985 by Biochem Products.

Novall* — see Butisan S*; Quinmerac.

Novathion* — see Fenitrothion.

Novege* Herbicide (erbon) — Discontinued by Dow Chemical Co.

Novigam* — see Lindane.

Novigam Super* — see Permethrin.

Novobiocin**Identification**

OTHER NAME: Cathomycin.

Action/Use

ACTION: Antibiotic fungicide.

Novodor* — see *Bacillus thuringiensis* var. *tenebrionis*.

Novolate* — see Trifluralin.

Noxifire* — see Rotenone.

Noxfish* — see Rotenone.

Noxious Weed

A weed arbitrarily defined by law as being especially undesirable, troublesome, and difficult to control. Definition will vary according to legal interpretations (Weed Science Society of America).

NP-48 — see Alloxydim-Sodium.

NP-48Na — see Alloxydim-Sodium.

NP-55 — see Sethoxydim.

NPA — see Naptalam.

NPA-3* Herbicide (naptalam) — Discontinued by TH Agricultural & Nutrition.

NPD Herbicide (naptalam) — see Aspon*.

NPTN — see National Pesticide Telecommunications Network.

NRDC 14 Insecticide (permethrin) — Discontinued by Penick Corp.

NRDC 143 — see Permethrin.

NRDC 149 — see Cypermethrin.

NRDC 161 — see Decis*; K-Othrine*.

N-Serve* — see Nitrapyrin.

NTN 5006**Identification**

COMMON NAME: Amiprofos (ISO, BSI).

CODE NUMBER: CAS 33857-23-7.

Chemistry

COMPOSITION: O-ethyl O-2-nitro-p-tolyl isopropylphosphoramidothioate (IUPAC).

Action/Use

ACTION: Herbicide/algicide.

N-Trap* Elm Bark Beetle

(Discontinued 1993 by Scentry Inc.)

Identification

CODE NUMBERS: CAS 59014-03-8 ((-)- α -multistriatin); CAS 17699-14-8 ((-)- α -cubebene); CAS 63782-91-2 ((-)-4-methyl-3-heptanol); SHA 118001.

Chemistry

COMPOSITION: (-)- α -cubebene; (-)-4-methyl-3-heptanol; (-)- α -multistriatin.

Action/Use

ACTION: Pheromone attractant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (a.i.) (Rat): Oral $\text{LD}_{50} > 5$ g/kg. (Rabbit): Dermal > 2 g/kg.

Nuarimol — see Trimidal*.

Nu-Bait II* Insecticide (methomyl) — Discontinued by Griffin Ag Products Co., Inc.

Nucidol — see Diazinon*.

Nudor Extra* — see Alachlor; Atrazine.

Nudrin* Insecticide (methomyl) — Discontinued by Du Pont.

Nu-Film*-17 — see Pinolene*.

Nu-Film*-P — see Pinolene*.

Nuflor*

BP: J.M. Huber Corp., Chemicals Div.

Chemistry

COMPOSITION: Kaolin (China clay) + hydrated aluminum silicate.

PROPERTIES: Essentially inert.

Action/Use

ACTION: Anti-caking agent.

USE: For bulk and bagged fertilizers.

Safety Guidelines

TOXICITY: Nuisance dust, TLV 7.5-15 mg/m³ (OSHA regulations).

HANDLING AND STORAGE CAUTIONS: None.

See Kaolin.

Nu-Flow AD — see Metalaxyl; Terraneb* SP.

Nu-Flow D — see Terraneb* SP.

Nu-Flow ND — see TCMTB; Terraneb* SP.

Nu-Gro Delta-Coat AD — see Metalaxyl; Terraneb* SP.

Nu-Lawn* Weeder — see Bromoxynil.

Nu-Lure* Insect Bait

BP: Miller Chemical & Fertilizer Corp. (Nu-Lure* Insect Bait)

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: Hydrolyzed corn gluten meal.

PROPERTIES: Brown liquid, sweet odor.

Action/Use

ACTION: Fruit fly attractant.

USE: Combined with pesticides as spray mix additive.

Environmental Guidelines

HAZARDS: Considered safe to humans, animals, birds and fish.

SOLUBILITY: Water soluble.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Store in original container in secure area.

Emergency GuidelinesFIRST AID: Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water.

Nuodex* — see Mercaptobenzothiazole.

Nuratron* — see Methamidophos.

Nusan* 30 — Discontinued by Wilbur-Ellis.

Nustar* — see Flusilazole.

Nusyn-Noxfish* — see Piperonyl Butoxide; Rotenone.

Nu-Trex* Adjuvant — Discontinued by Kalo, Inc.

Nuvarcon* — see Monocrotophos.

Nuvalax* — see DDVP.

Nuvan* — see DDVP.

Nuvanol* N

BP: Ciba, Ltd.

Identification

COMMON NAMES: Iodofenphos (ISO-F, BSI, ESA, BAN); jodfenphos (ISO-E).

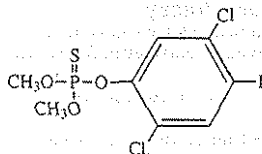
EXP. CODE NUMBER: C 9491 (Ciba-Geigy Ltd.).

OTHER CODE NUMBER: CAS 18181-70-9; OMS 1211 (WHO).

Chemistry

COMPOSITION: O-2,5-dichloro-4-iodophenyl O,O-dimethyl phosphorothioate (IUPAC).

PROPERTIES: White crystals, melting point 76°C. Soluble in dimethyl formamide, acetone, xylene.



Iodofenphos

Action/Use

ACTION: Insecticide.

USE: Controls flies, mosquitoes, fleas, bedbugs, beetles, moths, cockroaches, mosquito larvae, poultry mites, ticks. Used in houses, farm buildings, storages, factories.

FORMULATIONS: Pressurized sprays, kerosene-base sprays, emulsions, suspensions in water, and ready-to-use powders.

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: In water <0.2 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2100 mg/kg.**Nux Vomica****Chemistry**PROPERTIES: The poisonous seed of the small tree (*Strychnos nuxvomica*) native to southern Asia from India to northern Australia. Commercial supplies are mostly from India. The seeds contain several alkaloids, principally strychnine and brucine.**Action/Use**

ACTION: Rodenticide (mammal poison).

USE: The ground seeds have been used in mouse baits, but nux vomica used mainly as a source of strychnine.

See Strychnine.

NU-Z* (zinc sulfate) — Discontinued by Tennessee Chemical Co.

Nu-Zone 10ME — see Imazalil.

Nymph

Early stage in the development of insects having no larval stage. The stage between egg and adult during which growth occurs in such insects as cockroaches, grasshoppers, aphids, and termites.

Oatax* Herbicide (barban) — Discontinued by Shell Chemicals UK Ltd.

Obex EPG* — see Sticker.

Occidor* — see Carbendazim.

Occidor Plus* — see Carbendazim; Mancozeb.

OCS 21693

(Discontinued by Velsicol Chemical Corp.)

Identification

CODE NUMBER: CAS 14419-01-3.

Action/Use

ACTION: Experimental herbicide.

OCS 21799

(Discontinued by Velsicol Chemical Corp.)

Identification

CODE NUMBERS: CAS 1081-53-4; SHA 216700.

Action/Use

ACTION: Experimental herbicide.

OCS-21944 — see Glenbar*.

Octachlor* Insecticide (chlordane) — Discontinued by Velsicol Chemical Corp.

Octacide 264* — see MGK 264*.

Octa-Klor* Insecticide (chlordane) — Discontinued by Chevron Chemical Co.

Octalene* — see Aldrin.

Octalox* Insecticide (dieldrin) — Discontinued by Velsicol Chemical Corp.

Octanoic Acid Ester of Bromoxynil — see Bromoxynil.

Octanol — see Antak*; Fair 85*; Off-Shoot-T*; Royaltac*; Sucker Plucker*.

Octave* — see Prochloraz.

Off-Shoot-Q*

BP: Cochran Corp.

Chemistry

COMPOSITION: Methyl esters of fatty acids, mainly methyl octanoate and methyl decanoate.

Action/Use

ACTION: Plant growth regulator, chemical pinching (pruning) agent.

USE: For azaleas, woody ornamentals including cottoncreeper, juniper, ligustrum, rhamnus and taxus.

FORMULATIONS: Active product.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: LD₅₀ 20,500 mg/kg.

PROTECTIVE CLOTHING: None.

HANDLING AND STORAGE CAUTIONS: Shelf life is several years in unopened original containers.

Emergency GuidelinesFIRST AID: Eyes, flush with plenty of water.**Off-Shoot-T***

BP: Cochran Corp.

Chemistry

COMPOSITION: Fatty alcohols, mainly octanol and decanol.

PROPERTIES: Contains fatty alcohols (C₈ = 0.5%; C₉ = 42%; C₁₀ = 56%; C₁₂ = 1.5%).**Action/Use**

ACTION: Contact tobacco sucker control agent.

USE: Apply at early button stage with coarse spray down stalk at 20 psi. Always mix well immediately before use.

FORMULATIONS: Active product.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: WARNING (eye irritant).

TOXICITY CLASS: II (eye irritant).

TOXICITY: Oral LD₅₀ 25,000 mg/kg.

PROTECTIVE CLOTHING: None.

HANDLING AND STORAGE CAUTIONS: Shelf life is several years in original unopened containers.

Emergency GuidelinesFIRST AID: Eyes, flush thoroughly with water for at least 15 minutes.

Oftanol* — see Isofenphos.

Oftanol* T — see Isofenphos; Thiram.

Ofunack*

BP: Mitsui Toatsu Chemicals, Inc.

Identification

COMMON NAME: Pyridaphenthion (JMAF).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

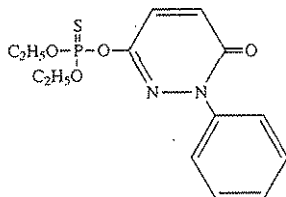
Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

CODE NUMBER: CAS 119-12-0.

Chemistry

COMPOSITION: O-(1,6-dihydro-6-oxo-1-phenylpyridazin-3-yl) O,O-diethyl phosphorothioate (IUPAC).

PROPERTIES: Light yellow solid. Melting point 54.5-56°C. Soluble in most common organic solvents.



Pyridaphenthion

Action/Use

ACTION: Insecticide.

USE: For grasshoppers, locusts; chewing, sucking insects on rice, orchard fruits, vegetables, cereals.

FORMULATIONS: Emulsifiable concentrate, ULV, wettable powder.

COMBINATIONS: With carbamates, organophosphates, Trebon*, Fusalide, Blastocidin S, isoprothioran, tetradifon.

Registration Notes

U.S.: Not registered.

Environmental Guidelines

SOLUBILITY: Barely soluble in water.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 769.4 mg/kg (male); 850 mg/kg (female). Dermal 2300 mg/kg (male); 2100 mg/kg (female).

Emergency Guidelines

ANTIDOTE: Repeated therapeutic doses of PAM or atropine sulfate may be effective.

Ofurace

BP: Chevron Chemical Co.

Identification

COMMON NAME: Ofurace (ISO, ANSI, BSI); milfuram (rejected common name).

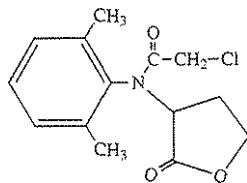
EXP. CODE NUMBERS: Chevron 20615, Ortho 20615 (Chevron Chemical Co.).

OTHER CODE NUMBERS: CAS 58810-48-3; EINECS 261-451-9.

Chemistry

COMPOSITION: (±)2-Chloro-N-(2,6-dimethylphenyl)-N-(tetrahydro-2-oxo-3-furanyl)acetamide (CAS 9CI).

PROPERTIES: White crystalline solid. Melting point 145-146°C. Very soluble in methylene chloride, chloroform, N-methylpyrrolidone, dimethylformamide. Soluble in cyclohexanone, 2-nitropropane. Slightly soluble in ordinary organic solvents. Insoluble in kerosene.



Ofurace

Action/Use

ACTION: Fungicide.

USE: Systemic action, both acropetal and basipetal. For Phycomycete plant pathogens, notably downy mildew of grapes, hops and lettuce, late blight of potato, tomato, and Phytophthora crown and root rots of safflower and tobacco. Disease control both on foliar and soil application in preventive and curative treatments.

COMBINATIONS: Aviso* Combi (+ metiram) (BASF AG).

Registration Notes

U.S.: Not registered.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3500 mg/kg (male); 2600 mg/kg (female). (Rabbit): Dermal LD₅₀ >5000 mg/kg. Mild skin irritant, moderate-severe eye irritant.

PROTECTIVE CLOTHING: Safety goggles.

FIRST AID: Ingestion, give water or milk; get medical advice. Eyes, flush immediately with water for at least 15 minutes. If irritation or discomfort persists, get medical attention. Skin, wash thoroughly with soap and water. Launder contaminated clothing.

Ohric*

(Discontinued by Sumitomo Chemical Co., Ltd.)

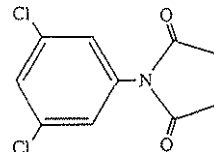
Identification

TRIVIAL NAME: Dimethachlon (proposed).

CODE NUMBER: CAS 24096-53-5.

Chemistry

COMPOSITION: N-(3,5-Dichlorophenyl)succinimide (CAS 8CI).



Dimethachlon

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Mouse): Oral LD₅₀ 1250 mg/kg.

Oil Absorption

Expressed as pounds of raw linseed oil per 100 pounds powder required to produce a stiff, puttylike paste with clays and other solid diluents. The values are used in predicting deterioration (caking) of oil-containing dusts in storage or behavior of a dust mixture during processing.

Oil Adsorption

This term has been defined as the per cent by weight of SAR-10 oil that can be adsorbed without losing free-flowing, dustable properties. It is important as a characteristic of diluents and carriers.

Oil Camphor Sassafrassy

Solvent. Has been used as a co-solvent or blending agent for rotenone extractives dissolved in petroleum fractions.

See Camphor Oil.

Oil, Petroleum — see Petroleum Oils.

Oil Solutions

Oil solutions are either oil concentrates or pesticides to be diluted with oil; or dilute ready-to-use oil-base preparations. They may be used as nonselective herbicides, as mosquito larvicides on swamps and standing water, in fogging machines used in mosquito abatement programs, or as household insecticides.

OK-135 — see Onic*.

OK-174 — see Oncol*.

OK-1166 — see Flazasulfuron.

Oku* — see DDVP.

Olé* — see Chlorothalonil.

Oleocuvire* — see Copper Oxide.

Oleofac* — see Prothoate.

Oleo Nordox* — see Copper Oxide.

Oligophagous

Restricted to a few kinds of food. For instance, the common cabbage worm feeds on plants related to the cabbage, such as turnips, mustard, and other plants of the crucifer family.

Olitref* — see Trifluralin.

Olive Stop* — see 1-Naphthaleneacetic Acid.

Olymp* — see Flusilazole.

OM-2424 — see Etridiazole.

Omadine*

(Discontinued by Olin Corp.)

Chemistry

COMPOSITION: 1-hydroxy-2-pyridine thione and its metallic salts (Fe, Mn, or Zn salt).

Action/Use

ACTION: Fungicide, bactericide.

Omaflora*

(Discontinued by Olin Corp.)

Identification

CODE NUMBERS: CAS 109-84-2; SHA 055502.

Chemistry

COMPOSITION: β-Hydroxyethylhydrazine.

MOLECULAR FORMULA: NH₂NHCH₂CH₂OH.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Flower-inducing agent.

Omazine*

(Discontinued by Olin Corp.)

Chemistry

COMPOSITION: Cupric dihydrazinium sulfate.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 590 mg/kg.

Omega* — see Prochloraz.

Omethoate — see Folimat*.

Omite* — see Propargite.

Omite* Nissorun — see Hexythiazox; Propargite.

Omite* TD — see Propargite; Tetradifon.

Omnex* — see Penconazole.

OMPA — see Schradan.

OMU — see Cyclurion.

Oncogenic

The property of a substance or mixture of substances to produce or induce benign or malignant tumor formation in living animals.

See Carcinogen; Carcinogenicity Categorization; Determination of Dietary Risk.

Oncol*

BP: Otsuka Chemical Co., Ltd. (Oncol*)

Identification

COMMON NAME: Benfuracarb.

EXP. CODE NUMBERS: OC-11588, OK-174.

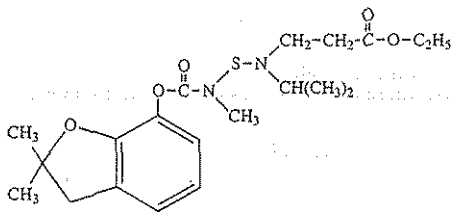
OTHER CODE NUMBERS: CAS 82560-54-1; SHA 111811.

ADDITIONAL TRADE NAMES: Furacon*, Nakar* (Otsuka Chemical Co., Ltd.).

Chemistry

COMPOSITION: Ethyl N-[2,3-dihydro-2,2-dimethylbenzofuran-7-yloxy carbonyl(methyl)aminothio]-N-isopropyl-β-alaninate (IUPAC). **FAMILY:** Carbamate.

PROPERTIES: Viscous reddish-brown liquid; molecular weight 410.5; vapor pressure 1.6 × 10⁻⁶ mmHg (20°C). Solubility in benzene, ethyl acetate, xylene, methanol, acetone, dichloromethane: >50%.



Benfuracarb

Action/Use

ACTION: Insecticide, nematocide.

USE: Used in soil application, seed treatment and foliar spray to control insects and nematodes in citrus, maize, rice, sugar beets, potatoes, ornamentals and other food crops.

FORMULATIONS: Emulsifiable concentrate, granules, wettable powder, suspension concentrate (flowable), dust and ULV.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.65 ppm (48 h) (Carp); LC₅₀ >10 ppm (3 h) (*Daphnia*). Birds: Oral LD₅₀ 92 mg/kg. (Hen). No acute delayed neurotoxicity.

SOLUBILITY: In water, 8.1 ppm (20°C).

Safety Guidelines

SIGNAL WORD: WARNING (Tech); CAUTION (10G).

TOXICITY CLASS: II (Tech); III (10G).

TOXICITY: (Rat): Oral LD₅₀ 110 mg/kg. Dermal LD₅₀ >2000 mg/kg. (Rabbit): Minimally irritating to eyes, non-irritating to skin.

PROTECTIVE CLOTHING: Goggles or suitable eye shield, rubber gloves and protective clothing.

HANDLING AND STORAGE CAUTIONS: Wash thoroughly with soap and water after handling and before eating or smoking. Remove contaminated clothing and wash with soap and water before re-use.

Emergency Guidelines

FLASHPOINT: 114°C.

ANTIDOTE: Atropine sulfate. Do not use oxime.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contami-

nated clothing and shoes. **Inhalation,** remove to fresh air. Have patient lie down and keep quiet. If not breathing, start artificial respiration. **Ingestion,** drink one or two glasses of water and induce vomiting by touching back of throat with finger.

EMERGENCY TELEPHONE: 06 946 6241 (Otsuka Chemical).

One Shot* (diclofop methyl + bromoxynil + MCPA) — Discontinued 1989 by Hoechst-Roussel Agri-Vet Co.

Onecide* — see Fluazifop-butyl.

Onic*

BP: Otsuka Chemical Co., Ltd. (Onic*)

Identification

COMMON NAME: Alanycarb.

EXP. CODE NUMBERS: OK-135.

OTHER CODE NUMBERS: CAS 83130-01-2.

ADDITIONAL TRADE NAMES: Onice*, Orion*, Rumbleline* (Otsuka Chemical Co., Ltd.).

Chemistry

COMPOSITION: Ethyl Z-N-benzyl-N-[(methyl(1-methylthioethylideneamino-oxycarbonyl)amino)thio]-β-alaninate (IUPAC).

FAMILY: Carbamate.

PROPERTIES: Pure alanycarb is colourless crystalline solid; molecular weight 399.5; vapor pressure ≤3.5 × 10⁻⁶ mmHg (20°C). Solubility in benzene, dichloromethane, methanol, acetone, xylene, ethyl acetate >50%; specific gravity D₄²⁰ 1.207.

Action/Use

ACTION: Insecticide.

USE: Apply as foliar spray, soil treatment or seed treatment. Effective against Coleopterous, Hemipterous, Lepidopterous and Thysanopterous pests in corn, cotton, peanuts, vines, pome fruits, soybeans, sorghum, tea, tobacco, sugar beets, vegetables, turf and ornamentals.

FORMULATIONS: Emulsifiable concentrate, granules, wettable powder.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 1.0 ppm (48 h) (carp); LC₅₀ >9.4 ppm (3 h). Birds: LC₅₀ > 3553 mg/kg (bobwhite quail). No acute delayed neurotoxicity in hens.

SOLUBILITY: In water, 20 ppm (20°C).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 440 mg/kg. Dermal LD₅₀ >2000 mg/kg. (Rabbit): Nonirritating to skin, slightly irritating to eyes.

PROTECTIVE CLOTHING: Goggles or suitable eye shield, rubber gloves and protective clothing.

HANDLING AND STORAGE CAUTIONS: Care should be taken handling the technical alanycarb to avoid inhalation, contact with skin or eyes, and ingestion of the compound. Wash thoroughly with soap and water after handling and before eating or smoking. Remove contaminated clothing and wash with soap and water before re-use.

Emergency Guidelines

FLASHPOINT: 134°C.

ANTIDOTE: Atropine sulfate

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash immediately with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. Have patient lie down and keep quiet. If not breathing, start artificial respiration. **Ingestion,** drink one or two glasses of water and induce vomiting by touching back of throat with finger.

EMERGENCY TELEPHONE: 06 946 6241 (Otsuka Chemical).

Onice* — see Onic*.

Ontracric 800* — see Pramitol*.

Ontrack* Herbicide (metolachlor) — Discontinued by Ciba-Geigy.

Onyxide 172*

(Discontinued by Onyx Chemical Co.)

Identification

CODE NUMBERS: CAS 71808-54-3; SHA 067301.

Chemistry

COMPOSITION: Ethylbenzyl dimethylalkylammonium cyclohexylsulfamate. (Alkyl group = 50% C12, 30% C14, 17% C16, and 3% C18.)

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 700 mg/kg.

Opogard* Herbicide (terbutylazine + terbutryn) — Discontinued by Ciba-Geigy Ltd.

OPSPA — see Morzid.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Optica* DP— see Dichlorprop.

Optima*

BP: Helena Chemical Co. (Optima*)

Identification

COMPOSITION: Polyethoxylated alkyl amines + hydroxy alkyls + buffering agents.

Action/Use

ACTION: Spray adjuvant.

Safety Guidelines

SIGNAL WORD: DANGER (eye).

TOXICITY CLASS: I.

Option* — see Fenoxaprop-P-ethyl.

Option* II — see Fenoxaprop-P-ethyl.

Opus*

BP: BASF AG (Opus*)

Identification

COMMON NAME: Epoxiconazole (proposed).

EXP. CODE NUMBER: BAS 480F (BASF AG).

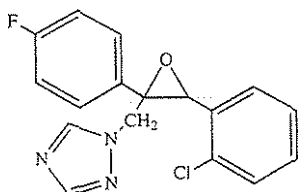
OTHER CODE NUMBER: CAS 106325-08-0.

Chemistry

COMPOSITION: (2 RS, 3 SR)-1-[3-(2-chlorophenyl)-2,3-epoxy-2-(4-fluorophenyl)-propyl]-1H-1,2,4-triazole (IUPAC); cis-1-[[3-(2-chlorophenyl)-2-(4-fluorophenyl) oxirane-2-yl]methyl]-1,2,4-triazole (CAS).

FAMILY: Triazoles.

PROPERTIES: White, crystalline, weak smelling powder; melting point 135°C.



Epoxiconazole (proposed)

Action/Use

ACTION: Systemic fungicide.

USE: Septoria spp., rusts (*Puccinia* spp.), powdery mildew (*Erysiphe graminis*), eyespot (*Pseudocercospora herpotrichoides*), Rhynchosporium, net blotch and leaf stripe (*Pyrenophora* spp.) in cereals; *Cercospora*, *Erysiphe* and *Uromyces* in sugar beets. *Mycosphaerella* in bananas and peanuts; coffee rust in coffee; sheath blight and rice blast in rice; light leaf spot (*Cylindrosporium concentricum*), *Sclerotinia* white leaf spot (*Pseudocercospora capsellae*) in oilseed rape.

FORMULATIONS: Suspension concentrate.

COMBINATIONS: Duet*/*Swing* (+ carbendazim), Opus* Team and Opus* Top (+ fenpropimorph); Opus* Duo, Opus* Forte, Opus* Plus and Tango* (all + tridemorph), Rex* (+ thiophanate-methyl) (all BASF AG).

Environmental Guidelines

HAZARDS: Tech.: Fish: LC₅₀ (96 h) > 2.2 < 4.6 mg/l (rainbow trout). Bird: LD₅₀ > 2000 mg/kg body weight. Bee: Nontoxic.

SOLUBILITY: 6.63 x 10⁻⁴ g/100 g (Tech.).

Safety Guidelines

TOXICITY: Tech.: (Rat): Oral LD₅₀ 5000 mg/kg; Dermal 2000 mg/kg.

PROTECTIVE CLOTHING: Protective suit and head gear with neck protection, gloves, and protective goggles.

HANDLING AND STORAGE CAUTIONS: Do not eat, drink, smoke when using. Wash hands and face after use.

SPILL CONTROL/CLEANUP: (Formulations): Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. (A.I.): Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations. PRODUCT/WASTE DISPOSAL: Must be carried out in officially approved incinerator.

Emergency Guidelines

COMBUSTION PRODUCTS: Carbon monoxide, chlorine water and fluorine water.

FIRE EXTINGUISHING MEDIA: Water spray, foam, carbon dioxide dry fire extinguisher.

ANTIDOTE: Unknown.

FIRST AID: Ingestion, induce vomiting. Administer activated charcoal.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC).

Opus* Duo — see Calixin*; Opus*.

Opus* Forte — see Calixin*; Opus*.

Opus* Plus — see Calixin*; Opus*.

Opus* Team — see Fenpropimorph; Opus*.

Opus* Top — see Fenpropimorph; Opus*.

Oral Toxicity

To cause injury when taken by mouth.

See Toxicity (Human).

Orbencarb — see Lanray*.

Orbit* (Outside U.S.) — see Fenpropimorph; Prochloraz.

Orbit* (U.S.) — see Propiconazole.

OR-CAL Rex Lime Sulfur* — see Lime Sulfur.

OR-CAL Stablized Malathion* — see Malathion.

OR-CAL Ziram 400* — see Ziram.

Orcephate* — see Acephate.

Orchex* — see Petroleum Oils.

Ordram* — see Molinate.

Orfamone*

(Discontinued by Zoecon Corp.)

Chemistry

COMPOSITION: cis-8-Dodecenyl acetate; (Z)-8-dodecenyl acetate.

Action/Use

ACTION: Attractant.

Orflure — see Hercon Luretape*.

Organochlorine Insecticides

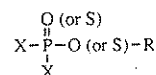
Principal pesticides included under organochlorines are the bischlorophenyls (as DDT) and the cyclodienes (aldrin, etc.) with 50% chlorine content or more. These insecticides are characterized by their persistence in the environment.

For a further but partial list, see Chlorinated Organic Insecticides and Acaricides.

Organophosphorus Pesticides

Organophosphorus compounds are anticholinesterase chemicals which damage or destroy cholinesterase, the enzyme required for nerve function in the animal body. Use of some of these pesticides may involve danger for the applicator.

Various alkoxy groups (x,x) are most often attachments to the phosphorus:



Examples of the six leading types of organophosphorus pesticides are as follows, where R represents some organic grouping:

Phosphate: (dicrotophos)	$\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3\text{O}-\text{P}-\text{O}-\text{R} \\ \parallel \\ \text{CH}_3\text{O} \end{array}$
Phosphorothioate: (parathion)	$\begin{array}{c} \text{S} \\ \parallel \\ \text{C}_2\text{H}_5\text{O}-\text{P}-\text{O}-\text{R} \\ \parallel \\ \text{C}_2\text{H}_5\text{O} \end{array}$
Phosphorothiolate: (cyanothorate)	$\begin{array}{c} \text{O} \\ \parallel \\ \text{C}_2\text{H}_5\text{O}-\text{P}-\text{S}-\text{R} \\ \parallel \\ \text{C}_2\text{H}_5\text{O} \end{array}$
Phosphorodithioate: (phorate)	$\begin{array}{c} \text{S} \\ \parallel \\ \text{C}_2\text{H}_5\text{O}-\text{P}-\text{S}-\text{R} \\ \parallel \\ \text{C}_2\text{H}_5\text{O} \end{array}$
Phosponate: (trichlorfon)	$\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3\text{O}-\text{P}-\text{R} \\ \parallel \\ \text{CH}_3\text{O} \end{array}$
Phosphoramidate: (crufomate)	$\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3\text{O}-\text{P}-\text{O}-\text{R} \\ \parallel \\ \text{CH}_3\text{NH} \end{array}$

Organosulfur Insecticides

Organosulfur compounds usually also contain chlorine as in the examples given. These chemicals are mostly acaricides, i.e., ovex and tetradifon (Tedian*).

Organotin Fungicides

Several tin-based organic fungicides are commercially available.

Triphenyltin acetate, triphenyltin hydroxide, tricyclohexyltin hydroxide are representative of these compounds.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Orifice

Opening in a nozzle; any opening.

Original Container

The package (bag, bottle, can, drum, etc.) in which a pesticide product is sold. Never store a pesticide in anything other than the original container.

Orion* — see Onic*.

Ornalin — see Vinclozolin.

Ornamec* — see Fluazifop-P-butyl.

Ornamental Weeder* 4G Herbicide (chloramben) — Discontinued by Union Carbide Corp.

Ornamite* — see Propargite.

Ornitrol*

(Discontinued 1994 by Avitrol Corp.)

Identification

COMMON NAME: Azacosterol HCL.

CODE NUMBERS: CAS 1249-84-9; SHA 098101.

Chemistry

COMPOSITION: 20, 25-Diazacholestenol dihydrochloride.

FAMILY: Choesterol.

Action/Use

ACTION: Chemosterilant.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: I.P. (Mouse): LD₅₀ 92 mg/kg. (Rat): 60 mg/kg.

I.G. (Mouse): LD₅₀ 380 mg/kg. (Rat): 470 mg/kg. (Dog): 600 no mortality/emesis.

Emergency Guidelines

FIRST AID: Toxic dose is physically impossible; bitter taste for humans.

Orthene* — see Acephate.

Ortho 5353 — see Bux*.

Ortho 9006 — see Methamidophos.

Ortho 12420 — see Acephate.

Ortho Fly Killer DM* (naled) — Discontinued by Chevron Chemical Co.

Ortho Klor* Insecticide (chlordane) — Discontinued by Chevron Chemical Co.

Ortho Lindane* — see Lindane.

Ortho LM Apple Spray* Fungicide (methylmercury quinolinolate) — Discontinued by Chevron Chemical Co.

Ortho LM Concentrate* Fungicide (methylmercury quinolinolate) — Discontinued by Chevron Chemical Co.

Ortho LM Seed Protectant* Fungicide (methylmercury quinolinolate) — Discontinued by Chevron Chemical Co.

Ortho MC* — see Magnesium Chlorate.

Ortho Paraquat CL* Herbicide — Discontinued by Chevron Chemical Co.

Ortho Phosphate Defoliant* (butifos) — Discontinued by Chevron Chemical Co.

Orthoarsenic Acid — see Arsenic Acid.

Orthobencarb — see Orbencarb.

Orthocide* — see Captan.

Ortho-Dichlorobenzene

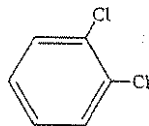
(Discontinued by Dow Chemical Co.)

Identification

CODE NUMBERS: CAS 95-50-1; SHA 059401.

Chemistry

COMPOSITION: 1,2-Dichlorobenzene.



Ortho-Dichlorobenzene

Action/Use

ACTION: Herbicide, insecticide, solvent, soil fumigant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Guinea Pig): Oral LD₅₀ >800 mg/kg.

Orthophos* — see Parathion.

Orthorix*

(Discontinued by Chevron Chemical Co.)

Chemistry

COMPOSITION: Calcium polysulfides + inert ingredients.

Action/Use

ACTION: Fungicide, miticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Orthoxenol* (ortho-phenylphenol) — Discontinued by Dow Chemical Co.

Ortran* — see Acephate.

Ortus* — see Fenpyroximate.

Oryzalin — see Snapshot*; Surfian*.

Orzan LS*

(Discontinued 1984 by Crown Zellerbach Corp.)

Action/Use

ACTION: Dispersant or suspending agent.

Orzan S*

(Discontinued 1984 by Crown Zellerbach Corp.)

Action/Use

ACTION: Dispersant or suspending agent.

OS-2046 — see Mevinphos.

Osadan* — see Fenbutatin Oxide.

Osaquat Super* — see Paraquat.

Osbac* — see BPMC; Fenitrothion.

Osmosalts — see Fluor Chrome Arsenate Phenol.

Osmosar* — see Fluor Chrome Arsenate Phenol.

Osmose Flame Proof

Action/Use

ACTION: Wood preservative.

Oust* — see Sulfometuron Methyl.

Outflank* — see Permethrin.

Outfox*

(Discontinued by Gulf Oil Chemical Co.)

Identification

COMMON NAME: Cyprazine (ISO, ANSI, BSI, WSSA).

EXP. CODE NUMBER: S-9115.

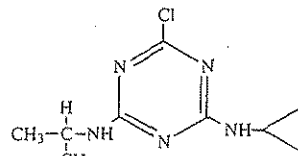
OTHER CODE NUMBERS: CAS 22936-86-3; SHA 100401.

DISCONTINUED NAME: Prefox* (+ ethiolate) (Gulf Oil Chemical Co.).

Chemistry

COMPOSITION: 2-Chloro-4-(cyclopropylamino)-6-(isopropylamino)-s-triazine.

PROPERTIES: Insoluble in hexane. Soluble in acetic acid, acetone, and dimethylformamide. Moderately soluble in chloroform, ethanol, methanol, and ethyl acetate.



Cyprazine

Action/Use

ACTION: Selective herbicide.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1200 mg/kg.

Ovasyn* — see Amitraz.

Ovatoxion* Insecticide (chlordimeform) — Discontinued by Agro-Quimicas de Guatemala.

Ovatran* — see Ovex.

Overlay — see Sequential Treatment.

Ovex

BP: Nippon Soda Co., Ltd. (Sappiran*)

Identification

COMMON NAMES: Ovex (ANSI, CSA); chlorfenson (ISO, BSI), ovatran (Argentina); difenson (Denmark); chlороfenizon (France); CPCBS (JMAF); ephirsulphonate (USSR).

CODE NUMBERS: CAS 80-33-1; SHA 020201; EINECS 2012704.

ADDITIONAL TRADE NAMES: Corotran*; Estonmite*; Ovochlor*; Ovotran* (Dow).

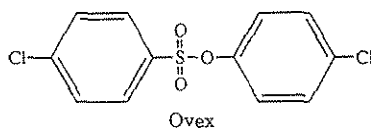
DISCONTINUED NAME: Trichlorfenson* (Pennwalt Holland B.V.).

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: 4-Chlorophenyl 4-chlorobenzenesulfonate (IUPAC).
PROPERTIES: Moderately soluble in alcohol. Readily soluble in petroleum oil, acetone, and aromatic solvents.

**Action/Use**

ACTION: Acaricide.

USE: Effective as an ovicide with long residual effect. For cotton, deciduous fruits, nuts, and ornamentals. Shows evidence of powdery mildew control.

COMBINATIONS: Fac Super* (+ prothoate).

Environmental Guidelines

HAZARDS: Fish: Moderately toxic. Bee: Nontoxic.

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2000 mg/kg. Toxic to active stages of spider mites. Low toxicity to warm-blooded animals and insect pollinators.

Ovicide

Substance intended for killing the eggs of insects and mites.

Ovifac* — see Prothoate.

Ovochlor* — see Ovex.

Ovotran* — see Ovex.

Oxabetrinil — see Concep* II.

Oxadiazon

BP: Rhone-Poulenc (Chipco* Ronstar*)

Identification

COMMON NAME: Oxadiazon (ISO, ANSI, BSI, JMAF, WSSA).

EXP. CODE NUMBER: 17623 RP.

OTHER CODE NUMBERS: CAS 19666-30-9; SHA 109001.

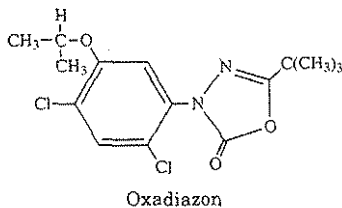
ADDITIONAL TRADE NAME: Ronstar*

DISCONTINUED NAMES: Sohyaron* (+ dymron) (SDS Biotech K.K.).

Chemistry

COMPOSITION: 2-tert-butyl-4-(2,4-dichloro-5-isopropoxyphenyl)- α -1,3,4-oxadiazolin-5-one.

PROPERTIES: White crystals. Melting point 88-90°C. Soluble in solvents.

**Action/Use**

ACTION: Herbicide.

USE: Preemergence, early postemergence control of annual grasses and broadleaf weeds.

FORMULATIONS: Emulsifiable concentrates, granules, flowable, wettable powder.

COMBINATIONS: OUTSIDE U.S.: Ronstar* (+ diuron), Ronstar 2-D* EC (+ 2,4-D), Ronstar* PL, Delcut* (+ butachlor).

Registration Notes

U.S.: Selective preemergent weed control of annual grasses and broadleaf weeds in turf and ornamentals.

OUTSIDE U.S.: In Japan and many other countries for preemergent control on transplanted rice; in many countries for preemergent and early postemergent weed control (in association with propanil) on direct-seeded rice. In France for weed control in vines, orchards, nurseries, sunflowers, and carnations, and selective preemergent weed control of annual grasses and broadleaf weeds in turf and ornamentals.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (EC); WARNING (G, WP).

TOXICITY CLASS: I (EC); IV (G, WP).

TOXICITY: Tech and formulations (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Handle carefully. Do not contaminate water, food, or feed by storage or disposal of chemical.

Emergency Guidelines

FLASHPOINT: (Ronstar* 25 EC) 25°C, (Ronstar* 12 L) 54°C, (Ronstar* F10) >100°C, (Ronstar* PL) 52°C, (Ronstar* PL2) 28°C.

Oxadixyl

BP: Sandoz Agro Ltd. (Recoil*, Ripost*, Sandofan*, Wakil*)

Identification

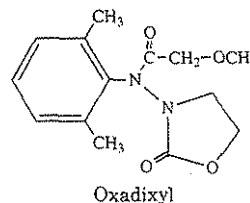
COMMON NAME: Oxadixyl (ISO draft, BSI).

CODE NUMBER: CAS 77732-09-8.

Chemistry

COMPOSITION: 2-methoxy-N-(2-oxo-1,3-oxazolidin-3yl)acet-2',6'-xylylide (IUPAC).

PROPERTIES: Colorless crystalline solid, melting point 104-105°C. Vapor pressure 0.0033 mPa (20°C)

**Action/Use**

ACTION: Systemic fungicide.

USE: Preventive and curative activity against many *Oomycetes* on grape vines, potatoes, vegetable crops, ornamentals, and seed treatments.

COMBINATIONS: Used only in combination with contact fungicides. Sandofan* F (+ folpet), Sandofan* M (+ mancozeb), Sandofan* C (+ copper), Sandofan* CM (+ mancozeb + copper), Pulsan* and Ripost* M (+ cymoxanil + mancozeb) (Sandoz Agro Ltd.).

Environmental Guidelines

HAZARDS: (Fish): LC₅₀ 300 ppm (carp); 320 ppm (rainbow trout).

SOLUBILITY: Solubility in water at 20°C is 3400 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 3480 mg/kg. Inhalation LC₅₀ >6 mg/l air. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, gloves and dust mask.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals. 2-5 years shelf-life if unopened.

Emergency Guidelines

ANTIDOTE: Unknown, treat symptomatically.

FIRST AID: Get medical aid. **Eyes:** flush immediately with plenty of water. **Skin:** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion:** drink one or two glasses of water and induce vomiting. **Inhalation:** remove to fresh air.

Oxamyl

BP: Du Pont Agricultural Products (Vydate* L)

Identification

COMMON NAME: Oxamyl (ISO, ANSI, BSI, ESA).

EXP. CODE NUMBER: DPX 1410 (Du Pont).

OTHER CODE NUMBERS: CAS 23135-22-0; SHA 103801.

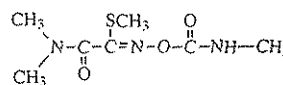
ADDITIONAL TRADE NAME: Pratt* Oxamyl 10% G (Miller Chemical & Fertilizer Corp.).

Chemistry

COMPOSITION: S-methyl N',N'-dimethyl-N-(methylcarbamoyloxy)-1-thio-oxamidate (IUPAC).

FAMILY: Carbamate.

PROPERTIES: Pure compound: White, crystalline solid, melting point 100-102°C changing to a different crystalline form which melts at 108-110°C. Solubility in methanol 129 g/100 g; acetone 67 g/100 g; ethanol 33 g/100 g; toluene 1 g/100 g.

**Action/Use**

ACTION: Insecticide, nematicide, acaricide.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

USE: For certain insects, mites, and/or nematodes on many field crops, vegetables, fruits, and ornamentals.

FORMULATIONS: Water-soluble liquid.

Registration Notes

U.S.: Some or all applications may be classified as RUP.

OUTSIDE U.S.: Vydate G* in Europe only.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96 hr.) (bluegill) 5.6 mg/l. Bee: Toxic.

SOIL PARTICLE ADSORPTION: Rapid degradation in soil.

SOLUBILITY: Solubility in water 28 g/100 g.m

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: Unformulated compound: (Rat): Oral LD₅₀ 5.4 mg/kg. (Rabbit): Dermal LD₅₀ 2960 mg/kg. Liquid form: 24%: Oral LD₅₀ 37 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine. Physician should be consulted in all cases of suspected poisoning. Do NOT use morphine or 2-PAM. Except for exposure to oxamyl and organophosphorous insecticides, 2-PAM may be used to supplement atropine sulfate treatments.

Oxapyrazone

Identification

COMPOSITION: (2-Hydroxyethyl)dimethyl ammonium-(5-bromo-6-oxo-1-phenylpyridazin-4-yl) oxamate.

Oxathiins

A group of systemic fungicides including carboxin (Vitavax*) and oxycarboxin (Plantvax*).

Oxatin* — see Carboxin.

Oxicob* — see Copper Oxychloride.

Oxine — see 8-Quinololinol.

Oxine Citrate — see Oxyquinoline Citrate.

Oxine-Copper — see Copper 8-Quinololinolate.

Oxine-Cu — see Copper 8-Quinololinolate.

Oxirane — see Ethylene Oxide.

Oxotin* — see Cyhexatin.

Oxoxanthone — see Genicide*.

Oxy COC* — see Copper Oxychloride.

Oxy Cop 8LS*

Discontinued by Cuproquim Corp.)

Chemistry

COMPOSITION: Copper ammonium carbonate, sulfur.

Action/Use

ACTION: Bactericide, fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Low. Tolerance exempt.

Oxy Cop S* — see Copper Oxychloride Sulfate.

Oxy DBCP* Fumigant (dibromochloropropane) — Discontinued by Occidental Chemical Corp.

Oxy Leafex-3* (sodium chlorate) — Discontinued 1984 by Occidental Chemical.

Oxy Weed and Grass Killer* (monobor chorate) — Discontinued by J.R. Simplot.

Oxycarboxin

BP: Jin Hung Fine Chemicals Co., Ltd. (Oxykivax*)
Uniroyal Chemical Co., Inc. (Plantvax*)

Identification

COMMON NAMES: Oxycarboxin (ISO-E, ANSI, BSI, JMAF); oxycarboxine (ISO-F).

EXP. CODE NUMBER: F-461, DC-MOD.

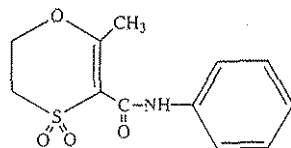
OTHER CODE NUMBERS: CAS 5259-88-1; SHA 090202.

ADDITIONAL TRADE NAME: Carbexsin* (Agsin Pte. Ltd.).

Chemistry

COMPOSITION: 5,6-dihydro-2-methyl-N-phenyl-1,4-oxathiin-3-carboxamide 4,4-dioxide (IUPAC).

PROPERTIES: Off-white crystals, melting point 127.5-130°C. Soluble in acetone. Oxykivax*: Soluble in 1 g/kg distilled water, 360 g/kg acetone, 34 g/kg benzene, 70 g/kg methanol, 30 g/kg ethanol.



Oxycarboxin

Action/Use

ACTION: Systemic fungicide.

USE: Foliar application for rust on carnations and geraniums (greenhouses only).

FORMULATIONS: Emulsifiable concentrate, wettable powder.

Registration Notes

OUTSIDE U.S.: Plantvax* registered on several food crops.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 28 mg/l (24 h) (bluegill, sunfish), 19.9 mg/l (rainbow trout). Bird: Nontoxic. Bee: Nontoxic.

SOLUBILITY: Soluble in water 1.0% at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Tech.) (Rat): Oral LD₅₀ 2000 mg/kg. (Rabbit): Dermal LD₅₀ >16,000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, long-sleeved shirt and long pants.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FLASHPOINT: 219°C.

FIRST AID: Eyes, flush immediately with running water. Get medical aid if irritation persists.

Oxycarboxine — see Oxycarboxin.

Oxycil* (sodium chlorate) — Discontinued by Occidental Chemical Corp.

Oxycop* — see Copper, Fixed; Copper Oxychloride.

Oxycop Dry S* — see Copper Oxychloride.

Oxycop 8L* Bactericide/Fungicide (copper ammonium carbonate) — Discontinued 1994 by Cuproquim Corp.

Oxyde Arsenieux — See Arsenic Trioxide.

Oxydemeton-methyl

BP: All India Medical Corp. (Aimcosystox*)
Bayer AG (Metasystox* R)
Gowan Co.

Identification

COMMON NAMES: Oxydemeton-methyl (ISO, BSI).

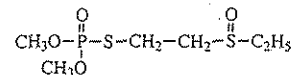
EXP. CODE NUMBERS: Bay 21097; R 2170.

OTHER CODE NUMBERS: CAS 301-12-2; SHA 058702; ENT-24964; EINECS 206-110-7.

Chemistry

COMPOSITION: S-[2-(Ethylsulfinyl)ethyl] O,O-dimethyl phosphorothioate.

PROPERTIES: Colorless liquid. Melting point <-20°C. Specific gravity 1.29 at 20/4°C. Vapor pressure 3.8 mPa at 20°C. Readily soluble in dichloromethane, 2-propanol, toluene. Nearly insoluble in n-hexane.



Oxydemeton-methyl

Action/Use

ACTION: Systemic insecticide with contact and stomach action.

USE: Controls aphids, leafhoppers, mites, sawflies, suckers, thrips, and other sucking insects on vegetable, fruit, grapes, ornamentals, and field crops. Soil injection only for ornamental crops.

FORMULATIONS: Emulsifiable concentrate, soluble concentrate.

COMBINATIONS: Difterex* MR (+ trichlorfon), Ecombi* (+ parathion) (Bayer AG).

Registration Notes

U.S.: Metasystox R* classified as RUP.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 17 mg/l (96 h) (rainbow trout). Bee: Toxic. Bird: LC₅₀ 361 mg/kg (diet) (bobwhite quail), LC₅₀ 2003 mg/kg (diet) (mallard).

SOLUBILITY: Miscible in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 50 mg/kg b.w.; Dermal approx. 1350 mg/kg b.w.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in a locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Administer atropine sulfate in large therapeutic doses. Repeat as necessary to the point of tolerance. 2-PAM is antidotal and may be administered in conjunction with atropine.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Oxydeprofos — see Metasystox*-S

Oxydisulfoton — see Disyston S*

Oxyfluorfen — see Goal*

Oxyfluorfen — see Goal*

Oxyfume* Sterilant (ethylene oxide) — Discontinued by Union Carbide Corp.

Oxykivax* — see Oxycarboxin.

Oxyquinoline Benzoate

Identification

CODE NUMBERS: CAS 148-24-3; SHA 059803.

Chemistry

COMPOSITION: Physical mixture of 8-quinolinol (oxide), benzoic acid.

Action/Use

ACTION: Fungicide.

Oxyquinoline Citrate

Identification

TRIVIAL NAME: Oxine citrate.

Chemistry

COMPOSITION: 8 Hydroxyquinoline citrate.

PROPERTIES: Yellow crystalline powder with saffron-like odor.

Action/Use

ACTION: Preservative.

USE: For cut flowers.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Irritating to skin, mucous membranes, and eyes.

Oxyquinoline Sulfate — see Chinosol.

Oxyquinolinoleate de Cuivre — see Copper 8-Quinolinolate.

Oxytetracycline — see Terramycin*.

Oxythane — see Neotran*.

Oxythioquinox — see Morestan*.

Oxytril* — see Ioxynil.

Oxytril CM* — see Bromoxynil; Ioxynil.

Oxytril M* — see Bromoxynil; Ioxynil; Mecoprop.

Ozoban*

Chemistry

COMPOSITION: Ascorbic acid + anhydrous inert materials.

Action/Use

ACTION: Smog protectant.

USE: When dissolved in water, yields a solution of potassium ascorbate. Used to reduce crop loss from smog.

P 666 — see Fuberidazole.

2,4-PA — see 2,4-D.

Paarian*

(Discontinued 1993 by DowElanco)

Identification

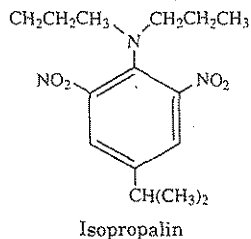
COMMON NAMES: Isoproalin (ISO-E, ANSI, BSI, WSSA); isopropaline (ISO-F).

EXP. CODE NUMBER: EL-179.

OTHER CODE NUMBERS: CAS 33820-53-0; SHA 100201.

Chemistry

COMPOSITION: 2,6-Dinitro-N,N-dipropylcumidine (CAS 8CI).



Action/Use

ACTION: Selective herbicide.

Registration Notes

U.S.: DowElanco has voluntarily cancelled use on tobacco, the last registered use of Paarian* EC. No other products containing isoproalin will be registered.

Environmental Guidelines

SOLUBILITY: In water 0.08 ppm at pH7, 25°C is 2.7×10^{-6} mm Hg.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral $LD_{50} > 5000$ mg/kg.

Emergency Guidelines

FIRST AID: Eyes, skin, flush immediately with plenty of water. Get medical aid if irritation persists.

PAC — see Pyramin*.

Pace* — see Mancozeb; Metalaxyl; Ridomil* MZ.

Package

The AAPCO has adopted these definitions: "The carton, box, barrel or other receptacle into which an economic poison is placed for use, handling, removal, shipment or conveyance; a single container of such article or articles, or several containers packed together, including both the immediate container of the material and the box, carton or other container (if any) in which it is enclosed or displayed."

Package, original unbroken: "The unit retail package as ordinarily displayed on and sold from the shelves of the dealer, distributor or other vendor."

Package, unbroken: "The package delivered by the shipper to the carrier at the initial point of shipment. It may contain one or more original unbroken packages as defined above."

Paclobutrazol

BP: Hubei Sanonda Co., Ltd.

ZENECA Ag Products (Bonzi*)

ZENECA Agrochemicals (Bonzi*, Cultar*, Parlay*, Smarect*)

Identification

COMMON NAME: Paclobutrazol (ISO, ANSI, BSI).

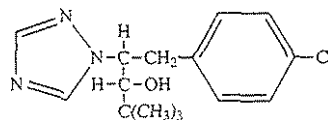
CODE NUMBERS: CAS 76738-62-0; SHA 125601.

DISCONTINUED NAME: Clipper* (Monsanto).

Chemistry

COMPOSITION: (2RS,3RS)-1-(4-chlorophenyl)-4,4-dimethyl-2-(1H-1,2,4-triazol-1-yl)pentan-3-ol.

PROPERTIES: Milk-white odorless liquid boiling at $>100^\circ\text{C}$. Vapor pressure, 22 mm/Hg at 20°C . Specific gravity, 1.05 with pH 7.68; 5% in H₂O. Cultar*, Parlay*: White crystalline solid, melting point 165°C . Solubility: Bonzi*: miscible. Cultar*, Parlay*: variable in range of organic solvents.



Paclobutrazol

Action/Use

ACTION: Plant growth regulator; gibberellin inhibitor.

USE: Bonzi* for ornamental crops. Cultar* for apple, pear orchard.

Parlay* for reduction of lodging in grass seed crops.

FORMULATIONS: Suspension concentrates, wettable powder.

Environmental Guidelines

SOLUBILITY: Cultar*, Parlay*: 35 ppm in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Bonzi* (Rat): Oral LD_{50} 5346 mg/kg. Inhalation LC_{50} 369 mg/l (a.i./4 hr.). (Rabbit): Dermal $LD_{50} > 1000$ mg/kg. Non-irritating to eye, skin.

Cultar*, Parlay* (Rat): Oral LD_{50} 1800-2000 mg/kg.

PROTECTIVE CLOTHING: Skin and eye protection. Refer to individual product labels.

HANDLING AND STORAGE CAUTIONS: Bonzi*: Avoid ingestion, inhalation and contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Do not contaminate water or wetlands by storage, cleaning of equipment or disposal of wastes. Avoid extreme heat. Do not store near food, feed or within reach of children. Discarded material is not hazardous under RCRA. May be disposed of on-site or at an approved waste disposal facility. Do not burn.

Emergency Guidelines

FIRST AID: Get medical aid as necessary. Eyes, immediately flush with plenty of water for at least 15 minutes. Skin, remove contaminated clothing and footwear. Ingestion, (Bonzi*) if conscious, give 1-2 glasses of water to drink and induce vomiting. Repeat until vomit is clear. Inhalation, remove to fresh air.

Pacrite* — see Imazalil.

Padan* — see Cartap Hydrochloride.

Pageant DF* — see Chlorpyrifos.

Paicer* — see Pyrazoxyfen.

Palléthrine — see Pynamin*.

Palfinal* — see Metiram; Nitrothal-isopropyl.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Pallinal* M Fungicide (maneb + metiram + nitrothal-isopropyl) — Discontinued 1994 by BASF AG.

Pallitop* — see Metiram; Nitrothal-isopropyl.

Pallitop* S Fungicide (nitrothal-isopropyl + sulfur) — Discontinued 1993 by BASF AG.

2-PAM (protopam chloride)

Chemistry

COMPOSITION: 2-Pyridine aldoxime methiodide.

Action/Use

ACTION: Antidote.

USE: Antidote for toxic reactions to anticholinesterase poisoning from organophosphate pesticides, but not for carbamate poisoning.

See Pralidoxime.

Pamcon* Herbicide — Discontinued by Ishihara Sangyo Kaisha, Ltd.

Pamisan* Herbicide (PMA) — Discontinued by Excel Industries, Ltd.

Panaplate* — see DDVP.

Panatac* Acaricide (clofentezine) — Discontinued by FBC Ltd.

Panic*

BP: Denka International B.V. (Panic*).

Identification

TRIVIAL NAME: E-B-Farnesene.

Chemistry

COMPOSITION: E-7,11-dimethyl-3-methylene-1,6,10-dodecatriene.

PROPERTIES: Soluble in most organic solvents.

Action/Use

ACTION: Alarm pheromone for aphids.

USE: Enhances effectiveness of insecticidal sprays by increasing mobility of aphids thereby increasing contact with toxicant.

FORMULATIONS: Emulsifiable concentrates, oil soluble concentrates, aerosol cans and formulations containing insecticide and alarm pheromone.

COMBINATIONS: With aphicides.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

Emergency Guidelines

FLASHPOINT: >230°F.

Panoccon*

BP: Kumiai Chemical Industry Co., Ltd.

Identification

COMMON NAME: Fenothiocarb (ISO, BSI, JMAF).

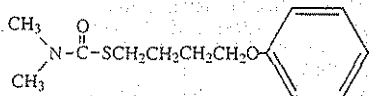
EXP. CODE NUMBERS: KCO-3001, BI-5452 (Kumiai).

OTHER CODE NUMBER: CAS 62850-32-2.

Chemistry

COMPOSITION: S-(4-phenoxybutyl) dimethylthiocarbamate (IUPAC).

PROPERTIES: White crystal. Melting point 40-41°C. Boiling point 155°C/0.02 mm/Hg. Stable in acids. Slightly unstable in alkalines. Soluble in most organic solvents.



Fenothiocarb

Action/Use

ACTION: Acaricide.

USE: Controls genus Panonychus mite species.

Environmental Guidelines

SOLUBILITY: 30 mg/l in water (30°C).

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Mouse): Oral LD₅₀ 7000 mg/kg.

Panoctine* — see Guazatine.

Panoctine Plus* — see Guazatine; Imazalil.

Panoctine Super* — see Fenfuram; Guazatine.

Panodrin A-13* — see Cyano (methylmercuri) guanidine.

Panogen* Turf Fungicide (cyano (methylmercuri) guanidine) — Discontinued.

Panogen* Fungicide (MEMA) — Discontinued by Rhone-Poulenc.

Panogen* M Fungicide (MEMA) — Discontinued by Rhone-Poulenc.

Panolil* Fungicide (guazatine) — Discontinued.

Pano-ram*

BP: Rhone-Poulenc Agrochimie S.A. (Pano-ram*)

Identification

COMMON NAME: Fenfuram (ISO-E, BSI); fenfurame (ISO-F).

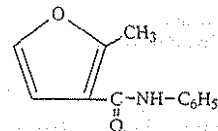
EXP. CODE NUMBER: WL 22361 (Shell International Chemical Co. Ltd.).

CODE NUMBER: CAS 24691-80-3.

Chemistry

COMPOSITION: 2-methylfuran-3-carboxanilide (IUPAC).

PROPERTIES: Tech light brown crystalline solid. Melting point 109-110°C. High thermal stability. Fairly stable at neutral pH but hydrolyzes under strongly alkaline, strongly acid conditions. Solubility: At 20°C in methanol 145 g/l; acetone 300 g/l; cyclohexanone 340 g/l.



Fenfuram

Action/Use

ACTION: Systemic fungicide.

USE: Pano-ram* seed dressing for smuts, bunts of temperate cereals; controls Tilletia, Ustilago spp including internally borne Ustilago nuda. Pano-ram* cereal seed treatment for loose smut.

FORMULATIONS: Liquid, powder.

COMBINATIONS: Panoctine Super* (+ guazatine) (Rhone-Poulenc Ag Co.).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 11.0 mg/l (guppy). Bee: Nontoxic.

SOIL PARTICLE ADSORPTION: Half-life in soil ca. 42 days.

SOLUBILITY: At 20°C in water 0.1 g/l.

Safety Guidelines

SIGNAL WORD: CAUTION (irritant).

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 12,900 mg/kg. Inhalation LC₅₀ >10.3 gr/m³ of air. No-effect level of 17 mg/kg body wt./day for 3-month feeding study. Negative Ames mutagenicity test.

PROTECTIVE CLOTHING: Rubber gloves. Apron, goggles for cleaning equipment.

HANDLING AND STORAGE CAUTIONS: Handle with adequate ventilation.

Emergency Guidelines

FIRST AID: Skin, wash with soap, water. Inhalation, symptomatic treatment.

Panoram D-31* — see Dieldrin.

Panron* — see Isoprotruron.

Pansoil* — see Etridiazole.

Panther* — see Diflufenican; Isoprotruron.

Panthion* — see Parathion.

Pantox* 360 — see Propanil.

PAP — see Phenthoate.

Papthion* Insecticide (phenthoate) — Discontinued 1992 by Sumitomo Chemical Co. Ltd.

Paquat* — see Paraquat.

90-Par* — see Petroleum Oils.

Para Spred*

BP: Custom Chemicides (Para Spred*)

Chemistry

COMPOSITION: Paraffinic petroleum oils, fatty acid esters.

Action/Use

ACTION: Penetrator, spreader.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Para Spred* Plus

BP: Custom Chemicides (Para Spred* Plus)

Chemistry

COMPOSITION: Paraffinic petroleum oils + fatty acid esters.

Action/Use

ACTION: Buffer, penetrator, spreader.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Paracol* — see Diuron; Paraquat.

Paraffinic Oil — see Refined Petroleum Distillate.

Paraformaldehyde

Identification

CODE NUMBERS: CAS 30525-89-4; SHA 043002.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Soil fungicide.
USE: Preplant application seed treatment, or in furrow at planting for barley and oats.
 See Formaldehyde.

Parahep*

Chemistry

COMPOSITION: Parathion + heptachlor.

Action/Use

ACTION: Insecticide.

Parakakes* Rodenticide (diphacinone) — Discontinued 1993 by Motomco Ltd.

Paramar* — see Parathion.

Paramet* — see Methyl Parathion.

Paraoxon

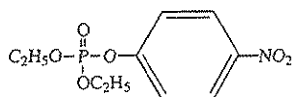
Identification

EXP. CODE NUMBER: E-600.

DISCONTINUED NAME: Mintacol* (Bayer AG).

Chemistry

COMPOSITION: O,O-Diethyl O-p-nitrophenyl phosphate.



Paraoxon

Action/Use

ACTION: Insecticide.

Paraphos* — see Parathion.

Paraquat

- BP:** Comlets Chemical Industrial Co., Ltd.
 Crystal Chemical Inter-America (Crisquat*, Herboxone*)
 Hubei Sanonda Co., Ltd.
 Kuo Ching Chemical Co., Ltd.
 Pilarquim Corp. (Pilarquat*, Pilarxone*)
 Productos OSA S.A.C.I.F.I.A. (Osaquat Super*)
 Sanex Inc.
 Shinung Corp.
 ZENECA Ag Products (Cyclone*, Gramoxone*)
 ZENECA Agrochemicals (Gramocil*, Gramoxone*, Gramoxone Extra*, Starfire*)

Identification

COMMON NAME: Paraquat (ISO, ANSI, BSI, JMAF, WSSA).
CODE NUMBERS: CAS 4685-14-7; SHA 061601. CAS 1910-42-5 (paraquat dichloride).

ADDITIONAL TRADE NAMES: Paquat* (Agsin Pte. Ltd.); Cekuquat* (Cequisa); Herbikill* (VAPCO); Dextrone* (ZENECA Agrochemicals); Total*, Toxer*.

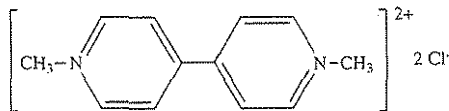
DISCONTINUED NAMES: Esgram*, Goldquat* 276 (F.E. Zuellig Pte.); Actor*, Weedol* (both with diquat dibromide), Sweep*, and Gramoxone S* (all ICI Agrochemicals); Herbaxon* (+ diquat dibromide) (AQ Group).

Chemistry

COMPOSITION: 1,1'-Dimethyl-4,4'-bipyridinium ion; present as the dichloride salt (ZENECA/Chevron Chemical Co./Crystal) or dimethyl sulfate salt (discontinued).

FAMILY: Bipyridylium, dipyrldylium.

PROPERTIES: Stable except under alkaline conditions. No measurable vapor pressure. Colorless crystalline solid decomposes at approximately 300°C. Sparingly soluble in lower alcohols, insoluble in hydrocarbons.



Paraquat

Action/Use

ACTION: Contact herbicide, desiccant.
USE: Desiccation of seed crops; noncrop and industrial weed control in bearing and non-bearing fruit orchards, shade trees and ornamentals. Defoliation and desiccation of cotton. Harvest aid in soybeans, sugarcane, guar and sunflowers, for pasture renovation, for use in "No-Till" or before planting or crop emergence, dormant alfalfa and clover, directed spray and for killing potato vines. Eradication of weeds in rubber plantations, coffee plantation, and paddy bund. Talent* postemergence in bananas, cocoa, coffee, coconuts, citrus and sugarcane.

FORMULATIONS: Granular, solid, soluble concentrate.

COMBINATIONS: Talent* (+ asulam) (Rhône-Poulenc); Preglone*, Priglone* (both with diquat dibromide), Dexuron* (+ diuron), Pathclear* (+ diquat dibromide + simazine) (ZENECA Agrochemicals); Gramuron*, Paracol*, Totacol* (all with diuron); Terraklene* (+ simazine); Gramonol* (+ monolinuron).

Registration Notes

U.S.: Some or all applications may be classified as RUP.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bird: Moderately toxic.

SOIL PARTICLE ADSORPTION: Strongly absorbed and inactivated by soil particles.

SOLUBILITY: Dichloride salt is freely soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 150 mg/kg.

PROTECTIVE CLOTHING: Rubber gloves and eye protection when handling concentrate. Wash yourself and your work clothes after using the product.

HANDLING AND STORAGE CAUTIONS: Eye contact may cause injury. Contact with irritated skin, or a cut, or repeated contact with intact skin will cause severe irritation and may result in poisoning. Inhalation exposure may cause irritation, nosebleeds and may lead to poisoning. Keep out of reach of children.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** immediately flush with water for at least 15 minutes. **Skin,** wash with soap and water. Remove and wash all contaminated clothing with soap and hot water before reuse. **Inhalation,** immediately get away from spray mist. **Ingestion,** induce vomiting by inserting finger in throat. Administer fluids and induce further vomiting. Prompt treatment is essential and must be initiated before signs and symptoms of injury appear.

Parasite

An organism that lives in or on a living plant or animal (called a host) and obtains all or part of its nutrients from it. A parasite is usually smaller than its host, and usually does not kill the host; however, under epidemic conditions the host may be killed. Tapeworms, lice, and fleas are parasitic animals. Rust, smut, mildew, dodder, and mistletoe are examples of parasitic plants.

Parasul* — see Methyl Parathion.

Parataf* — see Methyl Parathion.

Parathene* — see Parathion.

Parathion

- BP:** Cheminova Agro A/S
 HELM AG
 Hubei Sanonda Co., Ltd.
 Sanachem (Pty) Ltd.

Identification

COMMON NAMES: Parathion (ISO, BSI, ESA, JMAF); thiophos (USSR).

OTHER NAME: Ethyl Parathion.

EXP. CODE NUMBERS: AC 3422, E-605.

OTHER CODE NUMBERS: CAS 56-38-2; SHA 057501; OMS 19 (WHO); ENT 15108; EINECS 200-271-7.

ADDITIONAL TRADE NAMES: Chimac Par H* (Chimac-Agriphar S.A.); Roethyl-P* (Rotam Group); Alkron*, Alleron*, Aphamite*, Corothion*, Etulon*, Orthophos*, Panthion*, Paramar*, Paraphos*, Parathene*, Parawet*, Phoskil*, Rhodiatox*, Sopraphion*, Stathion*.

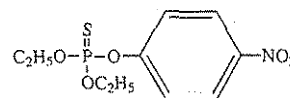
DISCONTINUED NAMES: Thiophos* (American Cyanamid); Bladan*, Folidol E-606* (Bayer AG); Co-thion* (+ azinphos-ethyl + azinphos-methyl) (Chemagro Corp.); Fosferno 50* (ICI Agrochemicals); Niran* (+ chlordane), Wallop* G (+ propachlor) (Monsanto Agricultural Co.); Sytemp* (+ methyl parathion + toxaphene) (Ring Around Products); Sopragam* (+ lindane) (SOPRA).

Chemistry

COMPOSITION: O,O-diethyl O-(4-nitrophenyl) phosphorothioate.

FAMILY: Organophosphate.

PROPERTIES: Pale yellow liquid. Melting point 6.1°C. Vapor pressure 8.9 x 10⁻⁶ mbar at 20°C. Hydrolyzes slowly at pH 7 or below. Specific gravity 1.26. Incompatible with alkaline materials. Readily soluble in dichloromethane, 2-propanol, toluene. Soluble in n-hexane.



Parathion

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Insecticide.

FORMULATIONS: Dusts, emulsion concentrates, granules, ULV liquid, wettable powders.

COMBINATIONS: Ecombi* (+ oxydemeton-methyl), Tamaron* EP (+ methamidophos) (Bayer AG).

Registration Notes

U.S.: Some or all applications classified as RUP. Voluntary cancellation 12/31/91 of ethyl parathion on over 80 crop uses in the U.S.

Environmental GuidelinesHAZARDS: (95% CD): Fish: LC₅₀ (96h) 1.5 mg/l. Bird: LD₅₀ 5.95 mg/l (bobwhite quail). Bee: LD₅₀ (Topical, 24h) 0.07-0.10 µg/bee (honeybee). SOIL PARTICLE ADSORPTION: Little or no potential to contaminate groundwater.

SOLUBILITY: In water (25°C) 12.4 mg/l.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ approx. 2 mg/kg. Dermal approx. 50 mg/kg.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in locked area, away from children, food, feed. Do not heat above 55°C. Decomposes rapidly above 120°C, explosion may be induced.

Emergency Guidelines

FLASHPOINT: 174°C (Pensky-Martens Closed Tester).

COMBUSTION PRODUCTS: Thermal decomposition (e.g. fire) may produce diethylsulfide, sulfur dioxide, carbon monoxide, carbon dioxide, phosphorus pentoxide, nitrogen oxides.

ANTIDOTE: Atropine, PAM, 2-PAMCl, 2-PAMM.

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation**, remove to fresh air. **Ingestion**, give 1-2 glasses of water and induce vomiting.

Parathion-methyl — see Methyl Parathion.

Paraton* — see Methyl Parathion.

Paratox* — see Methyl Parathion.

Parawet* — see Parathion.

Pardner* — see Bromoxynil.

Parexan*, Parexan Neu*

Chemistry

COMPOSITION: Pyrethrum formulations.

Parinol (Parnon*) — Discontinued by Elanco Products Co.

Paris Green**Identification**

CODE NUMBER: CAS 12002-03-8.

OTHER NAMES: Emerald green, French green, mitis green, Schweinfurt green.

Chemistry

COMPOSITION: Copper acetoarsenite.

Action/Use

ACTION: Stomach insecticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 22 mg/kg.

Parlay* — see Paclobotrazol.

Parnon*

(Discontinued by Elanco Products Co.)

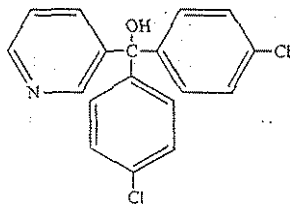
Identification

TRIVIAL NAME: Parinol.

CODE NUMBERS: CAS 17781-31-6; SHA 046501.

Chemistry

COMPOSITION: α,α-Bis(4-chlorophenyl)-3-pyridinemethanol (IUPAC).



Parinol

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 5000 mg/kg.

Parsolin* Insecticide — Discontinued by Ciba-Geigy Ltd.

Partner* — see Alachlor.

Partron M* — see Methyl Parathion.

Parzate* — see Nabam.

Parzate* C — see Zineb.

Passport* — see Pursuit*.

Pasta Caffaro* — see Copper Oxychloride.

Patap* — see Cartap Hydrochloride.

Pathclear* — see Diquat Dibromide; Paraquat; Simazine.

Pathfinder* — see Triclopyr.

Pathogen

Any microorganism which can cause disease in other organisms or in humans, animals or plants. Most pathogens are parasites but there are a few exceptions.

Pathway*

BP: DowElanco

Chemistry

COMPOSITION: 4-Amino-3,5,6-trichloropicolinic acid, (picloram) triisopropanolamine salt + 2,4-Dichlorophenoxyacetic acid triisopropanolamine salt.

PROPERTIES: Blue-green liquid with alcoholic odor.

Action/Use

ACTION: Herbicide.

Environmental Guidelines

SOLUBILITY: Miscible in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): LD₅₀ >5000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, impermeable gloves, waterproof boots, long-sleeved shirt and long pants.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Do not ship or store with food, feeds, drugs or clothing.

Emergency Guidelines

FLASHPOINT: 105°F.

FIRE EXTINGUISHING MEDIA: Water fog, alcohol foam, CO₂, dry chemical.FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation**, remove to fresh air. **Ingestion**, induce vomiting.

Patoran* Herbicide (metobromuron) — Discontinued 1994 by BASF AG.

Patrol* Fungicide — see Fenpropidin.

Patrol*

BP: Helena Chemical Co.

Chemistry

COMPOSITION: Proprietary blend of 28% nitrogen + nonionic surfactant.

Action/Use

USE: For use with pesticides, primarily herbicides, when label recommendations specify use of liquid nitrogen fertilizer and nonionic surfactant.

Patrole* — see Methamidophos.

Pattonex* — see Metobromuron.

Paturyl* — see BAP.

Paushafen* — see Fenvalerate.

Paushamycin* — see Streptomycin (sulfate or nitrate).

Paushaquin* — see Quinalphos.

Paushazim* — see Carbendazim.

Pausulfa* — see Endosulfan.

Paxilon* — see Probe*.

Payload* — see Acephate.

Pay-Off* Insecticide (flucythrinate) — Discontinued by Du Pont.

PBA**Identification**

COMMON NAME: PBA.

DISCONTINUED NAMES: Benzac* 354 (Union Carbide Corp.); Zobar* (+ trichlorobenzoic acid).

Chemistry

COMPOSITION: Polychlorobenzoic acid, dimethylamine salt.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1140 mg/kg (dimethyl-amine).

PB-Nox* — see Piperonyl Butoxide; Rotenone.

PB-Rope* — see Sticky Trapping Materials.

PCA — see Pyramin*.

PCNB

BP: Amvac Chemical Corp.
 Gilmore, Inc.
 Mitsui Toatsu Chemicals, Inc.
 Pyosa, S.A. de C.V.
 Uniroyal Chemical Co., Inc. (Terraclor*, Turfcide*)

Identification

COMMON NAME: Quintozene (ISO, BSI); PKhNB (USSR).

TRIVIAL NAME: PCNB.

EXP. CODE NUMBER: HOE 026014 (Hoechst AG).

OTHER CODE NUMBERS: CAS 82-68-8; SHA 056502.

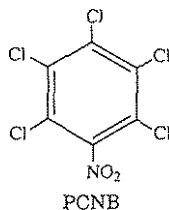
ADDITIONAL TRADE NAMES: Avicol*, Earthcide*, Folosan*, Kobu*, Kobuto*, Pentagen*, RTU* PCNB (Gustafson Inc.); Terrazan* (Quimica Organica de Mexico); Tri-PCNB*.

DISCONTINUED NAMES: Triquintam* (+ thiram) (Atochem Agri BV); Botrilex* and Tilcarex* (Bayer AG); Terra-Coat L-205N* and Terraclor Super X20-5* (+ etridiazole) (Gustafson Inc.); Brassicol* (Hoechst AG); Quintox* (Pyosa); Saniclor* 30 (Rhône-Poulenc).

Chemistry

COMPOSITION: Pentachloronitrobenzene.

PROPERTIES: Crystalline solid, melting point 142-146° C. Terrazan* pale yellow crystals, molecular wt. 295.0, melting point 141-143° C.



Action/Use

ACTION: Soil fungicide; seed dressing agent.

USE: For damping-off of cotton; black root and club-root of cabbage, cauliflower, Brussels sprouts, and broccoli; scab and Rhizoctonia of potatoes; southern stem and root rot of peanuts; southern blight of tomatoes and peppers; root and stem rot and white mold of beans; white rot of garlic; hant of wheat; botrytis storage rot of roses; brown patch and snow mold of turf; petal blight of azaleas; root rot of Easter lilies; flower blight of camellia; stem rot of various ornamentals; and crown and black rot of bulbous ornamentals.

FORMULATIONS: Emulsifiable concentrate, dust, granules, liquid flowable, wettable powder.

COMBINATIONS: Apron*-Terraclor* (+ metalaxyl), 4-Way* (+ captan + maneb + etridiazole), Prevail* (+ carboxin + metalaxyl), Rival* (+ captan + thiabendazole), Vitavax*-PCNB (+ carboxin) (Gustafson Inc.); System** (+ metalaxyl + *Bacillus subtilis*) (Helena Chemical Co.); Terraclor Super X* (+ etridiazole) (Uniroyal).

Registration Notes

OUTSIDE U.S.: Terrazan*.

Environmental Guidelines

HAZARDS: Fish: (96h) LC₅₀ 0.55 mg/l (rainbow trout); 0.1 mg/l (bluegill, sunfish); (48h), 0.77 mg/l (daphnia). Bird: Nontoxic. Bee: Nontoxic. SOLUBILITY: Terrazan* in water 8.7×10^{-2} gm/ml at 20°C.

TOXICITY: Tech (Rat): Oral LD₅₀ 1700-5000 mg/kg. Inhalation LC₅₀ 6.49 mg/l. (Rat): Dermal 2000-4000 mg/kg. Slight eye, skin irritant.

PROTECTIVE CLOTHING: Use eye protection. Wear gloves, respirator, long sleeved shirt and long pants while mixing-loading.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes or clothing. Avoid breathing dust or spray mist. Wash thoroughly with soap and water after use and before eating or smoking. Remove contaminated clothing and wash before reuse. Do not contaminate animal feed. Store in a cool, dry place away from feedstuffs.

Safety Guidelines

SIGNAL WORD: CAUTION (Tech., Triquintam*).

TOXICITY CLASS: III (Tech., Triquintam*).

Emergency Guidelines

FIRST AID: Get immediate medical aid. Eyes, Skin, flush affected area with water for 15 minutes.

Terra-coat LT-2N, 4-Way*: Ingestion, do NOT induce vomiting. Drink large quantities of milk. Call physician immediately. Contains petroleum hydrocarbons.

EMERGENCY TELEPHONE: Medical: 800-228-5635 Ext. 169 (Hazard Information Services); Transportation: 800-424-9300 (CHEMTREC).

PCP

BF: ISK Biosciences Corp. (Penta Plus 40*, Penta WR 1-5*, Penta Preservative Ready-to-Use* P, Permatox* Penta, Pol-Nu*)

Identification

COMMON NAMES: PCP (JMAF, WSSA); pentachlorophenol (ISO, BSI).

CODE NUMBERS: CAS 608-93-5; SHA 063001.

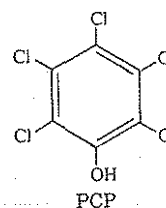
ADDITIONAL TRADE NAMES: Pentacon* and Penwar* (Forshaw Chemical, Inc.); GLAZD* Penta and Block Penta (Vulcan Chemical); Penchlorol*, Sinituho*.

DISCONTINUED NAMES: Penta* Ready, Penta* WR (Agrotol Chemical Products); Penta* EC 30, Penta Pres 1-10* (Chapman Chemicals); Dow Pentachlorophenol* DP-2, Dovicide* EC-7 (Dow Chemical); Priltox* (Idacon Inc.); Santobrite*, Santophen* (Monsanto Agricultural Co.); Antimicrobial*; Weedone*.

Chemistry

COMPOSITION: Pentachlorophenol.

PROPERTIES: Buff color crystals, melting point 174°C, 191°C (anhydrous); freezing point (tech.) 174°C.



Action/Use

ACTION: Wood preservative, molluscicide.

USE: Wood preservative for fungus decay, termite or Lyctus beetle attack. Molluscicide for snail carriers of larval human-blood flukes causing schistosomiasis in Egypt. PCP as formulated product to be applied with a hydrocarbon diluent or as an emulsifiable solution. Solution concentrates for use in formulating ready-to-use products by manufacturers and for use by large consumers. Usually applied to wood products after dilution to a 5% solution with solvents such as mineral spirits, No. 2 fuel oil or kerosene.

FORMULATIONS: Blocks, flakes, liquid concentrate, or ready-to-use petroleum solutions.

Registration Notes

U.S.: RUP as wood preservative.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 50-500 mg/kg; Inhalation LC₅₀ 0.20-2.1 mg/l. (Rabbit): LD₅₀ 105 mg/kg.

PROTECTIVE CLOTHING: Impervious gloves, apron (PVA, PVC, neoprene, or NBR). Organic vapors/acid gases respirator in closed areas where inhalation of vapors cannot be avoided. Safety glasses, goggles, or face shield.

HANDLING AND STORAGE CAUTIONS: May be fatal if swallowed or absorbed through skin. Not for use or storage in or around the home. Vapors will cause injury; use with adequate ventilation. Do not use indoors or in confined areas to avoid vapor injury to plant or animal life. Avoid eyes, skin, clothing contact. Wash thoroughly after handling. Keep container closed. Do not leave in sunshine. Do not use, pour, spill, or store near heat or open flame. Destroy or return container when empty; do not reuse.

Emergency Guidelines

FLASHPOINT: (Pol-Nu*): 200°F (TCC).

ANTIDOTE: PCP is a metabolic stimulant. Treatment is supportive. Forced diuresis may be effective to reduce total body burden. Treat hyperthermia with physical measures. Do NOT administer aspirin, phenothiazines, or atropine since they may enhance toxicity.

FIRST AID: Get medical aid. Eyes, flush with plenty of water for 15 minutes. Skin, flood with alcohol, then wash thoroughly with soap or detergent and water. Ingestion, give milk, milk of magnesia, or white of egg beaten with water.

EMERGENCY TELEPHONE: 901-683-9464 (ISK Biotech). 800-424-9300 (CHEMTREC).

See Sodium Pentachlorophenate.

PCPBS — see Fenson.

PCPCBS — see Chlorfenson.

P.C.Q.* Rodenticide (diphacinone) — Discontinued by Bell Labs.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

PDQ* — see MCPB.

PDU — see Fenuron.

Peach Thin 322*

(Discontinued by Rhone-Poulenc)

Chemistry

COMPOSITION: Sodium salt of naphthylphthalamic acid (17.2%).

Action/Use

ACTION: Plant growth regulator.

Pear-Clean

F: Wilbur-Ellis Co.

Identification

COMMON NAME: Dialkyl sodium sulfo dicarboxylate ethanol.

Chemistry

PROPERTIES: Clear liquid with a fruity odor.

Action/Use

ACTION: Wetting agent.

USE: When mixed with water, as nonbearing application or postharvest pear tree clean-up agent to remove Pear Psylla excrement (honeydew) from pear trees.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

PROTECTIVE CLOTHING: Long sleeved coveralls and chemical goggles.

Emergency Guidelines

FLASHPOINT: 185°F TOC*

FIRE EXTINGUISHING MEDIA: Water fog.

FIRST AID: In all cases, get prompt medical attention. Ingested, give several glasses of water and induce vomiting. Do NOT induce vomiting if person is unconscious. Skin, remove contaminated clothing and wash with soap and water. Eyes, irrigate eyes for a minimum of 15 minutes with water. Inhalation, remove victim to fresh air and administer CPR if necessary.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

PEBC — see Tillam*.

Pebulate — see Tillam*.

Pedinex — see DN-111*.

Pegafix* — see Spreader; Sticker.

Pellet

Dry formulation of pesticide chemical and other components in discrete particles usually larger than 10 cubic millimeters.

See Granular Formulation for comparison.

Penar* Plant Growth Regulator (dimethyldodecylamine acetate) — Discontinued by ELF Atochem North America.

PencaI* Herbicide/Insecticide (calcium arsenate) — Discontinued 1991 by Pennwalt.

Penchlorol — see PCP.

Penconazole

BP: Ciba, Ltd. (Topas*, Omnex*)

Identification

COMMON NAME: Penconazole (ISO draft, BSI).

EXP. CODE NUMBER: CGA-71818 (Ciba, Ltd.).

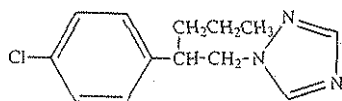
OTHER CODE NUMBER: CAS 66246-88-6.

ADDITIONAL TRADE NAMES: Topaz*, Topaze*.

Chemistry

COMPOSITION: 1-(2-(2,4-dichlorophenyl)pentyl)-1H-1,2,4-triazole (CAS).

PROPERTIES: Solubility in methanol at 20°C. 70 ppm 80%.



Penconazole

Action/Use

ACTION: Fungicide.

USE: Systemic fungicide with protective, curative and eradicated properties for use against powdery mildews, pome fruit scab, and other pathogenic ascomycetes, basidiomycetes, and deuteromycetes. For use in grapes, deciduous fruits, vegetables and ornamentals.

FORMULATIONS: Emulsifiable concentrate, wettable powder (10).

COMBINATIONS: Prepack mixtures usually with one of various residual fungicides. Topas* C 50WP (+ captan), Topas* D75SC (+ dithianon), Topas* MZ 61 WP (+ mancozeb).

Registration Notes

U.S.: Development abandoned.

Environmental Guidelines

SOLUBILITY: Solubility in water at 20°C. 70 ppm.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 2125 mg/kg. Dermal >3000 mg/kg.

Pencycuron

BP: Bayer AG (Monceren*, Trotris*)

Hanwha Corp.

Lucky Ltd.

Identification

COMMON NAME: Pencycuron (ISO, BSI).

EXP. CODE NUMBER: BAY NTN 19701.

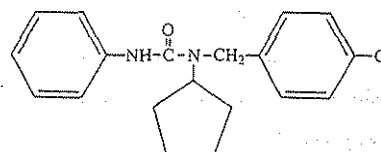
OTHER CODE NUMBERS: CAS 66063-05-6; SHA 128823; EINECS 266-096-3.

Chemistry

COMPOSITION: N-[(4-chlorophenyl)methyl]-N-cyclopentyl-N'-phenylurea (CAS).

FAMILY: Phenylurea.

PROPERTIES: Colorless crystals, vapor pressure 0.5 nPa at 20°C. Melting point 129.5°C. Moderately soluble in organic solvents.



Pencycuron

Action/Use

ACTION: Nonsystemic fungicide.

USE: For Rhizoctonia solani diseases in potatoes, rice, sugar beets, vegetables, turf and ornamentals.

FORMULATIONS: Dry seed dressing, dustable powder, flowable concentrate for seed treatment, suspension concentrate, wettable powder.

Registration Notes

U.S.: Not registered.

OUTSIDE U.S.: Not registered in Canada.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 127 mg/l (96 h) (bluegill); >690 mg/l (rainbow trout). Bird: LD₅₀ >2000 mg/kg body weight (bobwhite quail). Bee: Nontoxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech. (Rat): Oral LD₅₀ >5000 mg/kg b.w.; Dermal LD₅₀ >2000 mg/kg b.w.

Pendex 536*

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: 100% alkyl polyoxyethylene ethers, fatty acid esters.

Action/Use:

ACTION: Emulsifier.

USE: Nonionic surfactants designed for use as an emulsifier for paraffinic spray oils, can be used in most commercial grade oils or combined in herbicide or insecticide/oil formulations.

FORMULATION: Concentrated liquid.

Pendimethalin — see Prowl*; Squadron*.

Pendimethaline — see Prowl*.

Penetrant

Wetting agents, oils, or oil concentrates that enhance the ability of a liquid to enter into pores of a substrate, to penetrate the surface, are termed penetrating agents or penetrants.

Some examples are: Agri-dex*, Agri-Dex* Xtra, Agri-dex* Ad-Spray 101*, Citrufilm*, Dyne-amic*, Induce* pH, Kinetic*, Penetrator*, Penetrator Plus*, Spret* (Helena Chemical); Regulaid*, Tronic* 98 (Kalo, Inc.); Alkamuis SMO*, Geronol* (Rhone-Poulenc Surfactants & Specialties); Sanawett* (Sanachem (Pty) Ltd.); Adsee*, Armix*, Armul*, Flo-Mo* (Witco Corp., Oleo Surfactants Group).

Penetrator*

COMPOSITION: Light to mid range paraffin base petroleum oil + polyol fatty acid esters + polyethoxylated derivatives thereof.

Action/Use

ACTION: Oil concentrate spray enhancement adjuvant.

USE: Primarily with fungicides, insecticides; with pesticides recommending use of crop oil concentrate.

See Penetrant.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Penetrator Plus*

BP: Helena Chemical Co.

Chemistry

COMPOSITION: Light to mid range paraffin oil + polyol fatty acid esters + polyethoxylated esters thereof + ethoxylated alkyl aryl phosphate esters.

Action/Use

ACTION: Oil concentrate buffering agent.

USE: With pesticides when label requirements specify use of crop oil concentrate and buffering agent.

Pene-Turf* — see Ammonium Laureth Sulfate.**Penfluron****Action/Use**

ACTION: Insect growth regulator.

USE: Reproduction control agent for cotton boll weevil.

Registration Notes

U.S.: Experimental.

Penite* Fungicide/Herbicide/Insecticide (sodium arsenite) —

Discontinued by Pennwalt.

Pennamine* D Herbicide (2,4-D) — Discontinued 1991 by Pennwalt.**Pennant*** — see Metolachlor.**Penncap-E***

(Discontinued 1989 by ELF Atochem North America, Inc.)

Chemistry

COMPOSITION: Flowable microencapsulated ethyl parathion.

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

Penncap-M*

F: ELF Atochem Agri B.V. (Penncap M*)

ELF Atochem North America, Inc. (Penncap M*)

Identification

COMMON NAME: Methyl parathion.

Chemistry

PROPERTIES: Beige liquid with organophosphate odor.

Action/Use

ACTION: Insecticide.

USE: Controls many insects on cotton, field and sweet corn, alfalfa, soybeans, tobacco, rice, wheat, rangeland/pasture, peas, beans (dry), beans (snap and lima), onions (dry), apples, peas, pears, peaches, and grapes.

FORMULATIONS: Encapsulated capsule suspension.

Registration Notes

U.S.: RUP.

Environmental Guidelines

HAZARDS: Bee: Highly toxic (direct treatment or residues).

SOLUBILITY: Disperses in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Formulation (Rat): Oral LD₅₀ >600 mg/kg. (Rabbit): Dermal >5400 mg/kg.

HANDLING AND STORAGE CAUTIONS: Do not expose workers or other persons directly or through drift. Store in original container.

Emergency Guidelines

FLASHPOINT: (TCC) <96°C.

ANTIDOTE: Atropine. 2-PAM may be administered with atropine. Morphine is contraindicated.

EMERGENCY TELEPHONE: 33-10-4725171 (ELF Atochem Agri B.V.); 215-419-7219 (ELF Atochem North America, Inc.).

See Methyl Parathion.

Pennacphtrin* — see Permethrin.**Penncozeb*** — see Dithiocarbamates; Mancozeb.**Pennflo* Fungicide (mancozeb)** — Discontinued by ELF

Atochem Agri B.V.

Pennfluid* — see Dithiocarbamates; Mancozeb.**Pennstyl*** — see Cyhexatin.**Penoxalin** — see Prowl*.**Penphene***

(Discontinued by Atochem North America)

Identification

TRIVIAL NAME: TCTP.

CODE NUMBER: CAS 6012-97-1.

Chemistry

COMPOSITION: Tetrachlorothiophene.

Action/Use

ACTION: Nematicide, soil fumigant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 780 mg/kg.**Penta* EC30 Wood Preservative (PCP)** — Discontinued by Chapman Chemicals.**Penta Plus 40*** — see PCP.**Penta Pres. 1-10* Wood Preservative (PCP)** — Discontinued by Chapman Chemicals.**Penta Preservative Ready-to-Use* P** — see PCP.**Penta* Ready Wood Preservative (PCP)** — Discontinued 1989 by Agtrol Chemical Products.**Penta* WR Wood Preservative (PCP)** — Discontinued 1989 by Agtrol Chemical Products.**Penta WR 1-5*** — see PCP.**Pentac*** — see Dienochlor.**Pentac* Aquaflo** — see Dienochlor.**Pentachlorin** — see DDT.**Pentachloronitrobenzene** — see PCNB.**Pentachlorophenol** — see PCP; Sodium Pentachlorophenate.**Pentachlorophenolate de Sodium** — see Sodium Pentachlorophenate.**Pentachlorophenoxy Sodium** — see Sodium Pentachlorophenate.**Pentacon*** — see PCP.**Pentagan*** — see Chlormequat chloride.**Pentagen*** — see PCNB.**Pentane****Identification**

CODE NUMBERS: CAS 109-66-0; SHA 098001.

Action/Use

ACTION: Incidental additive in liquid grain fumigants.

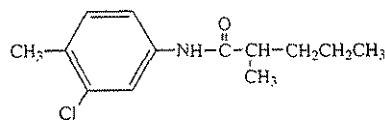
Pentanochlor**Identification**COMMON NAMES: *Solan* (WSSA); *pentanochlor* (ISO-E, BSI); CMMP (JMAF); *pentanchlore* (ISO-F).

EXP. CODE NUMBER: Nia 4512 (FMC Corp.).

OTHER CODE NUMBERS: CAS 2307-68-8; SHA 020901.

DISCONTINUED NAMES: *Solan** (FMC Corp.); *Dakuron**.**Chemistry**

COMPOSITION: 3'-Chloro-2-methyl-p-valerotoluidide (CAS 8CI).



Solan

Action/Use

ACTION: Herbicide (selective postemergence).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg.**Pentaphenate** — see Sodium Pentachlorophenate.**Pentavel****Chemistry**

COMPOSITION: Made by chlorinating side chain of ethylchlorobenzene.

Action/Use

ACTION: Insecticide.

Registration Notes

OUTSIDE U.S.: For use in Germany.

Penwar* — see PCP.**Peprothion*****Chemistry**

COMPOSITION: DDT (64%), endosulfan (18%), methyl parathion (18%).

Peptoil*

BP: Drexel Chemical Co.

Chemistry

COMPOSITION: Paraffinic petroleum oil + nonionic surfactant.

FAMILY: Petroleum hydrocarbon.

Action/Use

ACTION: Spray tank adjuvant.

USE: For use with pesticides.

Safety Guidelines

TOXICITY: Nontoxic.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Peracetic Acid

Identification

CODE NUMBER: CAS 79-21-0.

Chemistry

COMPOSITION: Ethaneperoxy acid.

Action/Use

USE: Postharvest spray for bananas, citrus, berries, other fruits, vegetables, and containers; wash for eggs; treatment for containers for harvesting crops.

Perbaz* — see Permethrin.

Perchloroethylene — see Tetrachloroethylene.

Perchlorobenzene — see Hexachlorobenzene.

Percolation

Movement of water downward and radially through the sub-surface soil layers, usually continuing downward to the groundwater.

Perecot* (copper oxides) — Discontinued by ICI Agrochemicals.

Perennial Weed

A weed which lives through three or more years, such as the dandelion. Often no seeds are produced for the first year but seeding occurs each year thereafter during life of the weed.

See Annual Weed; Biennial Weed.

Perfekthion* — see Dimethoate.

Perflan* Herbicide (tebuthiuron) — Discontinued by Elanco Products.

Perfluidone

Identification

COMMON NAME: Perfluidone (ANSI, WSSA).

EXP. CODE NUMBER: MBR 8251.

OTHER CODE NUMBER: CAS 37924-13-3.

DISCONTINUED NAME: Destun* (3M Co.).

Chemistry

COMPOSITION: (1,1,1,-Trifluoro-N[2-methyl-4-(phenyl-sulfonyl)phenyl]methanesulfonamide).

Action/Use

ACTION: Selective preemergence herbicide.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: Tech (Mouse): Oral LD₅₀ 920 mg/kg. (Rabbit): Dermal LD₅₀ >4000 mg/kg.

Perigen* — see Permethrin.

Periplanone B

Identification

CODE NUMBER: CAS 61228-92-0

Action/Use

ACTION: Synthetic chemical that acts like the male attractant produced by the female American cockroach (*Periplaneta americana*).

Perk* — see Ammonium Laureth Sulfate.

Perm-E8* — see Copper Naphthenates.

Permanone* — see Permethrin.

Permasect* — see Permethrin.

Permatox 101* Fungicide (sodium pentachlorophenate) —

Discontinued by Chapman Chemical in 1992.

Permatox 181* Fungicide (sodium pentachlorophenate) —

Discontinued by Chapman Chemical in 1992.

Permatox* Penta — see PCP.

Permethrin

BP: American Cyanamid Co. (Outflank*, Talcord*)

Atabay Agrochemicals & Veterinary Products Inc.

Chinoin Pharmaceutical & Chemical Works Co. Ltd.

Fersol Indústria E Comércio Ltda.

FMC Corp. (Astro*, Cellutec*, Dragnet* FT, Flee*, Pounce*)

Gilmore, Inc.

HELM AG

Lucky Ltd.

Mitchell Cotts Chemical Ltd. (Permasect*)

Point Enterprise S.A. (Point* Permethrin)

Roussel Uclaf Corp. (Permanone*, Pramex*)

Roussel Uclaf Environmental Health (Coopex*, Perigen*,

Permanone*, Qamlin*)

Sanachem (Pty) Ltd. (Sanathrin*)

Sumitomo Chemical Co., Ltd. (Ekamin*, Adion*)

ZENECA Ag Products (Ambush*)

ZENECA Agrochemicals (Ambush*, Kafil*, Perthrine*)

ZENECA Professional Products (Prelude*)

ZENECA Public Health (Dragon*, Imperator*)

Identification

COMMON NAMES: Permethrin (ISO-E, ANSI, BSI, ESA, BAN, INN, USAN); Permethrine (ISO-F).

EXP. CODE NUMBERS: FMC-33297 (FMC); PP 557 (ZENECA); BW-21-Z; NRDC 143.

OTHER CODE NUMBERS: CAS 52645-53-1; SHA 109701.

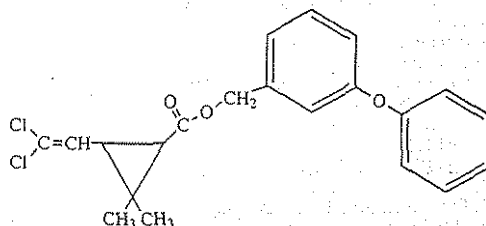
ADDITIONAL TRADE NAMES: Pertox* (Agsin Pte. Ltd.); Primetrim* (Atabay); Pirine* (Chimac-Agriphar S.A.); Perbaz* (C.M.I. Ltd.); Pennacphtrin* (ELF Atochem Agri B.V.); Persect* (VAPCO); Indothrin*. DISCONTINUED NAMES: Ectiban* (ICI Americas); Torpedo* (ZENECA Professional Products).

Chemistry

COMPOSITION: 3-phenoxybenzyl (1RS)-cis,trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate (IUPAC). (3-phenoxyphenyl methyl) (±)-cis,trans-3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate (CAS).

FAMILY: Pyrethroid.

PROPERTIES: Molecular weight 391.3. Physical form colorless crystals to a viscous liquid. Color, water white to pale yellow. Melting point approx. 35°C (analytical grade); boiling point 220°C at 0.05 mm Hg; vapor pressure <10 Torr at 50°C; specific gravity 1.190-1.272 at 20°C. Soluble, miscible with most organic solvents except ethylene glycol. Soluble in acetone, ethanol, ether, and xylene.



Permethrin

Action/Use

ACTION: Insecticide (synthetic pyrethroid), termiticide (Dragnet* FT), wood preservative (Cellutec*).

USE: Varies by formulation. For almonds, apples, asparagus, avocado, bell peppers, broccoli, Brussels sprouts, cabbage, cantaloupes, cauliflower, celery, cherries, chrysanthemums (greenhouse), cole crops, collards, conifers (container/field grown), cotton, corn (field/pop/sweet), eggplants, filberts, garlic, head lettuce, horseradish, leafy vegetables, mushrooms, onions, ornamental nursery stock (field grown), papaya, peaches, pears (summer/dormant/delayed dormant), pine seed orchards, pistachios, potatoes, pumpkins, walnuts, range grass, roses (field/greenhouse), soybeans, spinach, sweet corn, tomatoes (fresh market), turnips. Pramex* for plant pests in greenhouses, lath houses, indoor landscaping and home gardens. Dragnet*, Torpedo* for termites. Flee* for general pest control. Astro* for turf and ornamentals. FORMULATIONS: Dusts, emulsifiable concentrate, smokes, ULV, wettable powder.

COMBINATIONS: Phinco-T22* (+ piperonyl butoxide + tetramethrin) (VAPCO).

Registration Notes

OUTSIDE U.S.: Europe: Pennacphtrin*.

Environmental Guidelines

HAZARDS: Fish: Highly toxic in laboratory tests; low in field tests. Bee: Highly toxic in laboratory tests; low in field tests. Bird: Practically nontoxic.

SOLUBILITY: In water, <1 ppm.

Safety Guidelines

SIGNAL WORD: WARNING (Ambush*). CAUTION (Dragnet* FT, Flee*, Outflank*, Pounce* 3.2 EC, Pramex*, Talcord*).

TOXICITY CLASS: II (Ambush*); III (Dragnet* FT, Flee*, Outflank*, Pounce* 3.2 EC, Pramex*, Talcord*).

TOXICITY: Tech (Rat): Oral LD₅₀ 430-4000 mg/kg. Dermal LD₅₀ >4000 mg/kg. Inhalation LC₅₀ >23.5 mg/l of air. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Hat or other suitable head covering, long sleeved shirt, long legged trousers or overall type garment (all of closely woven fabric covering the body, including the arms and legs), shoes and socks.

HANDLING AND STORAGE CAUTIONS: Keep out of lakes, streams, or ponds. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water by cleaning of equipment, or disposal of wastes near a body of water. Avoid contact with eyes, skin, or clothing. Avoid breathing vapor or spray mist. Wash thoroughly after handling. Do not store near food, feed, heat, or open flame.

Emergency Guidelines

FLASHPOINT: Perigen*: >100°C.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/T/M BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

FIRST AID: Get immediate medical aid as necessary. Eyes, immediately flush with plenty of water for at least 15 minutes. Skin, immediately remove contaminated clothing and flush skin with water. Ingestion, do NOT induce vomiting.
EMERGENCY TELEPHONE: 716-735-3765 (FMC), 800-327-8633 (ZENECA Ag Products).
 See Pyrethroids.

Permethrine — see Permethrin.

Permit*

BP: Monsanto Co., The Agricultural Group (under license from Nissan Chemical Industries, Ltd.)

Identification

COMMON NAME: Halosulfuron-methyl.
EXP. CODE NUMBER: MON 12037 (Monsanto).
OTHER CODE NUMBER: CAS 100784-20-1 (halosulfuron-methyl).

Chemistry

COMPOSITION: (A.I.) methyl 5-[(4,6-dimethoxy-2-pyrimidinyl)aminocarbonylamino-sulfonyl]-3-chloro-1-methyl-1H-pyrazole-4-carboxylate.

FAMILY: Sulfonylurea.

PROPERTIES: Brown granules. pH 6.6 (1% solution).

CORROSIVENESS: Compatible with equipment and containers.

Action/Use

ACTION: Selective herbicide.

USE: For postemergence control of broadleaf weeds in field corn, field corn grown for seed, and grain sorghum (milo).

Registration Notes

U.S.: Being tested under an EUP.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III, IV.

TOXICITY: (Rat): Oral LD₅₀ 1287 mg/kg. Dermal LD₅₀ >5000 mg/kg. (Rabbit): Moderate eye irritant; slight skin irritant. Acute inhalation: >5.7 mg/l.

PROTECTIVE CLOTHING: Goggles or face shield, long-sleeved shirt, long pant, socks, and shoes.

HANDLING AND STORAGE CAUTIONS: Do not get in eyes, on skin or clothing. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse. Do not contaminate water, foodstuffs, feed, or seed by storage or disposal.

Emergency Guidelines

FLASHPOINT: N/ap (solid material).

FIRST AID: Eyes, immediately flush with plenty of water. Get medical attention. Ingestion, remove visible particles from mouth and rinse with water. If conscious, give plenty of water. Get medical attention.
EMERGENCY TELEPHONE: 314-694-4000 (Monsanto Co., The Agricultural Group).

Peropal*

BP: Bayer AG (Peropal*, Clairmaid*)

Identification

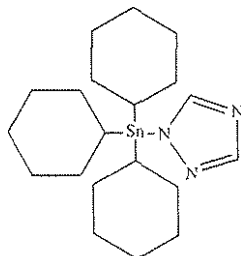
COMMON NAME: Azocyclotin.
EXP. CODE NUMBER: Bay BUE 1452.
OTHER CODE NUMBER: CAS 41083-11-8 (azocyclotin); EINECS 255-209-1.

Chemistry

COMPOSITION: 1-(tricyclohexylstannyl)-1H-1,2,4-triazole.

FAMILY: Organotin compounds.

PROPERTIES: Colorless powder. Vapor pressure 0.06 nPa at 25°C. Barely soluble in dichloromethane, 2-propanol, toluene. Nearly insoluble in hexane.



Azocyclotin

Action/Use

ACTION: Acaricide.

USE: For all mobile stages of *Tetranychus*, *Panonychus* spp. on citrus, fruits (including grapes), vegetables, hops, cotton and ornamentals.

FORMULATIONS: Wettable powder.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.004 mg/l (96 h) (rainbow trout). Bee: Nontoxic. Bird: LD₅₀ 144-250 mg/kg (Japanese quail).

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 209-363 mg/kg/b.w. Dermal >5000 mg/kg/b.w.

Persistent Herbicide

A herbicide which, when applied at the recommended rate, will harm susceptible crops planted in normal rotation after harvesting the treated crop, or which interferes with regrowth of native vegetation in noncrop sites for an extended period of time.

See Residual Herbicide.

Persistent Pesticide

Many degrees of persistency exist, often as a necessary attribute. Space fumigants are virtually nonpersistent as soon as the space is aired. A contact insecticide must remain on the insect long enough to take effect. Chlorinated hydrocarbon insecticides such as dieldrin are much more persistent than organic phosphorus insecticides. Persistency is dependent upon such properties as volatility and resistance to chemical breakdown, although pesticide metabolites may still be persistent.

See Crop Tolerance.

Perthane*

(Discontinued by Rohm and Haas Co.)

Identification

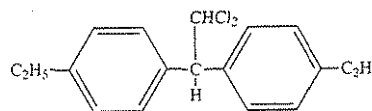
COMMON NAME: Ethylan.

EXP. CODE NUMBER: Q-137 (Rohm and Haas).

OTHER CODE NUMBERS: CAS 72-56-0; SHA 032101.

Chemistry

COMPOSITION: 1,1-Dichloro-2,2-bis(4-ethylphenyl)ethane.



Active Ingredient of Perthane*

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 8170 mg/kg.

Perthrine* — see Permethrin.

Pertox* — see Permethrin.

Persect* — see Permethrin.

Pescombi* — see Mecarbam.

Pest

Any organism which injures man, his property, or his environment, or which annoys him. Such organisms include principally certain insects, nematodes, fungi, weeds, birds, and rodents, or any other terrestrial or aquatic plant or animal life, or virus, bacteria, or other organisms (except microorganisms on or in living man or other living animals).

Pest Strip* — see DDVP.

Pestan* Acaricide/Insecticide (mecarbam) — Discontinued by Takeda Chemical Industries, Ltd.

Pesticidal Soaps — see Soaps, Pesticidal.

Pesticide — see Economic Poison.

Pesticide Interaction

The action or influence of one pesticide upon another and upon the pest or system involved.

Pestilizer* Emulsifier — Discontinued by Stepan Co. in 1992.

Pestmaster* Fumigant (methyl bromide) — Discontinued by Velsicol Chemical Corp.

Pestox III* Insecticide/Acaricide (schradan) — Discontinued by Fisons Ltd.

Pestox XIV* Insecticide (dimetox) — Discontinued by Fisons Ltd.

Pestox XV* Insecticide (mipafox) — Discontinued by Fisons Ltd.

Pestrin* Fogging Spray-CI Insecticide (pyrethrum) — Discontinued by Hopkins Agricultural Chemical Co.

Petro* AG Special — see Wetting Agent.

Petroleum Distillate — see Refined Petroleum Distillate, TME.

Petroleum Oils

Used as (1) dormant sprays to control scale insects, aphid eggs, spider mite eggs; (2) summer oils against aphids, mites, and scale crawlers; (3) parasiticides for application to livestock; (4) carriers for other pesticides; (5) herbicides by themselves; (6) adjuvants to increase efficacy of fungicides.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

When petroleum by itself or as a carrier of other pesticides is to be applied to vegetation for the control of insects and/or plant diseases, it is usually formulated with an emulsifier which permits it to be diluted with water. Petroleum oils are applied as contact herbicides, being used for either selective or general weed control. Petroleum products used as herbicides include Stoddard solvent, diesel oil.

A number of criteria are used in judging the potential effectiveness of an oil. Many are of equal importance whether the material is to be used as an insecticide or a herbicide. (1) Sulfonation (in percentage) indicates the degree of refinement, the higher the figure (95% for example), the more refined. White Oils is another term for refined oils. (2) Volatility is an indication of persistence. Volatility is slight for spray oils above the kerosenes, so is of little importance in considering orchard oil sprays. (3) Density ("gravity") increases from paraffinic to naphthenic to aromatic hydrocarbon types. The density of crude oil ranges from 0.65-1.06; of kerosenes commonly employed as insecticide base oils 0.78-0.80; oils used for spray oils approx. 82-0.92. (4) Viscosity is the most important property in selection of an oil for either dormant or summer spraying of fruit trees. It is the "body" of the liquid, and is stated in arbitrary relative terms based on time in seconds to pass through a standard opening.

Viscosity of dormant oils may range from 90-150 seconds (Saybolt is the name of the standard test equipment), while summer oils may be from 65-90 seconds.

See Fuel Oils; Mineral Spirits; Naphtha; Refined Petroleum Distillate; Solvents; Stoddard Solvent; Superior Oils.

Petroleum Solvents — see Mineral Spirits; Petroleum Oils; Stoddard Solvent.

PGR-IV* — see Gibberellic Acid.

pH

The symbol of hydrogen ion concentration, a measure of acidity and alkalinity is pH. The pH 7 is the midpoint where a liquid is neither acid nor alkaline. Below pH 7, progressively more acid and above, more alkaline.

Phaitan* Fungicide (folpet) — Discontinued by Chevron Chemical Co.

Pharolid* — see Methoprene.

Phaser* — see Endosulfan.

PHC — see Propoxur.

Phenaban 801*

(Discontinued 1993 by PBI/Gordon)

Chemistry

COMPOSITION: Dimethylamine salt of 2,4-D, 3,6-dichloro-o-anisic acid.

Action/Use

ACTION: Selective herbicide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY (Rat): Oral LD₅₀ >1000 mg/kg.

Emergency Guidelines

FIRST AID: Ingestion, induce vomiting.

Phenacide* Insecticide (toxaphene) — Discontinued.

Phenacridane Chloride — see Acrizane*.

Phénaminiphos — see Nemaacur*.

Phénaminosulf — see Lesan*.

Phenatox* Insecticide (toxaphene) — Discontinued.

Phenazine

Chemistry

COMPOSITION: Azophenylene.

Action/Use

ACTION: Insecticide.

Phencapton

(Discontinued by Ciba-Geigy Ltd.)

Identification

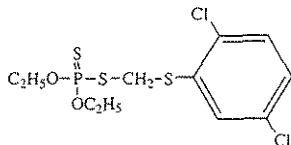
COMMON NAMES: Phencapton, phenkapton (ISO, BSI).

EXP. CODE NUMBER: G 28029 (Ciba-Geigy Ltd.).

OTHER CODE NUMBERS: CAS 2275-14-1; SHA 335300.

Chemistry

COMPOSITION: S-(2,5-dichlorophenylthio-methyl) O,O-diethyl phosphorodithioate.



Phencapton

Action/Use

ACTION: Acaricide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY (Rat): Oral LD₅₀ 182 mg/kg.

Phenixion

Chemistry

COMPOSITION: Dichlorovinylmethyl-p-chlorophenylthio-ethyl-phosphate.

Action/Use

ACTION: Insecticide.

Phenisobromolate — see Acarol*.

Phenisopham — see Verdinal*.

Phenkapton — see Phencapton.

Phenmad* (PMA) — Discontinued by Mallinckrodt, Inc.

Phenmedipham

BP: AgrEvo USA Co. (Spin-Aid*)

Hoechst Schering AgrEvo GmbH (Betanal*)

Kemira Agro Oy (Kemifam*, Rubenal*)

Pen-Tsao-Materia-Medica-Center GmbH

Identification

COMMON NAMES: Phenmedipham (ISO-E, ANSI, BSI, JMAF, WSA); phenmediphame (ISO-F).

EXP. CODE NUMBERS: EP-452; SN 38584; ZK-15320.

OTHER CODE NUMBERS: CAS 13684-63-4; SHA 098701.

ADDITIONAL TRADE NAMES: Betapost* (Chimac-Agriphar S.A.);

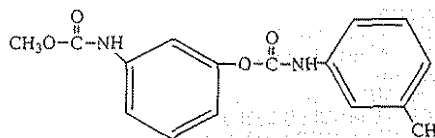
Tanex* (Diachem S.P.A.).

DISCONTINUED NAME: Medifene* (Diachem S.P.A.).

Chemistry

COMPOSITION: Methyl m-hydroxycarbanilate m-methylcarbanilate ester (CAS 8CD) or 3-Methoxycarbonylamino-phenyl-N(3'-methylphenyl)carbamate.

PROPERTIES: Colorless crystals, melting point 143-144°C. Soluble in polar organic solvents.



Phenmedipham

Action/Use

ACTION: Postemergence herbicide.

USE: For kochia, lambsquarters, mustard, green foxtail, etc. in red table beets and spinach.

FORMULATIONS: Emulsifiable concentrate, Oil-SC.

COMBINATIONS: Spin-Aid*/Betanal* (+ isophorone) (AgrEvo USA Co.); Betamix* (+ desmedipham), Betanal Compact* (+ desmedipham), Betanal* OF, Betanal Progress* (+ desmedipham + ethofumesate), Betanal Tandem* (+ ethofumesate), Betanal Trio* (+ ethofumesate + metamitron) (Hoechst Schering AgrEvo GmbH); Kemifam* Duo (+ ethofumesate), Kemifam* Pro FL (+ desmedipham + ethofumesate), Kemifam* S (+ desmedipham) (Kemira Agro Oy).

Registration Notes

OUTSIDE U.S.: For sugar beets, table beets, and strawberries.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 16.5 mg/l (96 h) (harlequin). Bee: Nontoxic. Bird: LD₅₀ >3000 mg/kg (hen).

SOIL PARTICLE ADSORPTION: 95% of the a.i. degraded within 6 months.

SOLUBILITY: Practically insoluble in water (5 ppm), hydrolysis under alkaline conditions.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY (Rat): Oral LD₅₀ >8000 mg/kg. Dermal >4000 mg/kg.

PROTECTIVE CLOTHING: Goggles.

HANDLING AND STORAGE CAUTIONS: Do not store below -20°C. Avoid breathing spray mist or contact with skin or eyes.

Phenmediphame — see Phenmedipham.

Phenobenzuron — see Benzomarc*.

Phenostat-A* — see Triphenyltin Acetate.

Phenostat-C* — see Triphenyltin Chloride.

Phenostat-H* — see Triphenyltin Hydroxide.

Phenotan* — see Aretit*.

Phenoterb* — see Dinoterb Salts.

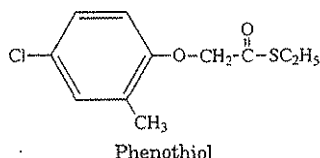
Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Phenothiol

BP: Hokko Chemical Industry Co., Ltd. (Herbit*)

IdentificationCOMMON NAMES: Phenothiol (JMAF); MCPA-thioethyl (ISO, BSI).
CODE NUMBER: CAS 25319-90-8.**Chemistry**COMPOSITION: S-ethyl (4-chloro-o-tolyloxy)thioacetate (IUPAC).
PROPERTIES: White needle crystal. Melting point 41-42°C; boiling at 165°C/7 mmHg.**Action/Use**ACTION: Selective hormone type herbicide.
USE: Controls broadleaf, cyperaceous weeds in rice, cereal fields.
FORMULATIONS: Emulsifiable concentrate, granule.
COMBINATIONS: With Simetryne or DCPA.**Environmental Guidelines**

SOLUBILITY: Slightly soluble in water (2.3 ppm at 25°C).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Mouse): Oral LD₅₀ 811 mg/kg; 749 mg/kg (female).

HANDLING AND STORAGE CAUTIONS: Keep cool and dry.

Emergency Guidelines

FIRST AID: Ingestion, induce vomiting.

Phenothioxin**Identification**

CODE NUMBERS: CAS 262-20-4; SHA 0664301.

Action/Use

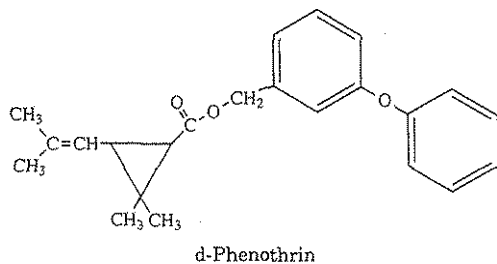
ACTION: Insecticide.

d-PhenothrinBP: Sanachem (Pty) Ltd.
Sumitomo Chemical Co., Ltd.**Identification**

TRIVIAL NAME: d-phenothrin

EXP. CODE NUMBER: S-2539 Forte.

OTHER CODE NUMBERS: CAS 26046-85-5; OMS 1810 (WHO); ENT 27972.

ChemistryCOMPOSITION: 3-phenoxybenzyl (1R)-cis/trans chrysanthemate.
PROPERTIES: Yellow to yellow brown liquid. Specific gravity d₄²⁰ 1.06. Miscible with most organic solvents at 20-25°C.**Action/Use**

ACTION: Insecticide.

USE: For stored grain; sanitary uses. Flying and crawling insect control for household, industrial locations and outdoor use. For human lice, flea in pet animals, stored grain insect control.

FORMULATIONS: Emulsifiable concentrate, aerosol, oil liquid, powder, shampoo, lotion.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg. Dermal LD₅₀ >10,000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Ordinary good practices and sanitation. Ventilate well. Store in closed drum in cool, dry place.

Phenoxathiin**Chemistry**

PROPERTIES: Chemically similar to phenothiazine, except an oxygen atom in place of the amine group.

Action/Use

ACTION: Insecticide.

Phenoxy Compounds — see Chlorophenoxy Herbicides.**Phenoxy Solventless Esters**

(Discontinued 1992 by Agrolinz Inc. (U.S.A.))

Chemistry

COMPOSITION: Esters of 2,4-D, 2,4-DB, 2,4-DP MCPA, and MCPP which make the phenoxy ester available to the weed.

Safety Guidelines

TOXICITY: Less toxic than esters with solvent.

Phenoxylene* Plus (MCPA) — Discontinued 1989 by Schering AG.**Phenpiazine** — see Quinoxaline.**Phenthoate**

BP: Hanwha Corp. (Kap*)

ISAGRO (Cidial*)

Nissan Chemical Industries, Ltd. (Elsan*)

Identification

COMMON NAMES: Phenthoate (ISO, BSI); PAP (JMAF).

TRIVIAL NAME: Dimephenthoate.

EXP. CODE NUMBERS: Bay 33051, S 2940 (Sumitomo Chemical Co. Ltd.).

OTHER CODE NUMBERS: CAS 2597-03-7; SHA 10491; OMS 1075 (WHO); ENT-27386.

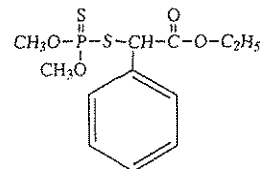
ADDITIONAL TRADE NAMES: Aimsan* (All India Medical).

DISCONTINUED NAME: Rogodial* (+ dimethoate), Tanone* (Agri-mont S.p.A.); Paphthion* (Sumitomo Chemical Co. Ltd.).

Chemistry

COMPOSITION: S-(α-ethoxycarbonylbenzyl) O,O-dimethyl phosphorodithioate (IUPAC).

PROPERTIES: Reddish-yellow liquid. Specific gravity 1.22; melting point 17.5°C. Miscible in all proportion with methanol, ethanol, benzene, xylene, acetone, cyclohexanone, methylcellosolve, carbon tetrachloride and carbon disulfide, ethyl ether, dioxane, and cyclo-hexane. Soluble, at 20°C, 12% in n-hexane, 17% in ligroin; soluble at concentrations above 20% in diethylene glycol and above.

**Action/Use**

ACTION: Insecticide-acaricide.

USE: Broad spectrum on crop pests (rice, cotton, vegetables, citrus and other fruits, tea, mulberry, tobacco), and on mosquitoes.

FORMULATIONS: Emulsifiable concentrate, wettable powder, oil solution, dust, granules.

Environmental GuidelinesHAZARDS: Fish: LC₁₀₀ 4.5 mg/l (goldfish). Bee: Toxic.

SOLUBILITY: Soluble, at 20°C, 0.02% in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 440 mg/kg.Dermal LD₅₀ 2100 mg/kg.

PROTECTIVE CLOTHING: Rubber gloves, respirator, rubber boots, long-sleeved clothes, long pants.

HANDLING AND STORAGE CAUTIONS: Must be stored in sealed original containers, stacked in such a way as to permit a free circulation of air also at the bottom and inside of the piles, in well-aired, fresh and dry storehouses or in shaded, well-aired places. Product temperature should not exceed 25-30°C. Keep away from sources of heat, free flames or spark-generating equipment. Storage areas must be located at a suitable distance from inhabited buildings, animal shelters, food stores inaccessible to unauthorized persons, children, and domestic animals. Biological activity of the product remains practically unvaried for 2 years under environmental conditions, provided the product is stored properly.

Emergency Guidelines

FLASHPOINT: 165-170°C. Nonflammable (Elsan*).

ANTIDOTE: Atropine.

Phentinoacetate — see Triphenyltin Acetate.**n-Phenyl phthalamic acid** — see Nevirol*Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Phenylaminocadmium Dilactate**Identification**

OTHER NAME: Anilino cadmium dilactate.
 CODE NUMBERS: CAS 19651-91-3; SHA 064601.

Action/Use

ACTION: Fungicide

Phenylaminocadmium Lactate — Phenylmercury Formamide**Identification**

CODE NUMBERS: CAS 19651-91-3 and 22394-47-0; SHA 064602.

Action/Use

ACTION: Seed treatment.

USE: For flax and cereal grains.

Phenylmercury Acetate — see PMA.

Phenylmercury Ammonium Acetate — see Setrete*.

n-Phenylmercury Ethylenediamine**Action/Use**

ACTION: Formerly for almonds, apples, pears.

Phenylmercury Formamide — see Phenylaminocadmium Lactate.

Phenylmercury Lactate**Action/Use**

ACTION: Fungicide.

USE: Formerly for early season application up to petal fall on apples.

Phenylmercury Monoethanol Ammonium Acetate**Identification**

TRADE NAME: Puratized Apple Spray*.

Action/Use

ACTION: Fungicide.

Registration Notes

U.S.: Formerly for apple and strawberry; food uses cancelled in 1969.

Phenylmercury Nitrate**Identification**

CODE NUMBERS: CAS 55-68-5; SHA 066016.

Action/Use

ACTION: Tree wound dressing.

Registration Notes

U.S.: Food uses cancelled 1969.

Phenylmercury 8-Oxyquinolate — see Quinex*.

Phenylmercury Salicylate**Identification**

CODE NUMBERS: CAS 28086-13-7; SHA 066019.

OTHER NAMES: Mercuriline, Mercusol.

Action/Use

ACTION: Seed treatment.

USE: Formerly for flax, grains, peanuts, peas, soybeans.

Phenylmercury Triethanol Ammonium Lactate**Identification**

CODE NUMBERS: CAS 23319-66-6; SHA 066021.

ADDITIONAL TRADE NAME: Puratized Agricultural Spray*.

Action/Use

ACTION: Fungicide.

USE: Formerly for apple scab, numerous other diseases of fruit and horticultural plants.

Phenylmercury Urea — see Agrox*; Leytosan*.

Phenylmercury-dimethyldithiocarbamate — see Thiram*.

Phenylphenol — Discontinued by Dow Chemical Co.

Phenylurea Herbicides

Some examples of phenylurea herbicides are:

Diuron (Karmex*) 3-(3,4-Dichlorophenyl)-1,1-dimethylurea.

Fenuron (Dybar*) 1,1-dimethyl-3-Phenyl-urea.

Linuron (Lorox*) 3-(3,4-Dichlorophenyl)-1-methoxy-1-methylurea.

Monuron (Telvar*) 3-(p-chlorophenyl)-1,1-dimethylurea.

Neburon 1-n-Butyl-3-(3,4-dichlorophenyl)-1-methylurea.

Siduron (Tupersan*) 1-(2-Methylcyclohexyl)-3-phenylurea.

Pherocon*

BP: Trece, Inc. (Pherocon*)

Action/Use

ACTION: Insect attractants and monitoring systems.

USE: Early warning monitoring systems for agricultural insect pests.

FORMULATIONS: Polymeric dispensers with pheromone or food attractants in traps of various designs.

Registration Notes

U.S.: No registrations required. No EPA restrictions.

Pheromone

The location and the mutual recognition of the male and female of an insect species are brought about by various sensory expedients, the most common of which is a chemical sex attractant secreted by special glands of one or both sexes. These secretions are called pheromones.

See Attractant.

Pheromone Dispensers — see Sticky Trapping Systems.

Phero-Tac* — see Hercon Disrupt*.

PHIMM

(Discontinued)

Chemistry

COMPOSITION: N-(Phenylmercuri)-1,4,5,6,7,7-hexachlorobicyclo (2.2.1) hept-5-ene-2,3-dicarboximide.

Action/Use

ACTION: Fungicide.

Phinco-T22* — see Permethrin; Piperonyl Butoxide; Tetramethrin.

Phix* — see PMA.

Phleomycin**Action/Use**

ACTION: Antibiotic fungicide isolated from streptomycetes cultures.

USE: Prevents, cures, rust of snap beans.

Phorate

BP: All India Medical Corp. (Granutox*)

American Cyanamid Co. (Geomet*, Granutox*, Thimet*)

Hubei Sanonda Co., Ltd.

Pesticides India (Vegfru Foratox*)

Voltas Ltd., Chemicals & Agro Products (Volphor* 10CG)

Identification

COMMON NAMES: Phorate (ISO, BSI, ANSI, ESA); timet (USSR).

EXP. CODE NUMBER: AC 8911; AC 35024.

OTHER CODE NUMBERS: CAS 298-02-2; SHA 057201.

ADDITIONAL TRADE NAME: Phorate 20G*, Rampart* (Platte Chemical).

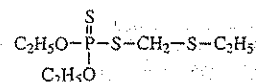
DISCONTINUED NAMES: AASTAR* (+ flucythrinate), Agrimet* (American Cyanamid Co.); Thimenox* (Crystal Chemical Inter-America); Phorate TSX* (+ etridiazole) (Platte Chemical).

Chemistry

COMPOSITION: O,O-Diethyl S-[(ethylthio)methyl] phosphorodithioate.

FAMILY: Organophosphate.

PROPERTIES: Pale straw to light brown; colorless to very light yellow liquid. Boiling point 118-120 °C. Stable in neutral and acidic conditions. Soluble in most organic solvents such as acetone and xylene. Miscible in xylene, vegetable oils, carbon tetrachloride, alcohols, ethers, and esters. Subject to hydrolysis under alkaline conditions.



Phorate

Action/Use

ACTION: Soil and systemic insecticide.

USE: Wide range of insects on a variety of crops: alfalfa, barley, beans, corn, cotton, peanuts, potatoes, sorghum, sugar beets, soybeans, sugarcane, and wheat.

FORMULATIONS: Granules.

COMBINATIONS: Holdem* (+ ethoprop). Tenax* (+ fonofos) (Platte Chemical).

Registration Notes

U.S.: Registered in 1959. Some or all applications may be classified as RUP.

OUTSIDE U.S.: In India extensively for brown plant hopper on rice.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 6-13 ppb (96 h) (rainbow trout); 2 ppb (96 h) (bluegill sunfish). Bee: Toxic. Bird: 0.62 mg/kg (mallard).

SOLUBILITY: In water, 50 mg/l at 25°C.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ 2-4 mg/kg. Dermal: (Guinea Pig) 20-30 mg/kg wet.

Thimet* 15G (Rabbit): Dermal 99 mg/kg (with water to form a paste/24 hr. continuous contact on clipped trunks of rabbits).

Dry granules: 1360 mg/kg.

PROTECTIVE CLOTHING: Wear freshly laundered, long-sleeved work clothing daily. Wear a clean cap and gloves (rubber or cotton) while transferring from package to equipment. If cotton gloves are used, they must be laundered or discarded after each day's use. Rubber gloves should be washed with soap and water after each use. Do not wear the same gloves for other work. Destroy and replace gloves frequently. In case of contact, immediately remove contaminated clothing and wash skin thoroughly with soap and water. Launder clothing before re-use. Wash thoroughly with soap and water before eating or smoking. Bathe at the end of the work day and change outer clothing. Do not breathe dust.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Phorate TSX

HANDLING AND STORAGE CAUTIONS: Thimet* and its formulations are highly poisonous by skin contact, inhalation or swallowing. Do not contaminate feed or foodstuffs. Keep out of reach of domestic animals. Not for use or storage in or around home. Shelf-life of Vegfru Foratox* is 2 years; tech Thimet* at least 2 years at room temperature.

Emergency Guidelines

ANTIDOTE: Atropine.

FIRST AID: In all instances, get medical aid.

Phorate TSX (phorate + etridiazole) — Discontinued 1992 by Platte Chemical.

Phosacetim — see Gophacide*.

Phosacetime — see Gophacide*.

Phosalone

BP: All India Medical Corp.
Gilmore, Inc.
Rhône-Poulenc (Azofene*, Zolone*)
Voltas Ltd., Chemicals & Agro Products

Identification

COMMON NAME: Phosalone (ISO, ANSI, BSI, ESA, JMAF).

EXP. CODE NUMBER: RP 11974 (Rhône-Poulenc).

OTHER CODE NUMBERS: CAS 2310-17-0; SHA 097701; ENT-27163.

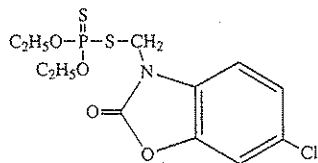
ADDITIONAL TRADE NAME: Rubitox*.

Chemistry

COMPOSITION: S-[(6-chloro-2-oxo-3(2H)-benzoxazolyl)methyl] O,O-diethyl phosphorodithioate (CAS).

FAMILY: Organophosphate.

PROPERTIES: White crystals, melting point 45-47°C. Soluble in methanol, ethanol and most aromatic solvents.



Phosalone

Action/Use

ACTION: Acaricide, insecticide.

USE: Pests (including lepidopterous, coleopterous, and piercing/sucking pests) on perennial crops, field crops, vegetables, ornamentals, cotton.

FORMULATIONS: Emulsifiable concentrate, wettable powder. Flowable.

COMBINATIONS: Dartone* (+ teflubenzuron), Faster* (+ pirimicarb), Ransbeck* (+ dichlorvos), Taxylone* (+ methyl-parathion) (all Rhône-Poulenc).

Registration Notes

OUTSIDE U.S.: Control of aphids, codling moth, cotton bollworms, rice stem borer, rice leaf and plant hoppers, psylla, rice hispa, chillies thrips and mites, tea mites and thrips, cardamon thrips and stem borer, sorghum midge, mango hoppers, etc.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic.

SOIL PARTICLE ADSORPTION: Preliminary data indicate ground-water contamination unlikely. Half life in soil ca. 7 days.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 120 mg/kg. (Rabbit): Dermal LD₅₀ 1530 mg/kg.

HANDLING AND STORAGE CAUTIONS: Do not store below 32°F. Do not transport or store with plants, seeds or foodstuffs.

Emergency Guidelines

ANTIDOTE: Atropine or 2-PAM.

Phosdiphen — see Baron*

Phosdrin* — see Mevinphos.

Phosethyl Al — see Fosetyl-Al.

Phosfene* — see Mevinphos.

Phosfolan — see Cyolane*.

Phosion*

(Discontinued 1981 by Mobil Chemical Co., Phosphorus Div.)

Identification

COMMON NAME: Chlorphonium (ISO-E, BSI); chlorfonium (ISO-F), tributyl chlorobenzylphosphonium (ISO).

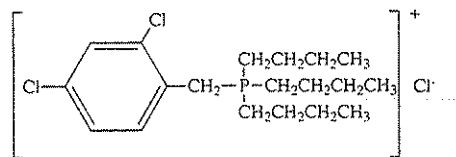
CODE NUMBERS: CAS 115-78-6 (chlorphonium chloride); SHA 080901.

ADDITIONAL TRADE NAME: Phosphon*.

PESTICIDE DICTIONARY

Chemistry

COMPOSITION: Tributyl-(2,4-dichlorobenzyl)phosphonium chloride.



Chlorphonium

Action/Use

ACTION: Plant growth regulator.

USE: Particularly used in ornamentals.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Oral LD₅₀ 178 mg/kg.

Phoskil* — see Parathion.

Phoskill* — see Monocrotophos.

Phosmet

BP: General Quimicas, S.A. (Fosdan*)

Gowan Co. (Imidan*)

Inquinosa

Productos OSA S.A.C.I.F.I.A. (Inovat*)

ZENECA Ag Products (Imidan*, Prolate*)

Identification

COMMON NAMES: Phosmet (ISO, BSI, ESA); phtalofos (USSR); PMP (JMAF).

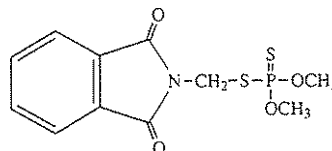
EXP. CODE NUMBER: R-1504 (ZENECA Ag Products).

OTHER CODE NUMBERS: CAS 732-11-6; SHA 059201.

ADDITIONAL TRADE NAMES: Appa*, Kemolate*.

Chemistry

COMPOSITION: O,O-dimethyl phosphorodithioate S-ester with N-(mercaptomethyl)phthalimide (CAS 8CI).



Phosmet

Action/Use

ACTION: Insecticide.

USE: Variety of crops including alfalfa, almonds, apples, apricots, cherries (tart), citrus, corn, cotton, cranberries, pecans, blueberries, grapes, nectarines, peaches, pears, peas (Pacific Northwest), potatoes, plums/prunes and certain deciduous shade and ornamental trees and woody evergreens and Christmas trees. Against a wide range of insects such as alfalfa weevil, boll weevil, codling moth, leafrollers, plum curculio, grape berry moth, oriental fruit moth, and many others.

FORMULATIONS: Wettable powder.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ 147-316 mg/kg. (Rabbit): Dermal LD₅₀ >4640 mg/kg.

PROTECTIVE CLOTHING: Hat, long-sleeved shirt, long-legged trousers or coveralls, chemical-resistant gloves for mixing.

Emergency Guidelines

ANTIDOTE: Atropine by injection.

FIRST AID: Eyes, Skin, flush with plenty of water. Ingestion, drink water and induce vomiting. Cholinesterase inhibitor.

EMERGENCY TELEPHONE: 800-327-8633 (ZENECA).

Phosnichlor

Identification

COMMON NAMES: Nichlorfos (France), phosnichlor (ISO, BSI).

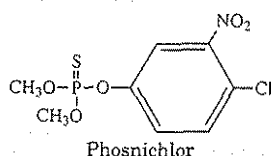
CODE NUMBERS: CAS 2463-84-5; SHA 034502.

Chemistry

COMPOSITION: O-4-Chloro-3-nitrophenyl O,O-dimethyl phosphorothioate (IUPAC).

PROPERTIES: Similar in structure to methyl parathion.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

**Action/Use**

ACTION: Insecticide.

Phosphamidon

BP: All India Medical Corp.
 Bharat Pulverising Mills Ltd. (D-CON*)
 Ciba, Ltd. (Dimecron*)
 Hui Kwang Chemical Co., Ltd. (Phosron*)
 Khatau Junker Ltd. (Khatau Midon*)
 Lupin Agrochemicals (I) Ltd.
 National Organic Chemical Industries Ltd. (Gildon*)
 Pilarquim Corp. (Pilarcron*)
 Sudarshan Chemical Industries Ltd. (Sumidon*)
 United Phosphorus Ltd. (Umecron*)

Identification

COMMON NAME: Phosphamidon (ISO, ANSI, BSI, ESA).

EXP. CODE NUMBER: C 570 (Ciba-Geigy Ltd.).

OTHER CODE NUMBERS: CAS 13171-21-6; SHA 018201; OMS 1325 (WHO); ENT-25515.

ADDITIONAL TRADE NAME: Phos-Sul* (Sulphur Mills Ltd.).

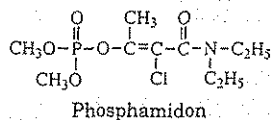
DISCONTINUED NAMES: Apamidon* (KenoGard AB), Dixon* (Quimica Estrella), Swat* (Ciba-Geigy).

Chemistry

COMPOSITION: 2-Chloro-2-diethylcarbamoyl-1-methyl-vinyl dimethyl phosphate.

FAMILY: Organophosphates.

PROPERTIES: Pale yellow liquid. Miscible with most organic solvents except paraffins, 3.2% in hexane at 25°C.

**Action/Use**

ACTION: Systemic insecticide with strong stomach action.

USE: Dimecron* for sucking insects, stemborers in rice, aphids in various crops.

FORMULATIONS: Liquid, soluble concentrates, ULV for waterless spraying.

Registration Notes

U.S.: Swat* voluntarily cancelled for use on cotton.

OUTSIDE U.S.: RUP.

Environmental Guidelines

HAZARDS: Bee: Highly toxic. Toxic to fish, birds, and wildlife.

SOIL PARTICLE ADSORPTION: Of brief persistence; initial half life in and on plants is 1-5 days as a rule.

SOLUBILITY: Miscible with water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 17-30 mg/kg. (Rabbit): Dermal LD₅₀ 267 mg/kg.

PROTECTIVE CLOTHING: Wear a pesticide respirator jointly approved by the Mining Enforcement and Safety Administration and by the National Institute for Occupational Safety and Health. Wear natural rubber gloves, protective clothing, and goggles.

HANDLING AND STORAGE CAUTIONS: Poisonous if swallowed, inhaled, or absorbed through skin. Do not contaminate feed or food-stuffs. Do not get in eyes, on skin or clothing. Do not breathe mist. Keep container closed. Wash thoroughly after handling. Do not drink any alcoholic beverage before or during spraying as alcohol promotes absorption of organic phosphates.

Emergency Guidelines

ANTIDOTE: Atropine. Oxime preparations (PAM or Toxogonin) under medical supervision.

Phosphine — see Aluminum Phosphide.

Phosphinon**Chemistry**

COMPOSITION: O,O-Diethyl O-(1-(2-chloroethoxy)-2,2-dichlorovinyl) phosphate.

Action/Use

ACTION: Insecticide.

Phosphon* — see Phosfon*.

Phosphopyron* — see Endothion.

Phosphoric Acid — see Limalum*.

Phosphorus**Identification**

CODE NUMBERS: CAS 7723-14-0; SHA 066502.

Action/Use

ACTION: Insecticide, rodenticide.

USE: Has been used as an insecticide in pastes made by grinding yellow phosphorous in the presence of water and mixing with flour. Glycerin sometimes is used as an ingredient. The phosphorus paste was used for the American cockroach and rats.

Phosron* — see Phosphamidon.

Phos-Sul* — see Phosphamidon.

Phostebupirim — see Tebupirimphos.

Phostek* — see Aluminum Phosphide.

Phostex*

(Discontinued 1966 by Niagara Chemical Co.)

Identification

EXP. CODE NUMBERS: NIA-1137 (Niagara Chemical Co.); FMC-1137 (FMC Corp.).

OTHER CODE NUMBERS: CAS 69042-28-0; SHA 293200.

Action/Use

ACTION: Miticide.

Phosvel*

(Discontinued by Velsicol Chemical Corp.)

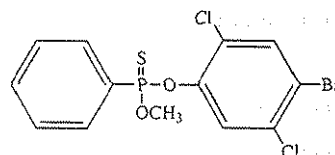
Identification

COMMON NAMES: Leptophos (ISO, ANSI, BSI, ESA); MBCP (JMAF).

CODE NUMBERS: CAS 21609-90-5; SHA 525300; OMS 1438 (WHO).

Chemistry

COMPOSITION: O-(4-Bromo-2,5-dichlorophenyl) O-methyl phenylphosphonothioate.

**Action/Use**

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 52.8 mg/kg. Dermal LD₅₀ >10,000 mg/kg.

Phosvin* — see Zinc Phosphide.

Phosvit* — see DDVP.

Photomirex

A toxic breakdown by-product of ferriamicide formed by exposure to sunlight.

Phoxim — see Baythion*.

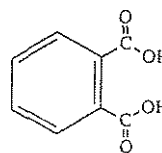
Phthalofos — see Phosmet.

Phthalate de Butyle — see Dibutyl Phthalate

Phthalanilic Acid — see Nevirol*.

Phthalates

Phthalates are organic compounds based on phthalic acid. Dimethyl phthalate and dibutyl phthalate are insect repellents; dioctyl phthalate is an orchard acaricide.

**Phthalimide****Identification**

CODE NUMBER: CAS 85-41-6.

Chemistry

COMPOSITION: 1,3-Isoindoleidione (CAS).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Fungicide.

Phthalonitrile**Chemistry**

COMPOSITION: 1,2-Dicyanobenzene.

Action/Use

ACTION: Insecticide, synergist.

Phthalthrin — see Pyrethroids; Tetramethrin.

Phyban* H.C. (MSMA) — Discontinued by Ansul Co.

Phygon* Fungicide (dichlone) — Discontinued 1974 by Uniroyal Chemical Co., Inc.

Phynazol (ethephon) — Discontinued 1984 by Chemiekombinat Bitterfeld VEB.

Phymone* Plant Growth Regulator (alpha-naphthylacetic acid) — Discontinued 1984 by ICI Agrochemicals.

Physical Constants

Numerical values, such as molecular weight, melting point, boiling point or range, specific gravity (or density), vapor pressure, viscosity, refractive index, flashpoint.

Physical Properties

Examples are solubility, volatility, flammability, state of being (solid, liquid or gas).

Phytar* — see Cacodylic Acid.

Phytar 138* Herbicide (cacodylic acid) — Discontinued by Inter-Ag Corp.

Phytar 560* Herbicide (cacodylic acid + sodium cacodylate) — Discontinued by Drexel Chemical Co.

Phyto Bordeaux* — see Copper Sulfate, Basic.

Phytoactin*

(Discontinued by P-L Biochemicals, Inc.)

Identification

CODE NUMBERS: CAS 11005-09-7; SHA 006316.

Chemistry

COMPOSITION: Polyamidohydrostreptin.

Action/Use

ACTION: Antibiotic fungicide.

Phytomycin***Chemistry**

COMPOSITION: Streptomycin nitrate.

See Streptomycin.

Phyton-27*

BP: Source Technology Biologicals, Inc.

Identification**Chemistry**

COMPOSITION: Tannate complex of picro cupric ammonium formate (PCAF).

PROPERTIES: Thick, dark green liquid having a sweet smell.

Action/Use

ACTION: Systemic fungicide, bactericide.

USE: Broad spectrum, having low phytotoxicity characteristics, can be applied as a spray, fog and soil drench, used as a dip or tree injection for disease control and prevention on many ornamental crops and trees. Systemic, leaving no residue and utilizing low amounts of copper per application.

FORMULATIONS: Water-soluble liquid.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 4500 mg/kg body weight. TWA = 1700 mg/m³.

PROTECTIVE CLOTHING: Wear protective equipment.

HANDLING AND STORAGE CAUTIONS: Avoid contact. Do not refrigerate or store below 45°F.

Emergency Guidelines

FLASHPOINT: Nonflammable. Noncombustible.

FIRST AID: Get immediate medical aid. Eyes, flush with ample water for a minimum of 15 minutes. Skin, wash with ample water.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

See Copper Sulfate.

Phytophthora palmivora — see DeVine*.

Phytosol* — see Agritox*.

Phytotoxicity

Degree to which a material is injurious (poisonous) to vegetation. It is specific for particular kinds or types of plants.

Phytox MZ80* — see Mancozeb.

Pic Brom* — see Chloropicrin.

Pic-Clor* — see Chloropicrin.

Picfume* Fumigant (chloropicrin) — Discontinued by Dow Chemical Co.

Picloram

BP: DowElanco (Grazon*, Tordon*)

Identification

COMMON NAMES: Picloram (ISO-E, ANSI, BSI, JMAF, WSSA); piclorame (ISO-F).

CODE NUMBERS: CAS 1918-02-1; SHA 005101.

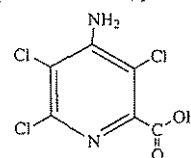
ADDITIONAL TRADE NAME: Pinene* (Diachem S.P.A.).

DISCONTINUED NAMES: Amdon* (Union Carbide Corp.); Borolin*, K-Pin* (both Dow Chemical).

Chemistry

COMPOSITION: 4-Amino-3,5,6-trichloropicolinic acid (IUPAC).

PROPERTIES: Decomposes at 215°C, photodegrades, nonvolatile.



Picloram

Action/Use

ACTION: Systemic herbicide.

USE: For wide variety of deep-rooted broadleaf weeds and woody plants. Most grasses are resistant. Noncrop use in brush control along utility rights-of-way on forest sites, for weed and brush control in pastures and rangeland, and broadleaf weed control in small grains.

FORMULATION: Water-soluble liquid.

COMBINATIONS: Access* (+ triclopyr), Grazon* P + D, Pathway*, Tordon* 101 Mixture (all with 2,4-D) (all DowElanco).

Registration Notes

U.S.: All applications RUP except Pathway* and Tordon* RTU.

Tolerances granted for picloram in grass, meat, meat products and milk on April 9, 1971 and in small grains on May 11, 1976.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ 19.3 mg/l (rainbow trout); 14.5 - 44.5 (bluegill). Bee: Nontoxic.**Safety Guidelines**

SIGNAL WORD: WARNING (Grazon* P + D, Grazon* PC, Pathway*, Tordon* 101 Mixture, Tordon* K); CAUTION (Access*).

TOXICITY CLASS: II (Grazon* P + D, Grazon* PC, Pathway*, Tordon* 101 Mixture, Tordon* K); IV (Access*).

TOXICITY: (Rat, female): Oral LD₅₀ 8200 mg/kg.

PROTECTIVE CLOTHING: Chemical goggles.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. Liquid formulations may cause irritation. Avoid contact with skin and eyes, avoid breathing spray mist, wash thoroughly after handling. Keep container closed. Do not cut or weld container. Do not contaminate water used for irrigation or domestic purposes.

Emergency GuidelinesFIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, induce vomiting if large amounts are ingested.

Piclorame — see Picloram.

Pictyl* Insecticide (fenoxycarb) — Discontinued 1989 by Maa Agrochemicals.

Piggyback — see Sequential Treatment.

Pik-Off*

(Discontinued by Ciba-Geigy)

Identification

TRIVIAL NAME: Glyoxime.

EXP. CODE NUMBER: CGA-15281.

OTHER CODE NUMBERS: CAS 557-30-2; SHA 425300.

Chemistry

COMPOSITION: Ethanediol dioxime.



Glyoxime

Action/Use

ACTION: Growth regulator (abscission agent).

Safety Guidelines

SIGNAL WORD: WARNING (tech); CAUTION (Pik-Off* 10SL).

TOXICITY CLASS: II (tech); III (Pik-Off* 10SL).

TOXICITY: Tech (Rat): Oral LD₅₀ 185 mg/kg. Inhalation LC₅₀ <0.030 mg/l for 4 hours. (Rabbit): Dermal LD₅₀ 1580 mg/kg. Eye irritation, mild; skin irritation, nonirritating.Pik-Off* 10SL (Rat): Oral LD₅₀ 1175 mg/kg. (Rabbit): Dermal LD₅₀ <3000 mg/kg. Eye irritation, minimal; skin irritation, non-irritating.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Pilier* — see Beta-cyfluthrin; Fenitrothion.

Pillarben* — see Benomyl.

Pillarcron* — see Phosphamidon.

Pillarfulan* — see Carbofuran.

Pillarich* — see Chlorothalonil.

Pillarmate* — see Methomyl.

Pillarquat* — see Paraquat.

Pillarset* — see Butachlor.

Pillarstin* — see Carbendazim.

Pillartex* — see Fenthion.

Pillarthere* — see Acephate.

Pillarxone* — see Paraquat.

Pillarzo* — see Alachlor.

Pilot* — see Quizalofop-ethyl.

Pilot Super* — see Quizalofop-P-ethyl.

Pimaricin

Identification

OTHER NAME: Myprozine.

Action/Use

ACTION: Antifungal antibiotic.

Pimelic Ketone — see Cyclohexanone.

Pindone — see Pivalyn*.

PIN-DOWN*

BP: Trece, Inc. (PIN-DOWN*)

Action/Use

ACTION: Insect sex pheromone/mating disruptant.

USE: For control of tomato pinworm by pheromone-mediated mating disruption.

FORMULATIONS: Pheromone dispenser system.

Registration Notes

Experimental use only at an application site of a cooperator and in accordance with the terms and conditions of the EUP.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

Pine Oil

Identification

CODE NUMBERS: CAS 8002-09-3; SHA 067002.

Action/Use

ACTION: Solvent, insecticide, and insect repellent.

USE: Possesses some fungicidal and disinfectant properties.

Pine Plus*

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: D'Limonene and Selected Emulsifiers.

Action/Use

ACTION: Pine Surfactant/Penetrant/Masking Agent.

USE: For use as a surfactant/penetrant for penetration through heavy canopies, works as a masking agent for herbicides that contain strong aromatic characteristics.

FORMULATION: Concentrated liquid.

Pinene* — see Picloram.

Pinene II*

BP: Drexel Chemical Co. (Pinene II*)

Identification

OTHER CODE NUMBERS: CAS 31393-98-3.

Chemistry

COMPOSITION: Terpenic polymer.

FAMILY: Terpenes.

PROPERTIES: Viscous amber liquid. Terpene odor.

Action/Use

ACTION: Spreader/sticker, extender.

USE: Compatible with most spray tank mixtures of pesticides and soluble fertilizer products. Softens plant cuticle and increases rate of absorption; improves rainfastness.

Environmental Guidelines

SOLUBILITY (IN WATER): Emulsifies.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY CLASS: (Rat): Oral LD₅₀ >34g/kg.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated area.

SPILL CONTROL/CLEANUP: Pick up spill with absorbent material.

PRODUCT/WASTE DISPOSAL: Dispose of in accordance with local, federal, and state regulations.

Emergency Guidelines

FLASHPOINT: >270°F.

FIRE EXTINGUISHING MEDIA: Water spray, dry chemical, carbon dioxide, foam.

FIRST AID: Get medical aid, treat symptomatically. **Eyes,** flush with plenty of water for 15 minutes. **Skin,** flush affected area with water. Remove contaminated clothing and launder before reuse. **Inhalation,** remove victim to fresh air. **Ingestion,** induce vomiting.

Pinethyrene — see Transfilm*.

Pinnacle*

BP: Du Pont Agricultural Products (Pinnacle*)

Identification

COMMON NAME: Thifensulfuron-methyl (ISO, ANSI, BSD).

TRIVIAL NAME: Thiameturon-methyl.

EXP. CODE NUMBER: DPX-M6316.

OTHER CODE NUMBERS: CAS 79277-27-3; SHA 128845.

DISCONTINUED NAME: Harmony* M (+ metsulfuron-methyl) (Du Pont).

Chemistry

COMPOSITION: Methyl 3-[[[(4-Methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]-2-thiophenecarboxylate (CAS).

FAMILY: Sulfonylurea.

PROPERTIES: White solid. Melting point 186°C. Low solubility in organic solvents.

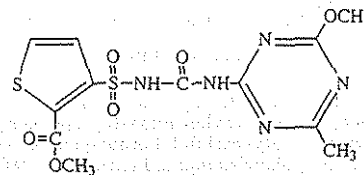
Action/Use

ACTION: Herbicide.

USE: Selective postemergence broadleaf and weed control in soybeans. Postemergence broadleaf weed control in barley, durum, and wheat when used in Harmony Extra* premix.

FORMULATIONS: Dry flowable.

COMBINATIONS: Cheyenne* Herbicide [Twin Pack of Cheyenne* FM (fenoxaprop-P-ethyl + MCPA) & X-TRA* (thifensulfuron-methyl + tribenuron-methyl)] (AgrEvo USA Co.); Concert and Synchrony* STS* (+ chlorimuron-ethyl), Harmony* Extra (+ tribenuron-methyl); Binex M* (+ pyridate).



Pinnacle*

Environmental Guidelines

SOLUBILITY: Water, 2400 ppm at 25°C pH 6.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes or clothing. Wash contaminated clothing with soap and hot water before reuse. Store in original container only, away from other pesticides, fertilizer, food or feed. Do not contaminate water, food or feed by storage or disposal. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Container disposal: triple rinse (or equivalent), then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or incineration or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Emergency Guidelines

FIRST AID: **Eyes,** flush with plenty of water. **Skin,** wash with plenty of soap and water. Get medical aid if irritation persists.

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Pinolene*

BP: Miller Chemical & Fertilizer Corp. (Nu-Film*-17, Nu-Film*-P, Vapor-Gard*)

Identification

DISCONTINUED NAME: Miller-Aide*.

Chemistry

COMPOSITION: Di-1-p-menthene.

Action/Use

ACTION: Sticker-spreader, extender, anti-transpirant.

USE: Nu-Film-P* compatible with commonly used pesticides to increase spray efficiency. Nu-Film-17* (used with limitations) as extender to increase biological activity of many insecticides and fungicides. Vapor Gard* to prevent winter damage on evergreens; a spray or dip for vegetable and ornamental transplants; improves size and storage quality of many tree fruits.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Pinoran* (difenoxuron) — Discontinued by Ciba-Geigy Ltd.**PinUp*** — see Glyphosate.**Piperaiin** — see Pipron*.**Piperine****Chemistry**

COMPOSITION: Naturally occurring acid amide which makes up 4-10% of black pepper berries. Piperine possesses the methylenedioxyphenyl group common to most pyrethrum synergist molecules such as that of piperonyl butoxide.

Action/Use

ACTION: Insecticide.

USE: Used in sprays against the house fly; knockdown is slow.

COMBINATIONS: Mixtures of piperine and pyrethrum extract in a petroleum base were patented some years ago.

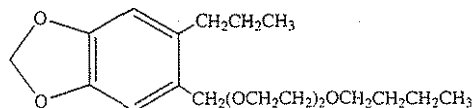
Piperonyl ButoxideBP: Endura S.p.A. (Tech, Endura PB 80 EC*, Ultra PBO* 94%)
McLaughlin Gormley King Co.
Prentiss Incorporated (Prentox* Tech, Prentox* PBO-8*)
Roussel Uclaf Corp. (Butacide*)**Identification**

COMMON NAMES: Piperonyl butoxide (ISO-E, BSI, BAN, ESA); piperonyl butoxyde (ISO-F).

CODE NUMBERS: CAS 51-03-6; SHA 067501.

ADDITIONAL TRADE NAME: Pybuthrin*.

DISCONTINUED NAME: Alleviate* (+ allethrin) (Fairfield American Corp.)



Piperonyl Butoxide

ChemistryCOMPOSITIONS: α -[2-(2-Butoxyethoxy)ethoxy]-4,5-methylenedioxy-2-propyltoluene; or 3,4-methylenedioxy-6-propylbenzyl (butyl) diethylene glycol ether; or butyl carbitol 6-propylpiperonyl ether.

PROPERTIES: Pale yellowish liquid. Boiling point 180°C at 1 mm/Hg. Specific gravity 1.055 at 20/20°C. Soluble in common organic solvents and in petroleum base oils used as solvents. Forms clear solutions with liquefied gases used as propellents for aerosols.

Action/Use

ACTION: Synergist.

USE: Highly synergistic action on pyrethrins, allethrin, permethrin, tetramethrin, rotenone, and others when combined with these insecticides. FORMULATIONS: Dust, emulsifiable concentrate, fogger, paper coating, pressurized spray, solution, wettable powder.

COMBINATIONS: Prentox* Pyronyl* (+ pyrethrins) (Prentiss Incorporated); Derringer* and Scourge* (+ resmethrin), Nusyn-Noxfish*, PB-Nox* and Rotacide* (+ rotenone), Pyrenone* (+ pyrethrins) (all Roussel Uclaf Corp.); Duracide* 15 (+ tetramethrin); Py-Rin* (+ pyrethrum) (Wilbur-Ellis Co.); PT* 1100, PT* 1600A (+ pyrethrins) (Whitmore Research Laboratories); Phinco-T22* (+ permethrin + tetramethrin) (VAPCO).

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

SOLUBILITY: Very slight solubility in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >7500 mg/kg.

HANDLING AND STORAGE CAUTIONS: Ventilate well. Store in closed drum in cool, dry place.

Emergency Guidelines

FLASHPOINT: 171°C (Open Cup).

Piperonyl Butoxyde — see Piperonyl Butoxide.**Piperonyl Cyclonene**

(Discontinued)

Chemistry

COMPOSITION: Piperonyl cyclohexenone.

Action/Use

ACTION: Insecticide synergist.

Piperophos — see Avirosan*.**Pipron***

BP: DowElanco

Identification

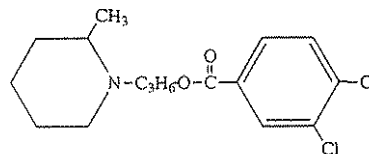
COMMON NAME: Piperalin.

CODE NUMBERS: CAS 3478-94-2; SHA 097003.

Chemistry

COMPOSITION: 3-(2-Methylpiperidino)propyl 3, 4-dichlorobenzoate.

PROPERTIES: Viscous, amber liquid, boiling at 156-157°C at 20 mm/Hg.



Piperalin

Action/Use

ACTION: Fungicide.

USE: For powdery mildew in rose, lilac, dahlia, phlox, zinnia, chrysanthemum, catalpa, and certain other ornamentals.

FORMULATIONS: Liquid concentrate.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2500 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in original container. Keep out of reach of children. Do not re-use empty container, destroy it. Avoid contact with skin and eyes. May be harmful if swallowed. Do not contaminate water, food or feed.

Emergency Guidelines

FLASHPOINT: 168°F.

Piprotal**Identification**

COMMON NAME: Piprotal (ESA).

CODE NUMBER: CAS 5281-13-0.

Chemistry

COMPOSITION: Piperonal bis[2-(2-butoxyethoxy)ethyl]acetal (CAS 8CI).

Action/Use

ACTION: Synergist.

USE: Synergistic with pyrethrum and carbamate insecticides.

Environmental Guidelines

HAZARDS: Bee: Nontoxic when mixed with insecticides.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ approx. 4400 mg/kg.**Piran*** — see Chlordane; DDVP; Dibromochloropropane.**Pirazinon**

(Discontinued 1992 by Ciba-Geigy Ltd.)

Identification

CODE NUMBER: CAS 5826-91-5.

EXP. CODE NUMBER: G-24622.

Chemistry

COMPOSITION: O,O-Diethyl O-(6-methyl-2-propyl-4-pyrimidinyl)phosphorothioate (CAS 8 and 9CI).

Action/Use

ACTION: Insecticide.

Piretro* — see Dimethoate.**Piridane*** — see Chlorpyrifos.**Pirimicarb**

BP: Hubei Sanonda Co., Ltd.

Rotam Group (Romicarb*)

ZENECA Agrochemicals (Aficida*, Aphox*, Fernos*,

Primor*, Rapid*)

Identification

COMMON NAMES: Pirimicarb (ISO-E, ANSI, BSI, JMAF); pyrimicarbe (France).

EXP. CODE NUMBER: PP062 (ICI Agrochemicals).

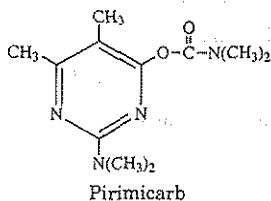
OTHER CODE NUMBERS: CAS 23103-98-2; SHA 106101; OMS 133 (WHO); ENT-27766.

DISCONTINUED NAME: Abol* (ICI Agrochemicals).

Chemistry

COMPOSITION: 2-Dimethylamino-5,6-dimethylpyrimidin-4-yl dimethylcarbamate (IUPAC).

PROPERTIES: Aqueous solutions unstable to UV light. Vapor pressure 1.6×10^{-6} mm Hg at 25°C. Soluble in most organic solvents.Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.



Action/Use
ACTION: Selective aphicide.
USE: For both OP-resistant and non-OP-resistant strains. Acts by contact, translaminar, systemic action, vapor. For a wide range of crops including cereals, sugar beet, potatoes, fruit, vegetables.
FORMULATIONS: Aerosol, dispersible grains, dispersible powders, emulsifiable concentrates, smoke generator, ULV spray.
COMBINATION: Faster* (+ phosalone) (Rhône-Poulenc).

Environmental Guidelines
HAZARDS: Fish: Nontoxic. Bee: Nontoxic.
SOLUBILITY: In water 0.27%.

Safety Guidelines
SIGNAL WORD: WARNING.
TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 147 mg/kg.
 Dermal LD₅₀ >500 mg/kg. Relatively nontoxic to beneficial predators, parasites, and bees.

Emergency Guidelines
ANTIDOTE: Atropine.

Pirimiphos-Ethyl — see Primicid*.

Pirimiphos-Ethyl — see Primicid*.

Pirimiphos-Methyl

BP: Wilbur-Ellis Co. (Actellic*)
 ZENECA Agrochemicals (Actellifog*, Blex*, Silosan*)
 ZENECA Public Health

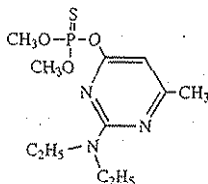
Identification

COMMON NAMES: Pirimiphos-methyl (ISO-E, ANSI, BSI, ESA); pyrimiphos-méthyl (ISO-F).
EXP. CODE NUMBER: PP-511 (ICI Agrochemicals).
OTHER CODE NUMBER: CAS 29232-93-7.

Chemistry

COMPOSITION: O-(2-Diethylamino-6-methylpyrimidin-4-yl) O,O-dimethyl phosphorothioate.

PROPERTIES: Miscible with most organic solvents. Vapor pressure 1.1 x 10⁻⁴ torr at 30°C; boiling point >282°F, 139°C.



Pirimiphos-methyl

Action/Use

ACTION: Fast acting broad-spectrum insecticide.
USE: Controls wide range of pests of stored grain.
FORMULATIONS: Emulsifiable concentrate.

Registration Notes

U.S.: Actellic* for export grains, domestic stored corn and sorghum.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic in some situations. Bird: (Oral) LD50 30-80 mg/kg (hen).
SOLUBILITY: In water approx. 5 ppm at 30°C.

Safety Guidelines

SIGNAL WORD: WARNING (Actellic*).

TOXICITY CLASS: II (Actellic*).

TOXICITY: (Rat): Oral LD₅₀ >2000 mg/kg (female). Dermal LD50 >4592 mg/kg (female).

PROTECTIVE CLOTHING: Wear goggles or face shield when handling.
HANDLING AND STORAGE CAUTIONS: Do not contaminate water, food or feed by storage or disposal. Do not reuse empty container. Store in a cool, dry place and protect from freezing. If accidentally frozen reconstitute by gently warming to room temperature and thoroughly mixing contents. Keep container closed when not in use.

Emergency Guidelines

FLASHPOINT: 120°F, 48.9°C (Setaflash CC).

FIRE EXTINGUISHING MEDIA: Water fog, foam, carbon dioxide, dry chemical, halogenated agents.

ANTIDOTE: Atropine, PAM.

FIRST AID: **Ingestion,** do NOT induce vomiting. Call a physician immediately. **Skin,** wash with plenty of soap and water. Get medical attention if irritation persists. **Inhalation,** remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Pirimor* — see Pirimicarb.

Pirine* — see Permethrin.

Piscicide

A material used primarily for the control of fish. Some piscicides are selective.

Pivacin* Rodenticide (pindone) — Discontinued.

Pival — see Pivalyn*.

Pival Parakakes* Rodenticide (pindone) — Discontinued 1993 by Motomco Ltd.

Pival* Rodenticide (pindone) — Discontinued 1993 by Motomco Ltd.

Pivaldione — see Pivalyn*.

Pivalyn*

BP: Motomco Ltd. (Pivalyn*)

Identification

COMMON NAMES: Pindone (ISO, BSI); pivaldione (France); pival (Turkey).

CODE NUMBERS: CAS 83-26-1; SHA 067703.

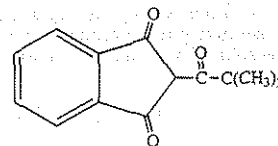
DISCONTINUED NAMES: Pival*, Pival Parakakes (Motomco Ltd.); Pivacin*; Tri-ban*.

Chemistry

COMPOSITION: 2-Pivalyl-1,3-indandione (CAS 8CI).

FAMILY: Indandione.

PROPERTIES: Tasteless and odorless, rodents do not develop bait shyness after feeding.



Pindone

Action/Use

ACTION: Anticoagulant rodenticide.

USE: Imparts resistance in cereal baits to insect infestation and molds. Controls Norway rats, roof rats, and house mice.

FORMULATIONS: Concentrate, powder.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. Baits should be placed in areas inaccessible to children, pets, wildlife, and domestic animals or in tamper-resistant bait boxes.

Emergency Guidelines

ANTIDOTE: If swallowed by humans, domestic animals, or pets, may reduce clotting ability of the blood and cause bleeding. Intramuscular and oral administration of Vitamin K₁ combined with blood transfusions are indicated as in the case of hemorrhage caused by overdose of bishydroxycoumarin.

See also Anticoagulant-Rodenticide.

Pix* — see Mepiquat Chloride.

PKhNB — see PCNB.

Place-Pax* Rodenticide (warfarin) — Discontinued by HACCO, Inc.

Planavin*

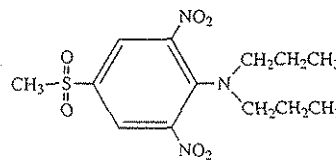
(Discontinued 1984 by Shell International Chemical Co. Ltd.)

Identification

COMMON NAME: Nitralin (ISO, BSI, JMAF, WSSA).

EXP. CODE NUMBER: SD 11831 (Shell Chemical Co.).

OTHER CODE NUMBERS: CAS 4726-14-1; SHA 037601.



Nitralin

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: 4-Methylsulphonyl-2,6-dinitro-N,N-dipropylaniline (IUPAC).

Action/Use

ACTION: Selective preemergence herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Mouse): Oral LD₅₀ >2000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

Planete* — see Anvil*; Carbendazim; Chlorothalonil; Fenpropidin.

Planete Aster* — see Anvil*.

Planofix* Plant Growth Regulator (1-naphthaleneacetic acid)

— Discontinued by ICI Ltd.

Planotox* — see 2,4-D.

Plant Growth Regulator

A preparation which, in minute amounts, alters the behavior of ornamental or crop plants or the produce thereof through physiological (hormonal) rather than physical action. May act to accelerate or retard growth, to prolong or break a dormant condition, to promote rooting, or in other ways.

A classification of plant growth regulators is as follows:

1. Auxins, as indole acetic acid, 2,4-D, MCPB, ENOA.
2. Gibberellins.
3. Cytokinins, as zeatin, kinetin, adenine.
4. Ethylene generators, as ethylene, ethephon.
5. Inhibitors, as benzoic acid, gallic acid, cinnamic acid, MH.
6. Retardants, as new types recently discovered.

Plant Pin*

BP: Wacker-Chemie GmbH (Plant Pin*)

Identification

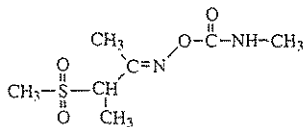
COMMON NAMES: Butoxycarboxim (ISO-E, BSI, JMAF); butoxycarboxime (ISO-F).

CODE NUMBER: EINECS 2521409.

Chemistry

COMPOSITION: 3-(methylsulphonyl)butan-2-one O-[(methylamino)carbonylloxime (IUPAC).

PROPERTIES: Crystalline, white, melting point 85-89°C; E-Z isomeric ratio 85:15. Good solubility in chloroform, alcohol. Less in ethylacetate, benzene. Low solubility in petroleum ether.



Butoxycarboxim

Action/Use

ACTION: Systemic insecticide.

USE: Only used as Plant Pin* against sucking insects in potted ornamentals.

FORMULATIONS: Pasteboard stick.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >170 mg/l (24 h) (rainbow trout).

SOLUBILITY: Good solubility in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 458 mg/kg.

Pasteboard stick form (Rat): Oral LD₅₀ >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in a dry place.

Emergency Guidelines

ANTIDOTE: Atropine.

Plantback

Restrictions that may be included on the pesticide label specifying time from final application to planting of next crop and crops that cannot be planted.

Plantdrin* — see Monocrotophos.

Plantgard* — see 2,4-D.

Plantomycin* — see Streptomycin.

Plantonit* Herbicide (terbutryn) — Discontinued by Chemol Trading Ltd. Co.

Plantvax* — see Oxycarboxin.

Pledge* Herbicide (bentazone) — Discontinued 1993 by Helena Chemical Co.

Plictran* Acaricide (cyhexatin) — Discontinued by Dow Chemical Co.

Plidion* — see Cyhexatin; tetradifon.

Plifenate

(Discontinued 1989 by Bayer AG)

Identification

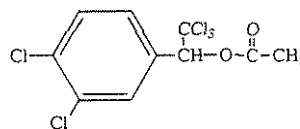
TRIVIAL NAMES: Benzethazet, plifenate.

EXP. CODE NUMBER: Bay MEB 6046 (Bayer AG).

OTHER CODE NUMBER: CAS 21757-82-4.

Chemistry

COMPOSITION: 3,4-dichloro-α-(trichloromethyl)benzenmethyl acetate (CAS).



Plifenate

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg. Dermal LD₅₀ >1000 mg/kg.

Plondrel* Fungicide (ditalimfos) — Discontinued by Dow Chemical Co.

Plucker* Plant Growth Regulator (1-naphthaleneacetic acid)

— Discontinued by ICI Ltd.

Pluracol* — see Dispersant; Spreader; Sticker; Wetting Agent.

Plurafac*

BP: BASF Corp. (Plurafac*)

Chemistry

COMPOSITION: A series of nonionic biodegradable oxyalkylated primary aliphatic alcohols.

Action/Use

ACTION: Surfactant-adjutant.

USE: Emulsifier, wetting agent.

FORMULATIONS: Emulsifiable concentrates, flowables, spray oils.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 0.5-1.0 mg/l (96 h) (orfe).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1680-14,000 mg/g. Tests indicate a low order of toxicity.

Pluraflo*

BP: BASF Corp. (Pluraflo*)

Identification

COMMON NAME: Pluraflo polyols.

Chemistry

COMPOSITION: Poly (oxypropylene) block polymer with poly (oxyethylene); molecular weight 1800-9000.

PROPERTIES: Active agent similar to Pluronic* polyols. All liquids, with some containing aqueous alcohols and/or glycols.

Action/Use

ACTION: Surfactant.

USE: Dispersant, emulsifier, designed for flowable formulations.

Emergency Guidelines

FIRST AID: Ingestion, induce vomiting. Get medical aid.

Plantovit* — see Terbutryne.

Pluraflo Polyols — see Pluraflo*.

Pluronic*

BP: BASF Corp. (Pluronic*)

Chemistry

COMPOSITION: Alpha-hydro-omega-hydroxy-poly[oxyethylene-poly(oxypropylene) block] copolymers.

Action/Use

ACTION: Surfactant, dispersant, emulsifier.

USE: For formulating herbicides, fungicides, insecticides, growth regulators.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 5000 mg/kg to >35,000 mg/kg. Entire series has extremely low order of toxicity.

2 Plus 2* — see 2,4-D; MCPB; Mecoprop.

Plyac*

BP: HACO, Inc.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: Emulsifiable oxidized polyethylene, octyl phenoxy polyethoxy ethanol.

Action/Use

ACTION: Spray adjuvant, spreader-sticker.

USE: Used with insecticides, fungicides, herbicides, and other agricultural and pest control sprays to improve initial and residual effectiveness. Wettable powder spray applications help in even dispersion and better deposit of the spray material, reducing pesticide losses due to heavy dews, sprinkler irrigation, rainfall or other causes.

FORMULATIONS: Liquid.

Environmental Guidelines

SOLUBILITY: Disperses in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Slight.

HANDLING AND STORAGE CAUTIONS: Product cannot readily be poured if stored below 32°F. However, freezing has no adverse effects on the quality of the product.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** flush with large amounts of water for at least 15 minutes. **Skin,** wash with soap and water. **Ingestion,** if conscious, induce vomiting by giving 2 glasses of warm water and touching back of throat.

BP:

United Phosphorus Ltd. (Unisan*)

Identification

COMMON NAMES: Phenylmercury acetate (ISO-E, BSI); PMA (JMAF); acétate de phénylmercure (ISO-F).

CODE NUMBER: CAS 62-38-4.

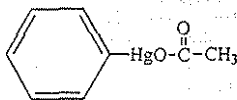
ADDITIONAL TRADE NAMES: Hong Nien*, Liquiphene*, Mersolite*, Phix*, Seedtox* (All India Medical Corp.); Agrosan*, Mergamma* (both ZENECA Agrochemicals); Shimmer-ex*.

DISCONTINUED NAMES: Cekusil* (Cequisa); PMAS*, Thimer* (+ thiram) (W.A. Cleary Chemical Corp.); Celmer*, Pamisan* (Excel Industries, Ltd.); Phenmad* (Mallinckrodt, Inc.); Shinmel* (Nihon Nohyaku Co., Ltd.).

Chemistry

FAMILY: Organo mercury compounds.

PROPERTIES: White powder, melting point 148-150°C. Soluble in benzene, alcohol, acetone.

**Action/Use**

ACTION: Selective herbicide; fungicide (Shinmel*); fungicidal seed dressing (Agrosan*, Mergamma*); contact fungicide (PMAS); insecticide (Mergamma*).

USE: For crabgrass, diseases of turf on golf greens and tees; most seed- and soil-borne diseases of cereals, sorghum, and groundnuts.

FORMULATIONS: Dust.

Registration Notes

U.S.: RUP. A red or blue dye must be added to mercurial agents as a warning of their hazardous nature. Cleared in U.S. for winter turf diseases. Gallotox* (Troy Chemical) agricultural uses cancelled.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic.

SOLUBILITY: Sparingly soluble in water (4.37 g/l water).

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 50-100 mg/kg.

PROTECTIVE CLOTHING: Protective gloves when handling the dust; protect wrists and forearms. Wash gloves thoroughly after use, especially the insides. Do not eat, drink or smoke while using. Do not breathe dust. In the event of spillage or leakage, wear protective overalls, gloves and a dust mask.

HANDLING AND STORAGE CAUTIONS: Wash hands and exposed skin before meals and after work. Keep away from food, drink, animal feed. Keep out of reach of children. Do not contaminate ponds, waterways or ditches with chemical or used container. Keep in original container, tightly closed, in a safe place. Wash out container thoroughly and dispose of safely. Do not re-use container for any purpose. Replace lid after use. Cover spills with moist sand, soil or sawdust. Small quantities may be swept up and disposed of by burying; larger spillages should be collected in sealed containers for disposal as toxic waste. After removing surplus material, wash down the contaminated area with plenty of water. Remove heavily contaminated clothing immediately. Do not use treated seed for human or animal consumption. Stable for at least 2 years under normal storage conditions in unopened containers.

Emergency Guidelines

ANTIDOTE: Activated charcoal, egg white or 2-5% sodium bicarbonate solutions (gastric lavage), 5% sodium formaldehyde sulphoxylate (gastric lavage, high colonic irrigation, I.V. fresh 100-200 ml) solutions. Sodium citrate, oral 1-4 g. every 4 hours. For spasms 100 ml. 10% calcium gluconate I.V.

FIRST AID: **Eyes, skin,** wash immediately. **Ingestion,** induce vomiting.

EMERGENCY TELEPHONE: 203-323-3500 (ZENECA).

PMAA — see Setrete*.

PMAS* — Discontinued 1994 by W.A. Cleary Chemical Corp.

PMP — see Phosmet.

PMP* Tracking Powder Rodenticide (Valone*) — Discontinued 1993 by Motomco Ltd.

Poast* — see Sethoxydim.

Podox-L* Fungicide (copper) — Discontinued by Mineral Research & Development Corp.

Point of Runoff

When a spray starts to run or drip off the leaves and stems of plants or the hair or feathers of animals.

Point* Imazalil — see Imazalil.

Point* Permethrin — see Permethrin.

Poison Bait

A material that has a poison mixed with it and is attractive as food for certain pests.

Poison (Biocide)

A substance which, when absorbed by eating, drinking, breathing or other means in relatively small quantities, causes illness or death, or even retardation of growth or shortening of life.

Poison Control Centers

A nationwide network of poison control centers has been set up with the aid of the U.S. Food and Drug Administration and Department of Health and Human Services. The centers are usually established in local hospitals. They are now widely distributed and available by phone from most parts of the country. Staff members are specially trained in the treatment of poisoning cases.

See Signal Words under Toxicity-Human.

Poison Information Center — see National Pesticide Telecommunications Network.

Polado*

BP: Monsanto Co., The Agricultural Group (Polado*)

Identification

CODE NUMBER: CAS 1071-83-6.

Chemistry

COMPOSITION: Sodium sesqui salt of N-phosphonomethyl glycine.

PROPERTIES: White solid with negligible volatility.

Action/Use

ACTION: Plant growth regulator.

USE: Foliar application to hasten ripening and increase the level of sucrose in sugarcane.

FORMULATIONS: Water soluble powder.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >1000 mg/l (96 h) (rainbow trout).

SOLUBILITY: Water soluble.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg b.w. (Rabbit): Dermal LD₅₀ >5,000 mg/kg. Slightly irritating to eyes. Non-irritating to skin.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling.

Emergency Guidelines

ANTIDOTE: Unnecessary, due to low acute oral toxicity.

FIRST AID: **Eyes,** flush with plenty of water. Get medical aid.

EMERGENCY TELEPHONE: 314-694-4000 (Monsanto Co., The Agricultural Group).

Poi-Akaritox* — see Tetradifon.

Polaris*

(Discontinued 1984 by Monsanto Agricultural Co.)

Identification

COMMON NAME: Glyphosine (ISO, ANSI, BSI).

EXP. CODE NUMBER: CP-41845.

OTHER CODE NUMBERS: CAS 2439-99-8; SHA 103602.

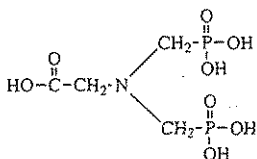
Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: N,N-bis(phosphonomethyl)glycine.



Glyphosine

Action/Use

ACTION: Chemical ripener.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Mammals): Oral LD₅₀ 3925 mg/kg.

Emergency Guidelines

ANTIDOTE: N/AP due to low acute oral toxicity.

Pol-Chwastox Extra* — see MCPA.

Pole Life* — see Metam-Sodium.

Pol-Funaben Technical* — see Carbendazim.

Pol-Gibrescol* — see Gibberellic Acid.

Policalcio 30* — see Lime Sulfur.

Police* — see Glyphosate.

Pol-Kupritox* — see Copper Oxochloride.

Pol-Nu* — see Sodium Pentachlorophenate.

Pol-Pielik* — see 2,4-D.

Pol-Sulkol* — see Sulfur.

Poly Ag*

(Discontinued by Knapp Manufacturing)

Action/Use

ACTION: Adjuvant, spreader-sticker, wetting agent.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

Poly Control 2*

BP: Brewer International Inc.

Identification

CODE NUMBER: CAS 8002-05-9.

Chemistry

COMPOSITION: Non-ionic polyacrylamide polymer.

PROPERTIES: White, viscous, opaque liquid; boiling point, 175°C (oil), 100°C water; specific gravity, 1.0; vapor pressure, 68°F; slight hydrocarbon odor.

Action/Use

ACTION: Sticker, drift control agent.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

PROTECTIVE CLOTHING: Full face shield or goggles, apron, long sleeves, work pants and gloves.

HANDLING AND STORAGE CAUTIONS: Wash thoroughly with soap and water before handling food or drink.

Emergency Guidelines

FLASHPOINT: 200°F, 93.3°C.

FIRE EXTINGUISHING MEDIA: Water spray, carbon dioxide, dry chemical.

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing. **Inhalation**, remove to fresh air. **Ingestion**, do NOT induce vomiting. Give water or milk and administer saline cathartic.

EMERGENCY TELEPHONE: 800 255-3924 (Chem Tel).

Polybor* 3

(Temporarily discontinued — 1992/1993)

Identification

COMMON NAME: Borate.

CODE NUMBERS: CAS 1303-96-4; SHA 011102.

Chemistry

COMPOSITION: Disodium octaborate tetrahydrate.

FAMILY: Sodium borate.

Action/Use

ACTION: Larvicide.

USE: Controls various larvae. May be applied dry or in water solution.

Read label carefully.

Registration Notes

Temporarily discontinued 1992/1993 — U.S. Borax is revising label.

Environmental Guidelines

SOLUBILITY: Highly soluble sodium borate compound; 9.5% in water at 20°C (68°F).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2.0 g/kg body weight.

PROTECTIVE CLOTHING: Dust mask, goggles with side shields, leather or cloth gloves.

HANDLING AND STORAGE CAUTIONS: Store in a cool dry place on pallets. Avoid contamination of feed and foodstuffs. Do not store where children or animals may gain access.

Emergency Guidelines

FLASHPOINT: N/AP. Product is fire retardant.

ANTIDOTE: To induce vomiting give one ounce syrup of Ipecac. Give 15 grams activated charcoal followed by gastric lavage. Follow with saline cathartic (Epsom salts). If dose is large and symptoms of nausea, diarrhea, or abdominal pain are evident have the gastric lavage done by a qualified medical individual. If central nervous system stimulation or an erythematous flush or macular skin rash appears (usually in chronic cases or massive acute doses), give 10% dextrose in water or saline as fluid balance dictates. Continue dextrose at high intake to induce diuresis. NOTE: Some physicians may discourage use of saline emesis.

FIRST AID: Get medical aid. **Eyes**, flush with gentle stream of tepid water for 15 minutes. **Skin**, flush surface thoroughly with water followed by washing with soap and water. **Inhalation**, remove to fresh air, rinse mouth and throat with warm water. Clean out nasal passages by blowing or with wet cotton-tipped applicator. **Ingestion**, if conscious, give tap water, then induce vomiting by stroking the back of the throat with finger or spoon handle. See antidote information above. NOTE: Some physicians may discourage use of saline emesis.

EMERGENCY TELEPHONE: 714-774-2673 (U.S. Borax).

Polybor-Chlorate*

(Discontinued by U. S. Borax & Chemical Corp.)

Chemistry

COMPOSITION: Disodium octaborate + sodium chlorate.

Action/Use

ACTION: Nonselective weed and grass killer.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4330 mg/kg.

Polybutene — see Bio-Tac*; Rimifoot*.

Polycaptan* — see Polyoxin B.

Polychlorcamphene — see Toxaphene.

Polychlorobenzoic Acid — see PBA.

Polyclene* (dichlorprop) — Discontinued by Schering AG.

Polycron* — see Curacron*.

Polyfac* — Discontinued 1987 by Westvaco Chemicals Div.

Polyfons* — see Dispersant; Lignosulfonates.

Polyhedrosis Virus — see Heliothis Nuclear Polyhedrosis Virus.

Polymone* — see Dichlorprop.

Polymone* 60 (MCPP + 2,4-D) — Discontinued 1984 by SOPRA.

Polynactins Complex

BP: Chugai Pharmaceutical Co., Ltd.

Identification

COMMON NAME: Polynactins complex.

CODE NUMBERS: CAS 33956-61-5 (tetranactin); CAS 7561-71-9 (trinactin).

Chemistry

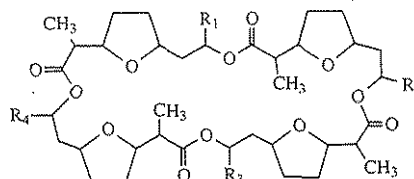
COMPOSITION: Dinactin, tetranactin, trinactin.

PROPERTIES: Colorless crystalline prism, vapor pressure 1-5 × 10⁻⁶, melting point 111-112°C. Freely soluble in chloroform, dimethylsulfoxide, dichloromethane, benzene, toluene, and acetone. Soluble in methanol, ethanol, and n-hexane.

Tetranactin = R_{1,2,3,4} = C₂H₅

Trinactin = R_{1,2,4} = C₂H₅, R₃ = CH₃

Dinactin = R_{1,3} = C₂H₅, R_{2,4} = CH₃



Polynactins Complex

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Miticidal antibiotics.

USE: Controls many species of mites in many agricultural and horticultural crops.

FORMULATIONS: Emulsifiable concentrate.

COMBINATIONS: Mitecadin* B (+ BPMC); Mitedown* (+ fenbutatin-oxide); Tolpiran* (+ CPCBS).

Environmental Guidelines

HAZARDS: Bee: Relatively nontoxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech (Mouse): Oral LD₅₀ >15,000 mg/kg. Dermal LD₅₀ >10,000 mg/kg. Mild skin and eye irritant.

PROTECTIVE CLOTHING: Wear goggles when handling.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes and skin.

Emergency Guidelines

FIRST AID: Eyes, Skin, flush with plenty of water. Get medical aid.

Polynox*

(Discontinued 1984 by Nihon Nohyaku Co., Ltd.)

Chemistry

COMPOSITION: Antibiotic polyoxin, Monox* [zinc dimethyl dithiocarbamate bis (dimethyl) dithiocarbamoyl ethylenediamine].

Action/Use

ACTION: Fungicide.

Polyonic*

BP: Custom Chemicides

Chemistry

COMPOSITION: Alkylaryl polyoxethylene glycols; alkylate sulfonates, ethoxylated amines, petroleum aromatic naphtha.

Action/Use

ACTION: Spreader.

USE: Aids in translocation and absorption of postemergent herbicides.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Polyoxin

Common name (JMAF) for a series of 13 antibiotics of similar physical and chemical properties.

See also Polynox*.

Polyoxin AL — see Polyoxin B.

Polyoxin B

BP: Kaken Pharmaceutical Co., Ltd.

Identification

COMMON NAME: Polyoxin (JMAF).

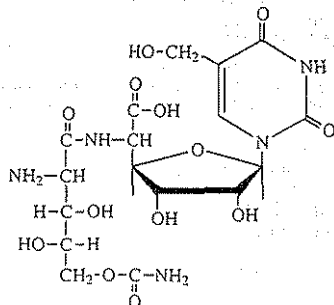
CODE NUMBER: CAS 19396-06-6.

OTHER NAME: Tech Polyoxin AL.

Chemistry

COMPOSITION: 5-(2-amino-5-O-carbamoyl-2-deoxy-L-xylonamido)-5-deoxy-1-(1,2,3,4-tetrahydro-5-hydroxymethyl-2,4-dioxypyrimidinyl)-β-D-allofuranuronic acid.

PROPERTIES: Light brown amorphous powder, decomposing at 150°C. Pure Polyoxin B is colorless crystal. Insoluble in organic solvents.



Polyoxin B

Action/Use

ACTION: Fungicide.

USE: For *Alternaria mali* on apples, *Alternaria kikuchiana* on pears, *Sphaerotheca fuliginea* on cucumbers, and *Botrytis cinerea* on tomatoes, etc.

FORMULATIONS: Emulsifiable concentrate, water soluble granule, wettable powder.

COMBINATIONS: Polyoxin O WP (+ copper 8-quinolinolate); Polycaptan* WP (+ captan); Altanone* WP (+ captafol).

Environmental Guidelines

FLASHPOINT: Nonflammable.

SOLUBILITY: Soluble in water.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 14,734 mg/kg (male); 14,665 mg/kg (female).(Mouse): Oral LD₅₀ 18,974 mg/kg (male); 15,638 mg/kg (female).

HANDLING AND STORAGE CAUTIONS: No substantial hazards with Polyoxin, but avoid skin, eye contact and inhalation. Hygroscopic, so store tightly sealed, under dry conditions.

Polyoxin D

BP: Kaken Pharmaceutical Co., Ltd.

Identification

COMMON NAME: Polyoxin.

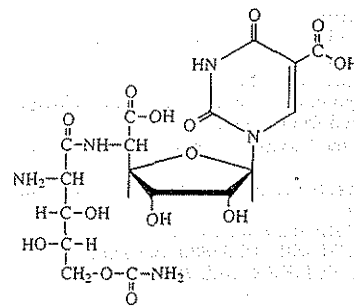
CODE NUMBER: CAS 22976-86-9.

ADDITIONAL TRADE NAME: Polyoxin Z.

Chemistry

COMPOSITION: 5-(2-amino-5-O-carbamoyl-2-deoxy-L-xylonamido)-5-deoxy-1-(1,2,3,4-tetrahydro-5-carboxy-2,4-dioxypyrimidinyl)-β-D-allofuranuronic acid.

PROPERTIES: Light brown amorphous powder, decomposing at 190°C. Pure Polyoxin D is a colorless crystal.



Polyoxin D

Action/Use

ACTION: Fungicide.

USE: For rice sheath blight (*Rhizoctonia solani*), apple canker (*Valsa ceratosperma*), apple silver leaf (*Stereum purpureum*), turf large patch (*Rhizoctonia solani*), etc.

FORMULATIONS: Dust, paste, wettable powder.

COMBINATIONS: With thiram, EDDP, MPP+EDDP, IBP, MPP+IBP.

Environmental Guidelines

FLASHPOINT: Nonflammable.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Mouse): Oral LD₅₀ >9600 mg/kg.

HANDLING AND STORAGE CAUTIONS: No substantial hazards but avoid eye, skin contact, and inhalation. Hygroscopic. Keep in tightly sealed container. Keep dry.

Polyoxin O — see Polyoxin B.

Polyoxin Z — see Polyoxin D.

Polyphagous Predators

Feeding on a wide range of food species, not necessarily related. For instance, the corn earworm, because of its damage to crops other than corn, is also called the tomato fruitworm and the bollworm.

Polyram* Combi — see Dithiocarbamates; Metiram.

Polyram* DF — see Dithiocarbamates; Metiram.

Polyram* M Fungicide (maneb) — Discontinued by BASF AG.

Polyram* Ultra Fungicide (thiram) — Discontinued 1989 by BASF AG.

Polyram* Z Fungicide (zineb) — Discontinued by BASF AG.

Polytrap*

BP: AgriSense, Div. of biosys (Acrylates Copolymer*, Decoy*, Magnet*)

Chemistry

PROPERTIES: Volatiles or active chemicals. Entails the use of pheromone attractants, synthetic attractants and pesticides.

Action/Use

ACTION: Custom-formulated polymer entrapment system enabling controlled time release.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

USE: Converts liquids into solid forms or protects a.i. from degrading effects.

FORMULATIONS: Solids, powders, sprayable beads, cylinder shaped lures or absorption powders.

Polytrin* — see Cypermethrin.

Pomarsol Forte* — see Thiram.

Pomarsol Z — see Ziram.

Pondmaster* — see Glyphosate.

Ponnax* Fungicide/Plant Growth Regulator (carbendazim + chlormequat chloride + choline chloride) — Discontinued 1989 by BASF AG.

Porter's Creek Clay — see Fuller's Earth.

Po-San*

(Discontinued by Mallinckrodt, Inc.)

Chemistry

COMPOSITION: Two-component system. (1) Formulation A: chlorflurenol. (2) Formulation B: ethanolamine salt of maleic hydrazide.

Action/Use

ACTION: Turf growth retardant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Form A (Rat): Oral LD₅₀ 7400 mg/kg.

Form B: 2200 mg/kg.

Posse* — see Carbosulfan.

Post Transplant

Over-the-top or directed application of herbicide after crop plants have been transplanted (set).

Postemergence Herbicide

A chemical applied as an herbicide to the foliage of weeds after the crop has emerged from the soil.

Post-Kite* — see Ioxynil; Isoproturon; Mecoprop.

Potablan*

BP: Hoechst Schering AgrEvo GmbH (Potablan*)

Identification

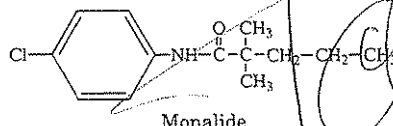
COMMON NAME: Monalide (ISO, BSI).

EXP. CODE NUMBER: SN 35830 (Schering AG).

OTHER CODE NUMBER: CAS 7287-36-7.

Chemistry

COMPOSITION: N-(4-chlorophenyl)-2,2-dimethylvaleramide (IUPAC).
PROPERTIES: Colorless crystals. Solubility in cyclohexanone, c.500 g/l; in xylene, c.100 g/l. Melting point 87-88°C.



Action/Use

ACTION: Postemergence herbicide.

USE: For weeding umbelliferous crops (carrots, etc).

FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

SOLUBILITY: Solubility in water; 22.8 mg/l at 23°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >4000 mg/kg. (Rabbit): Dermal LD₅₀ >800 mg/kg.

HANDLING AND STORAGE CAUTIONS: Do not store below -5°C.

Potable Water

A synonym for drinkable water.

Potasan*

(Discontinued by Bayer AG)

Identification

EXP. CODE NUMBER: E-838.

OTHER CODE NUMBER: CAS 299-45-6.

Chemistry

COMPOSITION: O,O-Diethyl O-(4-methylumbelliferone) phosphorothioate (IUPAC).

Action/Use

ACTION: Nonsystemic insecticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 19 mg/kg.

Potassium Ammonium Ethylene Bisdithiocarbamate

Identification

CODE NUMBERS: CAS 22221-14-3; SHA 014507.

Chemistry

COMPOSITION: Tank-mix with zinc sulfate to form zineb or with manganous sulfate to form maneb.

Action/Use

ACTION: Fungicide.

Potassium Antimonyl Tartrate — see Tartar Emetic.

Potassium Chromate

Identification

CODE NUMBERS: CAS 7789-00-6; SHA 068301.

Action/Use

USE: Formerly an ingredient of Kroma-Clor* and Ultra-Clor*.

Potassium Cresylate

Action/Use

USE: Incidental ingredient with other toxicants in animal dips.

Registration Notes

U.S.: All food uses cancelled 1969.

Potassium Cyanate

Identification

CODE NUMBERS: CAS 590-28-3; SHA 068002.

DISCONTINUED NAME: Aero* Cyanate (American Cyanamid Co.).

Chemistry

COMPOSITION: KOCN.

PROPERTIES: Its instability in the presence of moisture requires any materials used as extenders or additives be low in moisture content.

Action/Use

ACTION: Combination herbicide-fertilizer.

Environmental Guidelines

SOIL PARTICLE ADSORPTION: Material breaks down rapidly in the soil to residual nitrogen and potassium compounds.

Potassium Permanganate

Identification

CODE NUMBERS: CAS 7722-64-7; SHA 068501.

Chemistry

COMPOSITION: KMnO₄.

Action/Use

ACTION: Disinfectant (source of oxygen).

USE: Used occasionally for bulbs and rhizomes; for dipping grafting knives and other tools.

Potassium Salt of Maleic Hydrazide

Identification

ADDITIONAL TRADE NAMES: Retard*, Sucker-Stuff*, Super Sprout Stop*, Super Sucker Stuff* (Drexel Chemical Co.).

Chemistry

COMPOSITION: Potassium salt of 6-hydroxy-3-(2H)-pyridazinone.

Action/Use

ACTION: Growth retardant.

USE: Retard* for grass, trees, shrubs and ivy. Super Sprout Stop* for potatoes and onions. Sucker Stuff*, Super Sucker Stuff* for tobacco suckers.

FORMULATIONS: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

PROTECTIVE CLOTHING: Wear regular long-sleeve work clothing, when applying the product.

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed. Avoid breathing spray mist. Avoid contact with skin, eyes or clothing. Wash thoroughly after handling. Store under lock and key in a cool, dry, ventilated area away from heat or ignition source, secure from children or unauthorized personnel.

Emergency Guidelines

FIRST AID: Get medical aid. Ingestion, if conscious, drink 1-2 glasses of water and induce vomiting by touching back of throat with finger.

Potassium Salts of Fatty Acids — see Soaps.

Potassium Thiocyanate

Identification

CODE NUMBERS: CAS 333-20-0; SHA 068201.

Action/Use

ACTION: Herbicide.

See Ammonium Thiocyanate.

Pounce* — see Permethrin.

Power Duster

Power dusters deliver dust chiefly in two ways: (1) through a horizontal boom with a large number of delivery pipes, often terminating in a fishtail nozzle, and (2) through a single large orifice or circular muzzle. A fan or a turbine blower delivers the dust-carrying air stream. The

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

equipment is variously modified to fit the requirements of different field and orchard conditions.

Power Pak* — see Banvel*.

Power Sprayer

When a plunger-pump sprayer is operated by gasoline or electric motor, it is termed a power sprayer. The equipment may be small, hand-drawn, as in a wheelbarrow sprayer. Larger trailer-type power sprayers are driven by engines or by power take-off from the tractor. Power sprayers are adapted (1) for orchard use with hose, spray rods and nozzles arranged for spray coverage at considerable heights, and (2) for the treatment of row and field crops with nozzles adequately spaced on a horizontal boom.

See Mist Blower.

PP005 — see Fluazifop-butyl.

PP009 — see Fluazifop-butyl.

PP062 — see Primor*.

PP149 — see Ethirimol.

PP211 — see Primidic*.

PP296 — see Vigil*.

PP321 — see Lambda-cyhalothrin.

PP383 — see Cypermethrin.

PP450 — see Impact*.

PP511 — see Pirimiphos-methyl.

PP557 — see Permethrin.

PP580 — see Ratak*.

PP581 — see Brodifacoum.

PP588 — see Nimrod*.

PP675 — see Milcurb*.

PP745 — see Morfamquat.

ppb

Symbol for "parts per billion."

PPG-844 — see Cobra*.

PPI

An abbreviation for preplant incorporated.

ppm

Symbol for "parts per million."

PQ-8* — see Copper 8-Quinolinate.

Prado* — see Atrazine; Pyridate.

Pradone Kombi* — see Dimefuron.

Pradone Plus* — see Dimefuron.

Pradone TS* — see Dimefuron.

Pralidoxime

Used as an adjunct to but not as a substitute for atropine in the treatment of poisoning by certain cholinesterase inhibitors. It reactivates the enzyme cholinesterase when the activity of the enzyme is depressed and in this way it indirectly reduces an accumulation of acetylcholine. Atropine, on the other hand, directly counteracts the effects of this accumulation. Pralidoxime is administered as the chloride, iodide, mesylate, or methylsulfate. 2-PAMCI is pralidoxime chloride; 2-PAMM, pralidoxime mesylate; PAM, pralidoxime iodide.

See Atropine; 2-PAM (Protopam Chloride).

Prallethrin — see Etoc*.

Pramex* — see Permethrin.

Pramitol*

BP: Ciba (Pramitol*)

Identification

COMMON NAMES: Prometon (ISO-E, ANSI, BSI, WSSA); prométone (ISO-F).

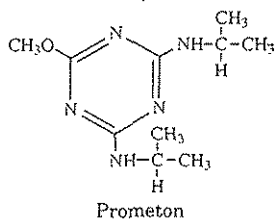
CODE NUMBERS: CAS 1610-18-0; SHA 080804.

ADDITIONAL TRADE NAMES: Gesafram* 50 (Ciba Ltd.); Ontracic 800* (Ciba).

Chemistry

COMPOSITION: 2,4-bis(isopropylamino)-6-methoxy-s-triazine.

PROPERTIES: White, crystalline, melting point 91-92°C. Solubility in acetone is >50% (>50 gm/100 ml of solvent); in benzene >25%; and in methanol is >50%.



Action/Use

ACTION: Nonselective herbicide.

USE: Applied before or following weed emergence. Controls most annual, many perennial broadleaf weeds and grasses, generally for a full season or longer.

FORMULATIONS: Emulsifiable concentrate, pellets.

COMBINATIONS: Pramitol* 5PS (+ sodium chlorate + sodium metaborate + simazine) (Ciba); Vegemec* (+ 2,4-D) (PBI/Gordon).

Environmental Guidelines

HAZARDS: (25E) Fish: LC₅₀ 20 mg/l (96 h) (rainbow trout); >32 mg/l (bluegill); 8.6 mg/l (goldfish). Bee: Nontoxic.

SOLUBILITY: Water solubility at 20°C is 620 ppm.

Safety Guidelines

SIGNAL WORD: DANGER—CORROSIVE (5PS, 25E).

TOXICITY CLASS: I (5PS, 25E).

TOXICITY: Tech (Rat): Oral LD₅₀ 2980 mg/kg. Inhalation LC₅₀ (4 hr.) >3.26 mg/l. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

Pramitol* (Rat): Oral LD₅₀ 2276 mg/kg (25E), 2745 (5PS). Inhalation LC₅₀ (4 hr.) 36.0 mg/l. 25E: >3.7 mg/l. 5PS. (Rabbit): Dermal LD₅₀ 2200 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation**, remove to fresh air. **Ingestion**, drink one or two glasses of water and induce vomiting.

Pramitol* 5PS — see Pramitol*.

Pratt* Oxamyl 10% G — see Oxamyl.

PRD*

Chemistry

COMPOSITION: 3,4-Dichlorotetrahydrothiophene 1,1-dioxide.

Action/Use

ACTION: Nematicide.

Registration Notes

U.S.: Experimental (Diamond Shamrock).

Prebane — see Terbutryn.

Pre-Beta 1*

(Discontinued by Great Western Sugar Co.)

Chemistry

COMPOSITION: Tillam* + Avadex*.

Action/Use

ACTION: Preplant herbicide.

Pre-Beta 2*

(Discontinued 1985 by Great Western Sugar Co.)

Chemistry

COMPOSITION: Ro-Neet* + Avadex*.

Action/Use

ACTION: Preplant herbicide.

Precipitate

A solid substance that forms in a liquid and settles. A material that no longer remains in suspension.

Predacide

A material used primarily for the control of vertebrates.

Predator

An animal that preys on and feeds on other animals. Predaceous animals include hawks, owls, snakes, and many insects.

Predazon* — see Pryamin*.

Pred-Feed IPM*

BP: Custom Chemicides

Chemistry

PROPERTIES: Sucrose, dairy product protein.

Action/Use

ACTION: Insect attractant, food supplement.

USE: Feed for beneficial insects.

FORMULATIONS: Sprayable powder.

Predict* — see Norflurazon.

Pre* — see Butisan S*.

Preemergence Herbicide

An herbicide applied after planting the crop but before the latter emerges above ground, to kill weed seedlings that appear ahead of the crop.

Preemergence Incorporated

Applied after seeding and incorporated in the soil above the seed.

Pre-Empt* Herbicide (trietazine + linuron + trifluralin) — Discontinued 1992 by Schering AG.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Prefar* — see Bensulide.

Prefix*

(Discontinued by Shell International Chemical Co. Ltd.)

Identification

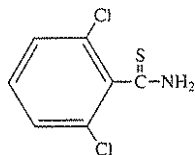
COMMON NAMES: Chlorthiamid (ISO-E, BSI); chlorthiamide (ISO-F); DCBN (JMAF).

EXP. CODE NUMBER: WL 5792.

OTHER CODE NUMBERS: CAS 1918-13-4; SHA 326300.

Chemistry

COMPOSITION: 2,6-Dichlorothiobenzamide.



Chlorthiamid

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 757 mg/kg. Dermal LD₅₀ >1000 mg/kg.

Prefix* D Herbicide (dichlobenil) — Discontinued by Shell Chemical Co. Ltd.

Preforan* Herbicide (fluorodifen) — Discontinued by Ciba-Geigy Ltd.

Prefix*

(Discontinued by Gulf Oil Chemical Co.)

Identification

COMMON NAME: Mixture of cyprazine, ethiolate.

CODE NUMBERS: CAS 15457-05-3; SHA 085001.

Chemistry

COMPOSITION: 2-Chloro-4-(cyclopropylamino)-6-(isopropylamino)-s-triazine + S-ethyl diethylthiocarbamate.

Action/Use

ACTION: Selective herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Cyprazine (Rat): Oral LD₅₀ 1200 mg/kg.

Ethiolate (Rat): Oral LD₅₀ 400 mg/kg.

Preglone* — see Diquat Dibromide; Paraquat.

Preharvest Interval — see Days To Harvest.

Prelude* — see Permethrin.

Premalin* Herbicide (linuron + monolinuron) — Discontinued by Rhone-Poulenc.

Premalox* Herbicide (propham + chlorpropham + fenuron) — Discontinued by May & Baker Ltd.

Premerge* Herbicide (dinoseb) — Discontinued 1987 by Cedar Chemical Corp.

Premerge* Plus Herbicide (dinoseb + naptalam) — Discontinued by Cedar Chemical Corp.

Premerlin* 600-EC — see Trifluralin.

Premier* Herbicide (flumetralin) — Discontinued 1993 by Ciba.

Premier* Insecticide — see Bay NTN 33893.

Premium* — see Neburon; Terbutryne.

Prenfish* — see Rotenone.

Prentox* Carbamate — see Propoxur.

Prentox* DDVP — see DDVP.

Prentox* Fenthion Insecticide (fenthion) — Discontinued by Prentiss Incorporated.

Prentox* Malathion 95% Spray — see Malathion.

Prentox* Methoxychlor — see Methoxychlor.

Prentox* PBO-8* — see Piperonyl Butoxide.

Prentox* Prenfish* — see Rotenone.

Prentox* Pyrethrum Extract 20% — see Pyrethrum.

Prentox* Pironyl* — see Piperonyl Butoxide; Pyrethrum.

Prentox* Rotenox* — see Rotenone.

Prentox* Synpren*-Fish Toxicant — see Rotenone.

Prentox* Tech — see Piperonyl Butoxide.

Prep* — see Ethephon.

Preplant Application

Applied on the soil surface before seeding or transplanting.

Preplant Incorporated

A herbicide applied prior to planting of the crop and incorporated into the soil.

Preplant Pesticide

A pesticide which is applied prior to planting a crop.

Preplant Treatment

Application of a material to the soil before the crop is planted, usually after seedbed preparation.

Preplanting Soil Incorporated

Applied and tilled into the soil before seeding or transplanting.

Pre-San* — see Bensulide.

Preserve*

(Discontinued 1987 by MicroGeneSys, Inc.)

Identification

COMMON NAME: European Pine Sawfly Nuclear Polyhedrosis Virus.

ADDITIONAL TRADE NAME: NEOCHEK-S*.

Chemistry

COMPOSITION: Nuclear Polyhedrosis Virus of Neodiprion sertifer.

Action/Use

ACTION: Selective microbial insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Non-hazardous to humans, animals and beneficial insects.

Preside* — see Broadstrike*.

Pretilachlor — see Avirosan*; Sanbird*.

Prevail* FT Insecticide — see Cypermethrin.

Prevail* Herbicide — see Carboxin; Metalaxyl; PCNB.

Prevx* — see Propamocarb Hydrochloride.

Previcur*

(Discontinued 1978 by Schering AG)

Identification

COMMON NAMES: Prothiocarb (ISO-E, BSI); prothiocarbe (ISO-F).

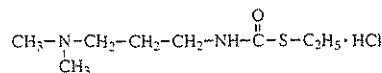
EXP. CODE NUMBER: SN-41703 (Schering AG).

OTHER CODE NUMBER: CAS 19622-19-6 (hydrochloride).

DISCONTINUED NAME: Dynone* (Schering AG).

Chemistry

COMPOSITION: S-ethyl N-(3-dimethylaminopropyl)thiocarbamate hydrochloride.



Prothiocarb Hydrochloride

Action/Use

ACTION: Fungicide, seed-dressing.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1300 mg/kg.

Previcur* N — see Propamocarb Hydrochloride.

Preview*

BP: Du Pont Agricultural Products

Chemistry

COMPOSITION: Metribuzin + chlorimuron-ethyl.

Action/Use

ACTION: Herbicide.

USE: Preplant incorporated or preemergence annual broadleaf control in soybeans.

FORMULATIONS: Dry flowable.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

Prezervit* — see Dazomet.

Priglone* — see Diquat Dibromide; Paraquat.

Priltox* (PCP) — Discontinued by Idacon Inc.

Primacol* — see 1-Naphthaleneacetic Acid.

Primagram* — see Atrazine; Bicep*.

Primatol* A — see Atrazine.

Primatol* M — see Terbutylazine.

Primatol* P — see Propazine.

Primatol* Q — see Prometryn.

Primatol* S — see Simazine.

Primaze* Herbicide (atrazine + prometryn) — Discontinued by Ciba-Geigy.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Prime+* — see Flumetralin.
Primetrin* — see Permethrin.
Primextra* — see Atrazine; Bicep*.
Primidic*

BP: ZENECA Agrochemicals

Identification

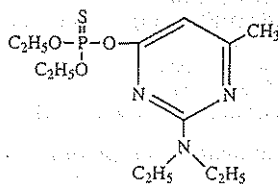
COMMON NAMES: Pirimiphos-ethyl (ISO-E, ANSI, ESA, BSI, BAN);
 primiphos-ethyl (ISO-F).
 EXP. CODE NUMBER: PP211 (ICI).
 OTHER CODE NUMBERS: CAS 23505-41-1; SHA 108101.

DISCONTINUED NAMES: Fernex*, Primotec* (ICI Agrochemicals).

Chemistry

COMPOSITION: O-2-diethylamino-6-methylpyrimidin-4-yl O,O-diethyl phosphorothioate (IUPAC).

PROPERTIES: Vapor pressure 1×10^{-4} Torr at 25°C. Miscible with most organic solvents.



Pirimiphos-ethyl

Action/Use

ACTION: Broad spectrum insecticide.
 USE: For long-term control of banana borers, turf pests and other soil pests in vegetables.
 FORMULATIONS: Emulsifiable concentrate, granules.

Environmental Guidelines

SOLUBILITY: 93 ppm in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 192 mg/kg (female). (Rat): Dermal LD₅₀ 1000-2000 mg/kg.

Emergency Guidelines

FLASHPOINT: 113°F, 45°C (PMCC).

ANTIDOTE: Atropine, PAM.

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion**, drink one or two glasses of water but do NOT induce vomiting. **Inhalation**, remove to fresh air.

Primin* Insecticide (isolan) — Discontinued mid-1970s by Ciba-Geigy Ltd.

Primisulfuron — see Beacon*.

Primotec* Insecticide (pirimiphos-ethyl) — Discontinued by ICI Agrochemicals.

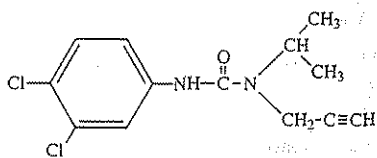
Princep* — see Eradicane*; Simazine.

Prism* — see Uniconazole-P.

Pro-5* — see Trifluralin.

Proban*

(Discontinued 1970 by American Potash & Chemical Corp.)



Proban*

Action/Use

ACTION: Herbicide.

Probe*

(Discontinued 1993 by Sandoz Agro, Inc.)

Identification

COMMON NAMES: Methazole (ANSI, BSI, SAA, WSSA).

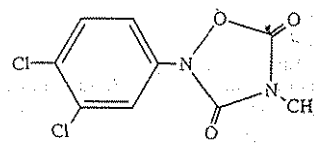
EXP. CODE NUMBER: VCS 438 (Velsicol Chemical Corp.).

OTHER CODE NUMBERS: CAS 20354-26-1; SHA 106001.

ADDITIONAL TRADE NAMES: Bioxone*, Mezopur*, Paxilon*, Tunic*.

Chemistry

COMPOSITION: 2-(3,4-Dichlorophenyl)-4-methyl-1,2,4-oxadiazolidine-3,5-dione (IUPAC).



Methazole

Action/Use

ACTION: Herbicide.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 3.14 mg/l (goldfish, rainbow trout). Bee: Toxic. 3 kg/ha wettable powder/400 l/water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 2501 mg/kg. (Rabbit): Dermal LD₅₀ 12,500 mg/kg.

Processed Corn Grits

BP: Illinois Cereal Mills, Inc. (Product #980)

Chemistry

COMPOSITION: Precooked corn grit (100% natural yellow corn).

PROPERTIES: Absorption 30% - density 12-15 lb./cu. ft.

Action/Use

ACTION: Carrier.

USE: For various food and industrial uses.

FORMULATIONS: Granular.

Prochloraz

BP: Hoechst Schering AgrEvo GmbH (Abavit*, Ascurit*, Octave*, Omega*, Prelude*, Sporgon*, Sportak*), Makhteshim-Agan (Mirage*)

Identification

COMMON NAME: Prochloraz (ISO, ANSI, BSI).

EXP. CODE NUMBER: BTS-40542 (The Boots Co. Ltd.)

OTHER CODE NUMBERS: CAS 87747-09-5; SHA 128851.

DISCONTINUED NAME: Tenor* (+ triadimefon) (Schering AG).

Chemistry

COMPOSITION: 1-N-propyl-N-[2-(2,4,6-trichlorophenoxy)ethyl]carbamoylimidazole (IUPAC).

PROPERTIES: Prochloraz tends to decompose on prolonged heating at high temperatures (200°C), but is stable at lower temperatures (100°C). Pure material is a colorless, odorless, crystalline solid, melting point 38.5 - 41.0°C. Readily soluble in a wide range of organic solvents.

Action/Use

ACTION: Protectant and eradicant fungicide.

USE: For use as a seed treatment, foliar spray on a wide range of crops. Broad spectrum fungicide for diseases on cereal, oilseed rape and other annual, perennial broadleaved crops, rice, mushrooms, ornamentals; postharvest treatment of certain fruits. Curative, residual activity in a number of crop situations. Abavit*, Prelude* as seed treatments.

FORMULATIONS: Wettable powders, emulsifiable concentrates, liquids.

COMBINATIONS: Magic*, Orbit*, Proton* (+ fenpropimorph) (Ciba Ltd.); Abavit*/Prelude* Universal (+ carboxin), Dibavit*, Fanyl Colza*, Sportak* Alpha, Sportak* PF (all + carbendazim), Genois* (+ copper oxydate), Markant* (+ iprodione), Rival*/Sprint*/Stanza L* (+ fenpropimorph), Sponsor* (+ fenpropidin), Sportak* Delta (+ cyproconazole), Troika* (+ fenbuconazole) (Schering AG); Tiptor* (+ cyproconazole) (Sandoz).

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Orbit*.

Environmental Guidelines

SOLUBILITY: Solubility in water is low 5.5×10^{-3} g/l at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1600 mg/kg. (Mouse): 2400 mg/kg.

Procure* — see Triflumizole.

Procyazine — see Cycle*.

Procymidone

BP: Lucky Ltd. (Tech.)

Sumitomo Chemical Co., Ltd. (Sumilex*, Sumislex*)

Identification

COMMON NAME: Procymidone (ISO, BSI, JMAF).

EXP. CODE NUMBER: S-7131 (Sumitomo).

OTHER CODE NUMBER: CAS 32809-16-8.

Chemicals are cross-referenced by common and trade name

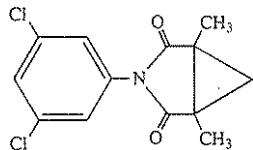
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: N-(3,5-dichlorophenyl)-1, 2-dimethylcyclopropane-1,2-dicarboximide.

PROPERTIES: Light brown crystalline solid. Density 1.43 g/ml at 20°C, melting point 166.0-166.5°C. Soluble in common solvents such as acetone and xylene.



Procymidone

Action/Use

ACTION: Fungicide.

USE: For controlling Sclerotinia, Botrytis, Helminthosporium, and Monilia diseases on cereals, beans, vegetables, fruits, and industrial crops.

FORMULATIONS: Dry flowable, flowable, wettable powder.

Environmental Guidelines

HAZARDS: Sumilex*: Fish: (carp) TLM 48 >10 ppm. Bee: Nontoxic.

SOIL PARTICLE ADSORPTION: Persistence 4-12 weeks (varies with humus content).

SOLUBILITY: Hardly soluble in water.

Safety Guidelines

TOXICITY: Sumilex*: (Rat): Oral LD₅₀ 6800 mg/kg (male); 7700 mg/kg (female). (Mouse): 7800 mg/kg (male); 9100 mg/kg (female). (Rat/Mouse): Dermal LD₅₀ >2500 mg/kg.

Prodalumnol Double* — see Sodium Arsenite.

Prodan*

BP: Tamogan Ltd. (Prodan*, Super Prodan*)

Chemistry

COMPOSITION: Sodium fluosilicate (10-15%), attractants (85-90%).

Action/Use

ACTION: Insecticide.

USE: To control cutworms and leafworms.

FORMULATIONS: Granular.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 125 mg/kg.

Prodaram* Fungicide (ziram) — Discontinued by ELF Atochem Agri B.V.

Prodazim* — see Carbendazim.

Prodiamine

BP: Sandoz Agro, Inc. (Barricade*)

Identification

COMMON NAME: Prodiamine (ISO, ANSI, BSI, WSSA).

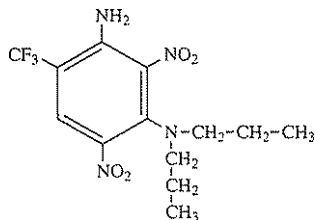
CODE NUMBERS: CAS 29091-21-2; SHA 110201.

DISCONTINUED NAMES: Blockade*, Endurance* (Sandoz).

Chemistry

COMPOSITION: 5-dipropylamino-α,α,α-trifluoro-4,6-dinitro-o-toluidine.

PROPERTIES: Yellow crystalline solid, melting point 124°C.



Prodiamine

Action/Use

ACTION: Selective preemergence herbicide.

FORMULATIONS: Water dispersible granule, flowable.

Registration Notes

U.S.: Sandoz Agro, Inc. now re-using discontinued trade name Endurance* for industrial vegetation herbicide with prodiamine as a.i.

Environmental Guidelines

SOLUBILITY: In water 0.013 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg. Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Wear protective clothing, including safety goggles, rubber or neoprene gloves, long pants and long-sleeved shirt.

HANDLING AND STORAGE CAUTIONS: Avoid ingestion, inhalation and absorption through skin. Store in original container away from fertilizer, feed, or food stuffs and separated from other products.

Emergency Guidelines

FIRST AID: Get medical aid as necessary. Eyes, rinse with water for at least 15 minutes. Skin, wash with soap and water. Rinse thoroughly. Inhalation, remove to fresh air; apply respiration if indicated. Ingestion, if conscious, drink 1-2 glasses of water. Induce vomiting by touching back of throat with finger or blunt object.

Prodix* — see Isoproturon*; Neburon.

Profen* — see Fenvalerate.

Profenofos — see Curacron.

PRO 5* Herbicide (trifluralin) — Discontinued 1993 by DowElanco.

Profluralin — see Tolban*.

Profluraline — see Tolban*.

Profos* — see Chlorpyrifos.

Profume* Fumigant (methyl bromide) — Discontinued by Dow Chemical Co.

Profume A* Fumigant (chloropicrin) — Discontinued by Dow Chemical Co.

Progacyl* Drift Control Agent — Discontinued 1993 by Rhone-Poulenc Surfactants & Specialties.

ProGibb* — see Gibberellic Acid.

Prograss* — see Ethofumesate.

Pro-Gro* — see Carboxin; Thiram.

Prokil* — see Cryolite.

Prolan* — see Dilan*.

Prolate* — see Phosmet.

Prolin*

(Discontinued 1992 by Prentiss Incorporated)

Identification

COMMON NAMES: Warfarin mixtures.

Chemistry

COMPOSITION: Warfarin + antibacterial agent + sulfaquinoxaline.

Action/Use

ACTION: Anticoagulant rodenticide.

Safety Guidelines

SIGNAL WORD: DANGER (High conc.). WARNING, CAUTION (Low conc., ready-to-use bait).

TOXICITY CLASS: I (High conc.). II, III (Low conc., ready-to-use bait).

TOXICITY: Warfarin (Rat): Oral LD₅₀ 50 mg/kg. (Dog): 200 mg/kg (NIOSH). TLV 0.1 mg/M³.

Sulfaquinoxaline (Rat): Oral LD₅₀ 1370-1600 mg/kg.

Emergency Guidelines

ANTIDOTE: Vitamin K, and transfusions may be indicated for ingestion of large quantities or repeated low doses.

FIRST AID: Ingestion, if conscious, induce vomiting. Get medical aid.

Promalin*

BP: Abbott Laboratories (Promalin*)

Identification

OTHER NAME: GA 4 + 7 + BA.

Chemistry

COMPOSITION: Gibberellins A₄A₇, 6-benzyl adenine.

Action/Use

ACTION: Plant growth regulator.

USE: Apples, especially Red and Golden Delicious, to improve type (L:D ratio) and increase yield of higher grades.

FORMULATIONS: Liquid concentrate.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Causes eye irritation; harmful if swallowed.

Promar* — see Diphacinone.

Promecarb — see Carbamult*.

Promecarbe — see Carbamult*.

Promet*

BP: Ciba, Ltd. (Deltanet*, Promet*)

Identification

COMMON NAME: Furathiocarb (ISO draft, BSI).

EXP. CODE NUMBER: CGA-73102 (Ciba, Ltd.).

OTHER CODE NUMBER: CAS 65907-30-4.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry
COMPOSITION: Butyl 2,3-dihydro-2,2-dimethylbenzofuran-7-yl N,N'-dimethyl-N,N'-thiodicarbamate (IUPAC).
PROPERTIES: Pure furathiocarb is a yellow liquid boiling at 160°C/0.01 mm Hg. Vapor pressure 84 µPa at 20°C.

Action/Use
ACTION: Systemic insecticide.
USE: For soil-dwelling insects and early-season pests: Special formulations for seed treatment.
FORMULATIONS: Granules, emulsifiable concentrate, capsule suspension.

Registration Notes
 U.S.: Not marketed.
Environmental Guidelines
SOLUBILITY: In water 10 mg/l at 20°C.

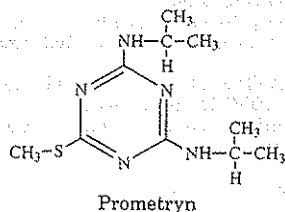
Safety Guidelines
SIGNAL WORD: WARNING.
TOXICITY CLASS: II.
TOXICITY: (50% Premix) (Rat): Oral LD₅₀ 137 mg/kg a.i. Dermal >2000 mg/kg a.i.

Emergency Guidelines
ANTIDOTE: Atropine.
Prometon — see 2,4-D; Pramitol*.
Prométo — see Pramitol*.
Prometrex* — see Prometryn.

Prometryn
 BP: Ciba (Caparol*)
 Ciba, Ltd. (Gesagard*)
 Griffin Corp. (Cotton-Pro*)
 Makhteshim-Agan (Prometrex*)
 OXON Italia S.p.A.

Identification
COMMON NAMES: Prometryn (ISO, WSSA), prometryne (BSI).
EXP. CODE NUMBER: G-34161.
OTHER CODE NUMBERS: CAS 7287-19-6; SHA 080805.
ADDITIONAL TRADE NAME: Primatol Q*.

Chemistry
COMPOSITION: 2,4-bis(isopropylamino)-6-(methylthio)-s-triazine.
FAMILY: Substituted triazine.
PROPERTIES: White, crystalline. Melting point 118-120°C. Readily soluble in organic solvents.



Action/Use
ACTION: Selective herbicide.
USE: For most annual grasses, broadleaf weeds in cotton and celery. Applied to cotton broadcast or in band as preplant incorporated, preemergence, directed postemergence, or layby spray.
FORMULATIONS: Wettable powder, liquid.

Environmental Guidelines
HAZARDS: Fish: LC₅₀ 10.0 mg/l (96 h) (bluegill), 2.5 mg/l (rainbow trout). Bee: Nontoxic.
SOIL PARTICLE ADSORPTION: Approx. 3 months residual activity at 2 kg/ha.
SOLUBILITY: Soluble in water to 33 ppm at 20°C.

Safety Guidelines
SIGNAL WORD: CAUTION (80W); WARNING (4L).
TOXICITY CLASS: III (80W); II (4L).
TOXICITY: Tech (Rat): Oral LD₅₀ 5235 mg/kg. (Rabbit): Dermal LD₅₀ >3100 mg/kg. Minimal eye or skin irritation. Caparol* 80W (Rat): Oral LD₅₀ 3750 mg/kg. (Rabbit): Dermal LD₅₀ >10,200 mg/kg. Inhalation (Rat): LC₅₀ >2.43mg/l for 4 hours. (Rabbit): Slight-mild eye or skin irritation.
PROTECTIVE CLOTHING: Rubber gloves, waterproof boots, protective clothing, hat, approved pesticide respirator.

Emergency Guidelines
FLASHPOINT: N/A.
FIRE EXTINGUISHING MEDIA: Dry chemicals, foam or CO₂.
FIRST AID: Eyes, flush with plenty of water. Get medical attention if irritation persists. Skin, wash with soap and water. Get medical attention if irritation persists. Ingestion, drink 1-2 glasses of water, milk,

egg whites or gelatin solution and induce vomiting by touching back of throat with finger. Call Poison Control Center. **Inhalation,** remove to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. Get medical attention.

Prometryne — see Prometryn.
Promot*
 BP: JH Biotech

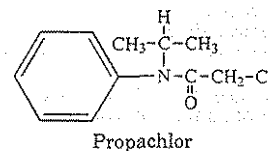
Chemistry
COMPOSITION: Fermentation of *Trichoderma* spp.
Action/Use
ACTION: Biological growth promoter.
USE: Improve seed germination, stimulate plant growth, and hasten flowering and fruiting.

Prompt* Herbicide — see Atrazine; Basagran; Bentazone.
Prompt* Insecticide — see Methyl Parathion.
Promurit* — see Muritan*.
Pronamide — see Kerb*.
Pro-Noxfish* — see Rotenone.
Pronto* — see Trichlorfon.

Propachlor
 BP: Chemol Trading Ltd. Co. (Satecid*)
 Makhteshim-Agan (Prolex*)
 Monsanto Co., The Agricultural Group (Ramrod*)

Identification
COMMON NAMES: Propachlor (ISO-E, BSI, WSSA), propachlore (ISO-F).
CODE NUMBERS: CAS 1918-16-7; SHA 019101.
DISCONTINUED NAMES: Bexton* (Dow Chemical); Wallop* G (+ parathion) (Monsanto Agricultural Co.); Niticid* (Nitrokémia Ltd.).

Chemistry
COMPOSITION: 2-Chloro-N-isopropylacetanilide (IUPAC).
PROPERTIES: Light tan solid, melting point 67-76°C.



Action/Use
ACTION: Selective herbicide.
USE: Preemergence control of many grasses and certain broadleaf weeds in corn and grain sorghum on a variety of soil types. No soil carryover.

FORMULATIONS: Flowable, granules.
COMBINATIONS: Sorgan* (+ propazine) (Makhteshim-Agan).
Registration Notes
 U.S.: Ramrod* for field corn, hybrid seed corn, silage corn, and grain sorghum (milo).

Environmental Guidelines
HAZARDS: Fish: Toxic. Bee: Nontoxic.
SOIL PARTICLE ADSORPTION: Rapidly degradable; a.i. disappears in 4-6 weeks in light soil.

Safety Guidelines
SIGNAL WORD: DANGER (Ramrod* - skin) (Ramrod* 20 G, Ramrod + Atrazine DF - eye); WARNING (Ramrod* + Atrazine).
TOXICITY CLASS: I (Ramrod* - skin) (Ramrod* 20 G, Ramrod + Atrazine DF - eye); II (Ramrod* + Atrazine).
TOXICITY: (Rat): Oral LD₅₀ 500-1700 mg/kg. May cause allergic skin reaction.

Propafos — see Kayaphos*.
Propachlore — see Propachlor.
Propal* — see Mecoprop.
Propamocarb Hydrochloride
 BP: AgrEvo USA Co. (Banol*, Prevx*)
 Hoechst Schering AgrEvo GmbH (Banol*, Dynone*, Filex*, Prevx*, Previcur* N)

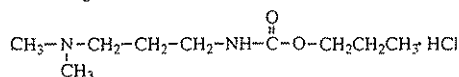
Identification
COMMON NAMES: Propamocarb hydrochloride (ISO-E, ANSI, BSI); propamocarbe hydrochloride (ISO-F).
EXP. CODE NUMBER: SN-66752 (Schering for propamocarb hydrochloride).
OTHER CODE NUMBERS: CAS 24579-73-5 (propamocarb); CAS 25606-41-1 (hydrochloride).

Chemistry
COMPOSITION: (IUPAC): Propyl 3-(dimethylamino)propylcarbamate-hydrochloride. (CAS): Propyl [3-(dimethylamino)-propyl]carbamate-hydrochloride (CAS).

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Propamocarbe Hydrochloride

PROPERTIES: Colorless crystals, very hygroscopic, melting point 45-55°C. Slightly corrosive to metals. Slightly aromatic. Soluble in methanol >500 g/l, isopropanol >300 g/l, ethyl acetate 23g/l, hexane <0.1 g/l and toluene <0.1 g/l (20°C).



Propamocarbe Hydrochloride

Action/Use

ACTION: Fungicide, seed treatment.

USE: Fungicide for control of Oomycete diseases by soil and foliar application in ornamentals, vegetables and other crops. Used as a seed treatment to control *Pythium*, *Aphanomyces* spp., and *Phytophthora* spp. in vegetables and sugar beets. Banol*, Prevex* for control of *Pythium* blight on turfgrass.

FORMULATIONS: Aqueous solution.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 235 mg/l (96 h) (carp); 410-616 mg/l (rainbow trout). Bee: Nontoxic.

SOIL PARTICLE ADSORPTION: Activity duration of 3-4 weeks.

SOLUBILITY: In water (pH 7) 1005 g/l.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 2000-8550 mg/kg; Inhalation LC₅₀ (4 h) >3960 mg/m³air. (Mouse): Oral LD₅₀ 1568-2000 mg/kg. (Rat/Rabbit): Dermal LC₅₀ >3000 mg/kg.

PROTECTIVE CLOTHING: Rubber gloves, and face shield, goggles or glasses.

HANDLING AND STORAGE CAUTIONS: Avoid breathing spray mist. Store in cool, dry area.

Emergency Guidelines

FLASHPOINT: Noncombustible.

FIRST AID: Get medical aid as necessary. **Eyes,** flush with plenty of water. **Skin,** wash with soap and water. **Ingestion,** administer gastric lavage.

EMERGENCY TELEPHONE: 302-892-3000 (AgrEvo USA Co.).

Propamocarbe Hydrochloride — see Propamocarbe Hydrochloride.

Propane

Identification

CODE NUMBER: CAS 74-98-6.

Action/Use

USE: Used in flame control of weeds in corn, soybeans, cotton, tobacco, strawberries. Rate, 4-6 gal./A; one-tenth second flame exposure kills young weeds around corn plant.

See Flame Cultivation, LP-Gas.

Propanex* — see Propanil.

Propanil

BP: AQ Group (Herbax*)

Atabay Agrochemicals & Veterinary Products Inc.

Bayer AG (Surcopur*)

Biesterfeld U.S., Inc.

Biochem S.R.L. (Propanile*)

Cedar Chemical Corp. (Cedar Propanil* 4, Propanex*,

Propanil* 36%, Super Wham*, Wham*)

Crystal Chemical Inter-America (Propanac*, Propanex*,

Propanilo*, Propax*, Supernox*)

Defensa Indústria de Defensivos Agrícolas S.A.

Fersol Indústria E Comércio Ltda.

Gilmore, Inc.

HELM AG

Herbitécnica Defensivos Agrícolas Ltda. (Herbiopropanin*)

Inquiport, S.A. (Inquiport-Propanil)

Insecticidas Internacionales, C.A. (Propanol*)

ISAGRO (Riselect*)

Koruma Tarim A.S.

Proficol El Carmen S.A. (Propanil Tech)

Pyosa, S.A. de C.V. (Pantox-360*)

Rohm and Haas Co. (Stam*, Stampede*, Strel*)

Tifa Ltd. (Chem Rice*)

Identification

COMMON NAMES: Propanil (ISO, BSI, WSSA); DCPA (JMAF).

EXP. CODE NUMBERS: Bay 30130, S 10145 (Bayer); DP-35 (Du Pont); FW-734 (Rohm and Haas Co.).

OTHER CODE NUMBERS: CAS 709-98-8; SHA 028201; EINECS 211-914-6.

ADDITIONAL TRADE NAMES: Apronox* (Atabay); Cekupropanil* (Cequisa); Chem-Rice* (Diachem S.P.A.); Prop-Job* (Drexel); Agro-

propanil LV*, Propanil Proficol*, Propatox* (Proficol El Carmen S.A.); DPA.

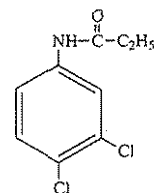
DISCONTINUED NAME: Prostar* (Rohm and Haas).

Chemistry

COMPOSITION: N-(3,4-dichlorophenyl)propanamide.

FAMILY: Anilide.

PROPERTIES: Solid, white-gray. Melting point 91.5°C. Vapor pressure 2.6 × 10⁻⁷ mbar. Molecular weight 218.1. Herbax* Tech completely soluble in ketones, alcohols, chlorinated hydrocarbons; moderately soluble in xylene, benzene, and toluene. Riselect* readily soluble in ketones (60% in isophorone at 25°C), alcohols (54% in ethanol at 25°C), ethers and chlorinated hydrocarbons; moderately soluble in aromatic solvents. Sparingly soluble in aromatic solvents.



Propanil

Action/Use

ACTION: Herbicide (contact type).

USE: Postemergence with no residual effect against numerous grasses and broadleaved weeds in rice.

FORMULATIONS: Emulsifiable concentrate, liquid and dry flowable, low volume, ultra low volume.

COMBINATIONS: Basagran* PL2 (+ bentazone), Facet P* (+ quinclorac) (BASF AG); Herbanil 368* (+ 2,4-D), Herbanil SC* (+ 2,4-D), Herbalin* (+ pendimethalin) (all Herbitécnica); Satunil*, Satunil*, Saturno* Plus (+ thiobencarb) (Kumiai Chemical Industry); Stampede* CM (+ MCPA) (Rohm and Haas Co.); Arrosolo* (+ molinate); Wydac* (+ carbaryl).

Registration Notes

U.S.: Propanex* (Cedar Chemical).

OUTSIDE U.S.: Dropaven*, Propanac*, Propanex*, Propanilo*, Propanex* and Supernox* (all Crystal Chemical Inter-America); Trio* (+ bromoxynil + 2,4-D) (Rhône-Poulenc).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 14 ppm (bluegill); 13 ppm (rainbow trout). Bird: Dietary LC₅₀ 2861 ppm (bobwhite quail), 5627 (mallard); oral LD₅₀ 201 mg/kg (quail).

DEGRADATION AND METABOLISM: Half-life in soil 1.5 days.

SOIL PARTICLE ADSORPTION: Moderate.

SOLUBILITY: Sparingly soluble in water 0.13 g/l at 25°C.

Safety Guidelines

SIGNAL WORD: WARNING (eye/skin).

TOXICITY CLASS: II (eye/skin).

TOXICITY: Tech (Rat): Oral LD₅₀ >2500 mg/kg b.w.; Dermal >5000 mg/kg.

PROTECTIVE CLOTHING: Use chemical splash goggles, polyvinyl chloride gloves, chemically-resistant apron or other impervious clothing to avoid prolonged repeated skin contact.

HANDLING AND STORAGE CAUTIONS: Do not handle or store this material near food, feed or drinking water.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: 100°C.

FIRST AID: **Eyes,** wash with plenty of water for 15 minutes. Get medical aid if irritation persists. **Skin,** wash with soap and water. Get medical aid if irritation persists. **Ingestion,** give 2 glasses of water. Consult physician. **Inhalation,** move to fresh air.

Propanil* 36% — see Propanil.

Propanile* — see Propanil.

Propanilo* — see Propanil.

Propanol* — see Propanil.

Propaphos — see Kayaphos*.

Propargite

BP: Fersol Indústria E Comércio Ltda.

Jin Hung Fine Chemicals Co., Ltd.

Uniroyal Chemical Co., Inc. (Comite*, Omite*, Ornamite*)

Information is presented herein for preliminary planning only.

Exclusive reliance must be placed on information/directions supplied by manufacturer.

Identification

COMMON NAMES: Propargite (ISO, ANSI, BSI, ESA); BPPS (JMAF).
EXP. CODE NUMBER: Uniroyal DO14 (Uniroyal Chemical Co., Inc.).
OTHER CODE NUMBERS: CAS 2312-35-8; SHA 097601; ENT 27226.

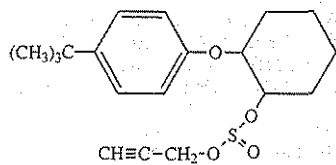
ADDITIONAL TRADE NAMES: Mightikill* (Agsin Pte. Ltd.); Fenpropar* (Diachem S.P.A.).

Chemistry

COMPOSITION: 2-[4-(1,1-dimethylethyl)phenoxy]cyclohexyl 2-propynyl sulfite (CAS).

FAMILY: Sulfite ester.

PROPERTIES: Light to dark viscous liquid. Soluble in most organic solvents.



Propargite

Action/Use

ACTION: Acaricide with residual killing action.

USE: Controls many mites including brown almond, citrus red, citrus rust, clover, European red, McDaniel, Pacific spider, peach silver, strawberry spider, twospotted spider, Willamette, Banks grass, Texas citrus, and sixspotted. For use on almonds, apples, apricots, avocados (non-bearing), beans, carrots (seed), Christmas trees and conifers, clover (seed), corn (field and sweet), cotton, cranberries, figs, grapefruit, grapes, hops, lemons, mint, nectarines, ornamentals, oranges, peaches, peanuts, pears, plums, potatoes, prunes, roses, sorghum (grain), strawberries, sugar beets (seed), and walnuts. Postharvest and non-bearing use on apricots, sweet cherries, and citrus.

FORMULATIONS: Wettable powder, emulsifiable concentrates, emulsion in water.

COMBINATIONS: Omite* Nissorun (+ hexythiazox), Omite* TD (+ tetradifon) (Uniroyal Chemical Co., Inc.).

Environmental Guidelines

HAZARDS: Fish: Toxic. Bird: Slightly toxic. Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: (Tech) DANGER.

TOXICITY CLASS: (Tech) I.

TOXICITY: (Rat): Oral LD₅₀ 4029 mg/kg; Inhalation LC₅₀ 0.05 mg/l. (Rabbit): Dermal LD₅₀ 2940 mg/kg. Severely irritating to rabbit eyes and skin.

PROTECTIVE CLOTHING: Gloves, respirator, goggles and protective clothes.

HANDLING AND STORAGE CAUTIONS: Keep container closed. Store in cool, dry place away from feed and foodstuffs. Keep out of reach of children.

Emergency Guidelines

FIRST AID: Get medical attention. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation**, remove to fresh air. Treat for potential respiratory irritation. **Ingestion**, Do NOT induce vomiting. Drink large quantities of whole or condensed milk.

Propargyl Bromide**Identification**

CODE NUMBERS: CAS 106-96-7; SHA 068701.

Chemistry

COMPOSITION: 3-Bromo-1-propyne (CAS).

Action/Use

ACTION: Ingredient of fumigants.

Propazine

BP: Makhteshim Agan (Prozinex*)
Sanachem (Pty.) Ltd.

Identification

COMMON NAME: Propazine (ISO, ANSI, BSI, JMAF, WSSA).

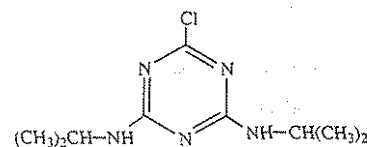
EXP. CODE NUMBER: G-30028.

OTHER CODE NUMBERS: CAS 139-40-2; SHA 080808.

ADDITIONAL TRADE NAMES: Milo-Pro* (Griffin Corp.); Primatol* P. DISCONTINUED NAMES: Gesamil*, Milocep* (+ metolachlor), Milogard* (all Ciba-Geigy).

Chemistry

COMPOSITION: 2-chloro-4,6-bis(isopropylamino)-s-triazine (CAS 8CI).
PROPERTIES: Colorless, crystalline, melting point 212-214°C. Difficult to dissolve in organic solvents.



Propazine

Action/Use

ACTION: Selective herbicide.

FORMULATIONS: Wettable powder, liquid, water dispersible granule.

COMBINATIONS: Sorgan* (+ propachlor) (Makhteshim-Agan).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 17.5 mg/l (rainbow trout). Bee: Nontoxic.

SOLUBILITY: In water to 8.6 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >7000 mg/kg. Mild-moderate eye or skin irritation.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry well-ventilated area out of reach of children and animals.

Propcorn* Grain Preservative (propionic acid) — Discontinued 1989 by Aceto Chemical Co.

Propel*

BP: Unocal Petroleum Products & Chemicals Div.

Identification

TRIVIAL NAME: Lactic acid.

EXP. CODE NUMBER: SY-83.

OTHER CODE NUMBER: CAS 50-21-5; EINECS 200-018-0.

Chemistry

COMPOSITION: 2-Hydroxypropanoic acid (CAS); 2-hydroxypropionic acid (IUPAC).

Action/Use

ACTION: Plant growth regulator.

USE: Almonds, apples, beans (green, dry), broccoli, cabbage, cauliflower, cherries, citrus, corn (sweet, field), cotton, grapes, lettuce, peppers (green, chile), pineapples, prunes, strawberries, sugarcane, tomatoes, walnuts.

FORMULATIONS: 80% solution.

Registration Notes

U.S.: Tolerance exempt as a plant growth regulator on all raw agricultural commodities.

OUTSIDE U.S.: No Mexican or Canadian tolerances or Codex Alimentarius maximum residue limits have been established for residues of lactic acid in any raw agricultural commodities.

Environmental Guidelines

HAZARDS: Fish: LD₅₀ 130 ppm (bluegill, rainbow trout). Bird: (Oral) >2250 mg/kg (quail). (Dietary) >5620 ppm (quail, mallard).

SOIL PARTICLE ADSORPTION: Lactic acid is naturally occurring and rapidly formed and degraded in soil.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 4936 mg/kg (male); 3543 mg/kg (female). (Rabbit): Dermal >2000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Corrosive. Causes severe burns.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Dry chemical, carbon dioxide, or alcohol foam.

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation**, remove to fresh air. **Ingestion**, rinse mouth with water then drink water or milk. Do NOT induce vomiting.

Propellant

An inert ingredient in self-pressurized formulations that produces the force necessary to dispense the active ingredient from the container.

See Aerosol.

Propenal — see Aqualin*.

Propenol — see Allyl Alcohol.

Properties — see Physical Properties.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Propetamphos

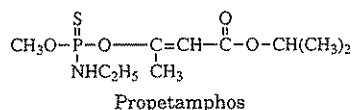
BP: Sandoz Agro, Inc. (Safrotin*)

Identification

COMMON NAME: Propetamphos (ISO, ANSI, BSI, ESA).
 EXP. CODE NUMBER: SAN 52 139 I; Vel 4283 (Velsicol Chemical Corp.).
 OTHER CODE NUMBERS: CAS 31218-83-4; SHA 113601; OMS 1502 (WHO).
 ADDITIONAL TRADE NAMES: Blotic*, Seraphos*.

Chemistry

COMPOSITION: (E)-O-2-isopropoxycarbonyl-1-methylvinyl O-methyl ethylphosphoramidothioate (IUPAC).
 PROPERTIES: Yellowish oily liquid boiling at 87-89°C at 0.005 mm Hg, d_4^{20} 1.1294, n_D^{20} 1.495. Thermostability is very good; hydrolytic stability at 24°C in an aqueous buffered solution is dependent on the pH values - at pH 3, 6, 9 the half lives are roughly 11, 365, and 41 days respectively. Soluble in most organic solvents.

**Action/Use**

ACTION: Contact insecticide with stomach activity.
 USE: For household and public health pests (cockroaches, flies, fleas, mosquitoes).
 FORMULATIONS: Emulsifiable concentrate, aerosol.
 COMBINATION: Safrotin* Aerosol (+ dichlorvos) (Sandoz Agro, Inc.).

Registration Notes

U.S.: EC classified as RUP.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 6.4 mg/l (96 h) (carp).
 SOLUBILITY: In water at 24°C is 110 ppm.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat, male): Oral LD₅₀ 119 mg/kg; Dermal 2825 mg/kg.**Emergency Guidelines**

ANTIDOTE: Atropine with PAM or atropine with obidoxime chloride.
 FIRST AID: In all cases, get medical aid.

Propham

BP: Bayer AG (Birgin*)

Identification

COMMON NAME: Propham (BSI, CSA, ISO, WSSA); prophame (ISO-F); IFC (USSR).

TRIVIAL NAME: IPC.

CODE NUMBERS: CAS 122-42-9; SHA 047601.

ADDITIONAL TRADE NAME: Tuberite*.

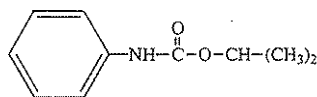
DISCONTINUED TRADE NAMES: Tribetol* (+ endothall) (Atochem Agri B.V.); Triherbide IPC* (ELF Atochem Agri B.V.); Premalox* (+ chlorpropham + fenuron) (May & Baker Ltd.); Chem-Hoe* (PPG Industries); Ban-Hoe* (+ lenacil); Beet-Kleen* (+ chlorpropham + fenuron) (Shell Chemicals UK Ltd.).

Chemistry

COMPOSITION: 1-methylethylphenyl-carbamate.

FAMILY: Carbamate.

PROPERTIES: Colorless crystals. Melting point 87°C, Vapor pressure 1.8 x 10⁻⁴ mbar.



Propham

Action/Use

ACTION: Sprout inhibitor and herbicide. Acts on meristematic tissue.
 USE: Controls sprouting in stored potatoes and in some cases against weeds in vegetables.

FORMULATIONS: Dust, flowable suspension, wettable powder.

COMBINATION: Silone* (+ chlorpropham) (Chimac-Agriphar S.A.); Tripece* (+ chlorpropham) (ELF Atochem Agri B.V.); Herald* (+ chloridazon + chlorpropham + fenuron) (Rhone-Poulenc).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 50 mg/l (96 h) (rainbow trout). Bird: LD₅₀ >2000 mg/kg body weight (Japanese quail).

SOIL PARTICLE ADSORPTION: Half-life in soil approx. 15 days at 16°C, 5 days at 29°C.

SOLUBILITY: In water, 0.25 g/l at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg. Dermal LD₅₀ >5000 mg/kg.

Propame — see Propham.

Propos* Insecticide (ethoprop) — Discontinued by Rhone-Poulenc.

Propiconazole

BP: Ciba (Alamo*, Banner*, Orbit*, Tilt*)

Ciba, Ltd.

Defensa Indústria de Defensivos Agrícolas S.A.

Makhteshim-Agan (Bumper*)

Identification

COMMON NAME: Propiconazole (ISO, BSI).

EXP. CODE NUMBER: CGA-64250 (Ciba, Ltd.).

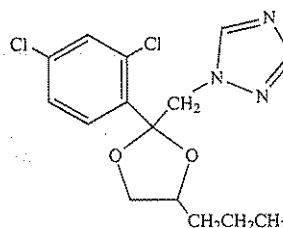
OTHER CODE NUMBERS: CAS 60207-90-1; SHA 122101.

ADDITIONAL TRADE NAME: Desmel* (Germany).

Chemistry

COMPOSITION: 1-[[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]methyl]-1H-1,2,4-triazole (CAS 9CI).

PROPERTIES: Tech: Amber liquid, boiling point 95°C; vapor pressure <3 x 10⁻⁶ mm Hg (20°C). Well miscible with most organic solvents.



Tilt*

Action/Use

ACTION: Foliar fungicide with systemic and eradivative properties; seed treatment.

USE: Tilt* broad spectrum for Ascomycetes, Basidiomycetes, and Deuteromycetes diseases on wheat, barley, rye, oats, rice, and grasses grown for seed. Orbit* for pecans. Banner* broad spectrum and systemic for turf and ornamentals.

FORMULATIONS: Emulsifiable concentrate, SCW, wettable powder.

COMBINATIONS: Tilt* C, Tilt* MBC, Hispor* (all with carbendazim), Tilt CT*, Sambarin* (both with chlorothalonil), Tilt* SP, Tilt* Excel (all with chlorothalonil + carbendazim), Archer*, Glint*, Simbo*, Tilt Top* (all with fenpropimorph), Tilt* Turbo (+ tridemorph), Desgan* (+ pyrazophos), Panogen* (+ guazatine), Zenit* (+ fenpropidin), Tournoi* (+ fenpropidin + fenpropimorph) (all Ciba, Ltd).

Environmental Guidelines

HAZARDS: Fish: Practically nontoxic. Bird: Practically nontoxic.

SOLUBILITY: Solubility in water 110 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1517 mg/kg. Dermal LD₅₀ >4000 mg/kg.**Emergency Guidelines**

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation**, remove to fresh air. **Ingestion**, Do NOT induce vomiting. If victim is fully conscious, give one or two glasses of water.

Propineb

BP: Bayer AG (Antracol*)

Hanwha Corp.

ISAGRO (Airone*)

Identification

COMMON NAMES: Propineb (ISO-E, BSI, JMAF), propinèbe (ISO-F).

EXP. CODE NUMBERS: Bay 46131, LH30/Z.

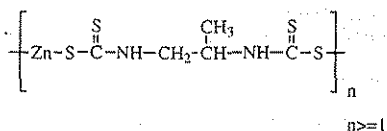
OTHER CODE NUMBERS: CAS 12071-83-9; SHA 522200; EINECS 235-134-0.

Chemistry

COMPOSITION: [[[1-methyl-1,2-ethanediy]bis(carbamodithioate)](2-)]zinc homopolymer.

PROPERTIES: White powder. Vapor pressure <1 mPa at 20°C. Practically insoluble in all solvents.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.



Action/Use

ACTION: Basic contact fungicide with protective action.
USE: Control of downy mildew, black rots, red fire disease on grapes; scab and brown rot on pome fruit; leaf spot diseases on stone fruit; *Alternaria* and *Phytophthora* blights, *Septoria* leaf spot and leaf mould on tomatoes; early and late blight on potatoes; rusts, leaf spot diseases and downy mildews on vegetables and ornamentals; blue mould on tobacco; also used on citrus fruit, rice, tea and berry fruit.
FORMULATIONS: Dusts, flowable, water-dispersible granule, wettable powder.
COMBINATIONS: Antracol* BT (+ triadimefon), Antracol* Kupfer and Antracol* Ramato Micro and Cupro-Antracol* (+ copper oxychloride), Antracol* Triple (+ copper oxychloride + triadimefon) (Bayer AG).

Registration Notes

U.S.: Not marketed.
 OUTSIDE U.S.: Not marketed in Canada.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 1.9 mg/l (96 h) (rainbow trout). Bee: Nontoxic. Bird: LD₅₀ >5000 mg/kg body weight (Japanese quail).

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: IV.
TOXICITY: Tech. (Rat): Oral LD₅₀ >5000 mg/kg b.w.; Dermal LD₅₀ >5000 mg/kg b.w.
PROTECTIVE CLOTHING: Wear appropriate clothing and equipment.

HANDLING AND STORAGE CAUTIONS: Store in sealed original containers, in well-aired, fresh and dry storehouses or in shaded and possibly well-aired places. Recommended product temperature <25-30°C. Stack containers to permit free circulation of air at bottom and inside of the piles. Shelf life: Biological activity of the product remains practically unvaried for 2 years under environmental conditions, provided stored as directed.

Emergency Guidelines

FLASHPOINT: Approx. 70°C.

Propinèbe — see Propineb.

Propionic Acid — see Luprosil*

Propionic Acid Grain Preserver* — Discontinued by Rhone-Poulenc.

Propionyl* — see MCPP.

Propi-Rhap* — see Dichlorprop.

Propisochlor — see Proponit* 720 EC.

Prop-Job* — see Propanil.

Propogon* Insecticide (propoxur) — Discontinued by Crystal Chemical Inter-America.

Proponex* D Herbicide (MCPP + 2,4-D) — Discontinued 1975 by Shell Chemicals UK Ltd.

Proponex-Plus* Herbicide (MCPP) — Discontinued by Shell Chemicals UK Ltd.

Proponit* 720 EC

BP: Nitrokémia Ltd. (Proponit* 720 EC)

Identification

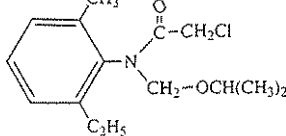
COMMON NAME: Propisochlor (proposed).
CODE NUMBER: CAS 86763-47-5.

Chemistry

COMPOSITION: 2-chloro-6'-ethyl-N-isopropoxymethylaceto-o-toluidide (IUPAC); 2-chloro-N-(2-ethyl-6-methylphenyl)-N-[(1-methylethoxy)methyl]acetamide (CAS).

FAMILY: Chloracetanilide.

PROPERTIES: Light brown to purple oil. Soluble in most organic solvents.



Propisochlor

Action/Use

ACTION: Selective herbicide.
USE: Preemergence or preplant incorporated for control of annual grasses and some broadleaf weeds in maize, sunflowers, soybeans, potatoes and peas.
FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96 h) 7.94 mg/l (carp); 0.25 mg/l (rainbow trout). Bird: Nontoxic. Bee: Nontoxic.

SOLUBILITY: In water, 184 mg/l (20°C).

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 2888 mg/kg (a.i.); 3425 mg/kg (form.). Dermal LD₅₀ 5000 mg/kg. Inhalation LD₅₀ 5000 mg/m³. (Rabbit): Mildly irritating to eyes, non-irritating to skin.

Propoxan* — see Propoxur.

Propoxon

Chemistry
COMPOSITION: O,O-Diethyl-Sthioate.

Action/Use

ACTION: Insecticide.
 See Acethion, Azethion, Prothion.

Propoxur

- BP: Bayer AG (Baygon*, Blattanex*, Suncide*, Unden*)
- EniChem Synthesis S.p.A. (Briproxur*)
- Makhteshim-Agan (Propyon*)
- Miles Inc. (Baygon*)
- Pilarquim Corp. (Pilargon*)
- PT. INTI Everspring Indonesia
- Sanachem (Pty) Ltd. (Mitoxur*, Propoxan*)
- Sanex Inc. (Prox*)
- Taiwan Tainan Giant Industrial Co., Ltd.

Identification

COMMON NAMES: Propoxur (ISO, BSI, ESA); PHC (JMAF); arprocarb abandoned by BSI.

EXP. CODE NUMBER: Bay 39007, BO Q 5812315 (Bayer AG).
OTHER CODE NUMBERS: CAS 114-26-1; SHA 047802; OMS 33 (WHO); ENT-25671; EINECS 204-043-8.

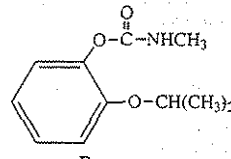
ADDITIONAL TRADE NAMES: Proprotox* (Agsin Pte. Ltd.); Prentox* Carbamate (Prentiss Incorporated).

DISCONTINUED NAME: Propogon* (Crystal Chemical Inter-America).

Chemistry

COMPOSITION: 2-(1-Methylethoxy)phenyl methylcarbamate (CAS).
FAMILY: Carbamate.

PROPERTIES: Colorless crystals. Melting point 90°C. Vapor pressure 1.3 mPa at 20°C. Believed compatible with most insecticides, fungicides except alkalines. Unstable in highly alkaline media. Readily soluble in dichloromethane, 2-propanol, toluene. Hardly soluble in n-hexane.



Propoxur

Action/Use

ACTION: Insecticide.
USE: Controls sucking and chewing insects in cane, cocoa, fruit, grapes, maize, rice, sugar, vegetables, cotton, lucerne, and ornamentals, etc. Baygon* for ants, cockroaches, crickets, flies, mosquitoes.
FORMULATIONS: Aerosol, bait, emulsifiable concentrate, dustable powder, fumigant, granules, oilspray, ULV liquid, wettable powder.
COMBINATIONS: Disyston* N (+ disulfoton), Gusaden* (+ azinphosmethyl) (Bayer AG); Chloxur* (+ chlorpyrifos) (Chimac-Agriphar S.A.).

Registration Notes

U.S.: Baygon* not for food crops. Prentox* Carbamate (Prentiss Incorporated) for professional use only.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 3.7 - 13.6 mg/l (96 h) (rainbow trout). Bee: Toxic. Bird: LC₅₀ 2828 mg/kg b.w. (bobwhite quail).

SOLUBILITY: Hardly soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (1.5 EC); WARNING (70 WP); CAUTION (2% Bait).

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

TOXICITY CLASS: I (1.5 EC); II (70 WP); III (2% Bait).
 TOXICITY: Tech (Rat): Oral LD₅₀ approx. 50 mg/kg. Dermal >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Ingestion, administer atropine sulfate in large therapeutic doses. Repeat as necessary to the point of tolerance. Do NOT give morphine.

FIRST AID: Get medical aid. Eyes, flush with plenty of water. Skin, wash immediately with soap and water. Inhalation, remove to fresh air.

EMERGENCY TELEPHONE: 49-2173-38-3030 (Bayer AG); 816-242-2582 (Miles Inc.).

Proprietary Chemical

A chemical made and marketed by one having the exclusive right to manufacture and sell it.

Proprop — see Dalapon.

Proprotox* — see Propoxur.

Propuron* — see Neburon.

Propyl isome

(Discontinued by S.B. Penick & Co.)

Identification

COMMON NAME: Propyl isome (ESA).

CODE NUMBER: CAS 83-59-0.

Chemistry

COMPOSITION: Dipropyl 5,6,7,8-tetrahydro-7-methylnaphtho(2,3-d)-1,3-dioxole-5,6-dicarboxylate.

Action/Use

ACTION: Pyrethrin synergist.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1500 mg/kg.

Propylene Dichloride

(Discontinued by Dow Chemical Co.)

Identification

COMMON NAMES: 1,2-Dichloropropane (ISO-E, BSI); dichloro-1,2, propane (ISO-F).

CODE NUMBERS: CAS 78-87-5; SHA 042005; ENT-15406.

Chemistry

COMPOSITION: 1,2-Dichloropropane (IUPAC and CAS).

Action/Use

ACTION: Fumigant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Guinea pig): Oral LD₅₀ 2000-4000 mg/kg.

s-2 Propylethyl-N-butyl Thiocarbamate

Action/Use

ACTION: Herbicide.

USE: Preplanting soil application or postemergence soil incorporation on sugar beets and tomatoes.

Propyure

Chemistry

COMPOSITION: (E)-10-propyl-5,9-tridecadien-1-ol acetate (CAS).

Action/Use

USE: Attractant formerly reported as the natural sex lure secreted by the female pink bollworm moth.

Propyon* — see Propoxur.

Propyzamide — see Kerb*.

ProShear*

BP: Abbott Laboratories

Identification

CHEMICAL NAME: 6-Benzyladenine in Tetrahydrofurfuryl alcohol (THFA).

CODE NUMBERS: CAS 1214-39-7 (6-Benzyladenine).

Chemistry

COMPOSITION: N-(Phenylmethyl)-1H-purine-6-amine.

PROPERTIES: Clear liquid, boiling point 78°C.

Action/Use

ACTION: Plant growth regulator.

USE: For use on White Pine to increase lateral bud set the year of application and branch development the year following application.

Environmental Guidelines

SOLUBILITY: Miscible with water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

Emergency Guidelines

FLASHPOINT: >180°F.

Prostar* Herbicide (propanil) — Discontinued 1992 by Rohm and Haas Co.

Protar* — see Moncut*.

Protect*

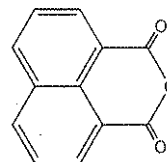
(Discontinued by Gulf Oil Chemical Co.)

Identification

CODE NUMBER: CAS 81-84-5

Chemistry

COMPOSITION: 1,8-Naphthalic anhydride (IUPAC).



1,8-Naphthalic Anhydride

Action/Use

ACTION: Corn seed treatment.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 12,340 mg/kg.

Protect T/O* — see Mancozeb.

Protectant

A pesticide applied to a plant or animal prior to the appearance or occurrence of the pest in order to prevent infection or injury by the pest.

Protective Clothing

EPA defined "protective clothing," effective August 21, 1992, as follows in connection with its reentry standards: "Devices and apparel that are worn to protect the body from contact with pesticides or pesticide residues, including, but not limited to, coveralls, chemical-resistant suits, chemical-resistant gloves, chemical-resistant footwear, respiratory protection devices, chemical-resistant aprons, chemical-resistant headgear, and protective eyewear."

See Worker Protection Standard article in the Environmental and Safety Section.

Protective Fungicide

A fungicide intended only for application prior to appearance of a plant disease to prevent or inhibit growth of the fungus or other disease organism if and when it appears.

Protector D* — see Thiram.

Protector L* — see Thiram.

Protector-3L* (TCMTB) — Discontinued 1987 by Agway, Inc.

Prothidathion

Identification

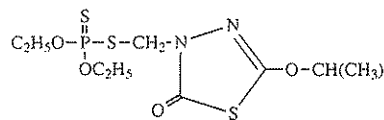
COMMON NAME: Prothidathion (ISO, BSI).

CODE NUMBERS: CAS 20276-83-9; SHA 350100.

Chemistry

COMPOSITION: S-(2,3-Dihydro-5-isopropoxy-2-oxo-1,3,4-thiadiazol-3-ylmethyl) O,O-diethyl phosphorodithioate.

PROPERTIES: Related to lythidathion.



Prothidathion

Action/Use

ACTION: Acaricide.

Prothiocarb — see Previcur*.

Prothiocarbe — see Previcur*.

Prothion

Chemistry

COMPOSITION: O,O-Diethyl S-carboethoxyethyl phosphoro-dithioate

Action/Use

ACTION: Insecticide.

See related compounds Acethion, Azethion, Propoxon.

Prothiotos — see Tokuthion*.

Prothoate

BP: Agrimont S.p.A. (Fac*)

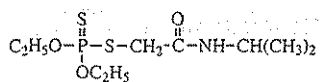
Identification

COMMON NAME: Prothoate (ISO, BSI).

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

CODE NUMBERS: CAS 2275-18-5; SHA 344300; ENT-24652.
 ADDITIONAL TRADE NAME: Fostion*.

Chemistry
 COMPOSITION: O,O-Diethyl S-(N-isopropylcarbamoylmethyl) phosphorodithioate.
 PROPERTIES: White crystals, melting point 23-24°C; Amber-colored semisolid. Soluble at 20°C with most organic solvents in amounts of less than 0.5% in water and 2% in petroleum solvent.



Prothoate

Action/Use

ACTION: Systemic insecticide-acaricide.

USE: Acts systemically by application to either foliage or roots. For control of mites, aphids and certain pests of fruit trees.

FORMULATIONS: Emulsifiable concentrates, wettable powder, dust, granules.

COMBINATIONS: Fac Super* (+ chlorfenazon); Oleofac*, Ovifac* (+ tetradifon).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 8 mg/kg. Dermal LD₅₀ 655 mg/kg.

PROTECTIVE CLOTHING: Wear appropriate clothing and equipment.

HANDLING AND STORAGE CAUTIONS: Store product in sealed original containers, in well-aired, fresh and dry storehouses or in shaded and possibly well-aired places. Recommended product temperature <25-30°C. Keep away from sources of heat, free flames or spark-generating equipment. Stack containers to permit free circulation of air at bottom and inside of piles. Storage areas must be located at a suitable distance from inhabited buildings, animal shelters, and food stores, inaccessible to unauthorized persons, children, and domestic animals. Biological activity of the product remains practically unvaried for 2 years under environmental conditions, provided stored as directed.

Emergency Guidelines

FLASHPOINT: 160°C.

ANTIDOTE: Atropine sulphate.

FIRST AID: In all instances, get medical aid.

Protopam Chloride — see 2-PAM (Protopam Chloride).

Proton* Fungicide — see Fenpropimorph; Prochloraz.

Proton* Herbicide — see Isoproturon.

Protosan* — see Isoproturon.

Prottox* — see Lindane.

Protugan* — see Isoproturon.

Provado* 75 WP — see Imidacloprid.

Provei* Herbicide (dicamba + 2,4-D) — Discontinued.

ProVide* — see Gibberellic Acid.

Prowl*

BP: American Cyanamid Co. (Accotab*, Go-Go-San*, Herbadox*, Prowl*, Sipaxol*, Stomp*, Wax Up*)

Identification

COMMON NAMES: Pendimethalin (ISO-E, ANSI, BSI, WSSA); pendiméthaline (ISO-F).

EXP. CODE NUMBER: AC 92553.

CODE NUMBERS: CAS 40487-42-1; SHA 108501.

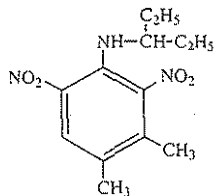
DISCONTINUED NAMES: Prozine* (+ atrazine) (American Cyanamid Co.).

Chemistry

COMPOSITION: N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzamine (CAS).

FAMILY: Dinitroaniline.

PROPERTIES: Orange-yellow crystalline solid, melting point 54-58°C. Soluble in most organic solvents such as acetone and xylene.



Pendimethalin

Action/Use

ACTION: Selective herbicide.

USE: Preemergence or postemergence in field corn; preemergence or preemergence incorporated use in potatoes; early postemergence use in rice; postemergence incorporated use in sorghum; preplant and early preplant use in soybeans and sunflowers in conservation tillage; incorporated use in cotton, soybeans, tobacco, peanuts, and sunflowers. Controls most annual grasses and certain broadleaf weeds.

FORMULATIONS: Emulsifiable concentrate.

COMBINATIONS: Pursuit Plus* (+ imazethapyr) (American Cyanamid); Vulkan* T (+ bentazone) (BASF AG); Scotts Progrow* (+ oxyfluorfen) (O.M. Scott & Sons).

Registration Notes

OUTSIDE U.S.: Wettable powder preemergence for established turf and winter cereals; preemergence or preplant incorporated for transplanted vegetables.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Solubility in water 0.275 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Prowl* (3.3EC): (Rat): Oral LD₅₀ 3956 mg/kg. (Rabbit):

Dermal LD₅₀ 2200 mg/kg. Mild irritant to rabbit and skin and eyes.

PROTECTIVE CLOTHING: Goggles or face shield and rubber gloves.

HANDLING AND STORAGE CAUTIONS: Store above 40°F. Extended storage at temperatures <40°F can result in the formation of crystals on the bottom of the container. If crystallization does occur, store the container on its side at room temperature (70°F) and rock occasionally until crystals redissolve. Do not store near food or feed products.

Emergency Guidelines

FLASHPOINT: 208°F.

EMERGENCY TELEPHONE: 201-835-3100 (American Cyanamid).

Prox* — see Propoxur.

Proxan — see IPX.

Proxol* — see Trichlorfon.

Prozap* Rodenticide (zinc phosphide) — Discontinued 1994 by HACCO, Inc.

Prozine* Herbicide (atrazine + pendimethalin) — Discontinued 1992 by American Cyanamid.

Prozinex* — see Propazine.

Prunit* — see Uniconazole-P.

Prussic Acid — see Hydrocyanic Acid.

Pryfon 6* Insecticide (isofenphos) — Discontinued 1993 by Miles Inc.

Prynachlor**Identification**

COMMON NAMES: Prynachlor (ISO-E, ANSI, BSI, WSSA); prynachlore (ISO-F).

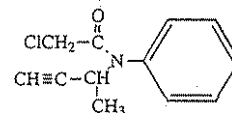
EXP. CODE NUMBER: BAS-290H.

OTHER CODE NUMBERS: CAS 21267-72-1; SHA 314300.

DISCONTINUED NAME: Basamaize* (BASF AG).

Chemistry

COMPOSITION: 2-Chloro-N-(1-methylprop-2-ynyl)acetanilide.



Prynachlor

Action/Use

ACTION: Selective preemergence herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 1177 mg/kg. (Rabbit): Dermal LD₅₀

1926 mg/kg. 4 EC (Rat): 2.0 ml/kg.

Prynachlore — see Prynachlor.

PT* 1100 — see Piperonyl Butoxide; Pyrethrum.

PT* 1325 ME DuraGuard*

BP: Whitmire Research Laboratories

Identification

COMMON NAMES: Chlorpyrifos.

Chemistry

FAMILY: Organophosphate.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Insecticide.

USE: For aphids, fungus gnats, scale, mealybugs, thrips, and ants.

FORMULATION: Timed release, water based microencapsulated liquid concentrate.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III, IV.

PT* 1600A — see Piperonyl Butoxide; Pyrethrum.

PT 265* **Insecticide/Nematicide (diazinon)** — Discontinued by Whitmire Research Laboratories.

PTMB — see Danifos*.

Pulsar* — see Cymoxanil; Mancozeb; Oxadixyl.

Pulsar* — see Bentazone; MCPB.

Pulta — see Bentazone; Facet*.

Punch* — see Flusilazole.

Punix* — see Cypermethrin.

Pupa

The resting stage of those insects in which a larva (or feeding stage) follows the egg stage. During the pupal period the creature develops wings and other adult parts.

Puratized* **Agricultural Spray** — Discontinued by Niagara Chemical Co.Puratized* **Apple Spray** — Discontinued by Niagara Chemical Co.Puratized* **B-2** — see Mercuric Lactate.

Purivel* — see Metoxuron.

Pursuit*

BP: American Cyanamid Co. (Pursuit*)

Identification

COMMON NAME: Imazethapyr (ISO draft, ANSI, BSI).

EXP. CODE NUMBERS: AC 263,499; CL-263499.

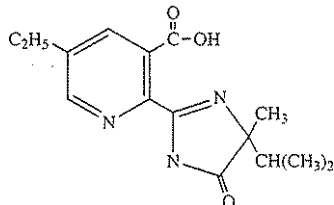
OTHER CODE NUMBER: CAS 81334-34-1.

Chemistry

COMPOSITION: (±)-2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-5-ethyl-3-pyridinecarboxylic acid (CAS).

FAMILY: Imidazolinone.

PROPERTIES: Clear dark brown or green liquid; musty odor.



Pursuit*

Action/Use

ACTION: Herbicide.

USE: Selective preemergence, preplant incorporated and postemergence herbicide for control of annual grass and broadleaf weeds in soybeans, other leguminous crops, and imidazolinone resistant /tolerant corn (IMI-Corn).

FORMULATIONS: Aqueous concentrate.

COMBINATIONS: Contour* (+ atrazine), Passport* (+ trifluralin), Pursuit Plus* (+ pendimethalin), Resolve* (+ dicamba) (American Cyanamid).

Registration Notes

U.S.: For soybeans, dry and edible beans, peas, peanuts, and imidazolinone resistant /tolerant corn (IMI-Corn).

Environmental Guidelines

SOLUBILITY: Miscible.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal >2000 mg/kg. Non-irritating to eyes, skin.

PROTECTIVE CLOTHING: Rubber gloves, apron.

HANDLING AND STORAGE CAUTIONS: Avoid skin, eye, clothing contact. Do not breathe spray mist. Do not store at <32°F. Do not contaminate water, food, or feed by storage or disposal.

Emergency GuidelinesFIRST AID: Get medical aid. **Eyes**, flush with plenty of water. **Skin**, wash with plenty of soap and water. **Ingestion**, drink two glasses of water, induce vomiting. **Inhalation**, remove to fresh air. If breathing is difficult, administer oxygen and see a physician promptly.

Putty Powder — see Calcium Carbonate, Surface Treated.

Pybuthrin* — see Piperonyl Butoxide.

Pydrin* **Insecticide (fenvalerate)** — Discontinued by Du Pont Agricultural Products.**Pynamin***

BP: Sumitomo Chemical Co., Ltd.

Identification

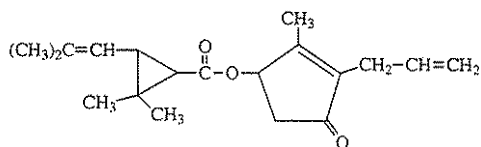
COMMON NAMES: Allethrin (ISO-E, ANSI, BSI, ESA, JMAF); al-léthrine (ISO-F); palléthrine (France).

CODE NUMBERS: CAS 584-79-2; OMS-468 (WHO); ENT-17510.

DISCONTINUED NAME: Alleviate* (+ piperonyl butoxide) (Fairfield American Corp.).

Chemistry

COMPOSITION: (RS)-3-allyl-2-methyl-4-oxocyclopent-2-enyl (1RS)-cis-trans chrysanthemate; also referred to as allyl homolog of cimerin I. PROPERTIES: Clear, amber-colored, viscous liquid. Miscible with most organic solvents at 20-25°C.



Allethrin

Action/Use

ACTION: Insecticide.

USE: Flying and crawling insect control for household, industrial locations and outdoor use.

FORMULATIONS: Aerosols, coils, mat, oil liquid, emulsifiable concentrate.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): LD₅₀ 1100 mg/kg (male); 685 mg/kg (female).

PROTECTIVE CLOTHING: Goggles, gloves, and respirator should be used when handling tech. grade or 90%.

None required for handling usual products for home and industry.

HANDLING AND STORAGE CAUTIONS: Ordinary good manufacturing practices and sanitation.

Ventilate well. Store in closed drum in cool, dry place.

See Pyrethroids.

Pynamin-Forte*

BP: Sumitomo Chemical Co., Ltd.

Identification

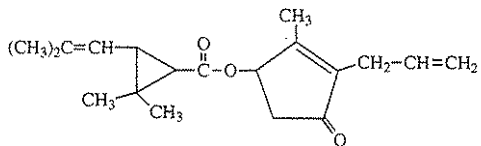
COMMON NAME: d-allethrin.

CODE NUMBERS: CAS 42534-61-2.

DISCONTINUED NAME: MGK* Allethrin Concentrate (McLaughlin Gormley King Co.)

Chemistry

COMPOSITION: (RS)-3-allyl-2-methyl-4-oxocyclopent-2-enyl (1R)-cis/trans chrysanthemate.

PROPERTIES: Pale, yellow, oily liquid. Specific gravity, d₂₀²⁰, 1.005-1.015. Vapor pressure: 1.2 × 10⁻⁴ mm Hg at 30°C. Miscible with most organic solvents at 20-25°C.

d-allethrin

Action/Use

ACTION: Insecticide.

USE: Flying and crawling insect control for household and industrial locations and outdoor use.

FORMULATIONS: Mosquito coils, mosquito mat, oil liquid, aerosol, vaporized liquid, emulsifiable concentrate.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1320 mg/kg. Dermal LD₅₀ > 2500 mg/kg (male); > 2500 mg/kg (female).

HANDLING AND STORAGE CAUTIONS: Ordinary good manufacturing practices and sanitation. Ventilate well. Store in closed drum in a cool, dry place.

Pynosect* — see Resmethrin.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

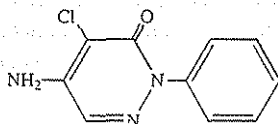
Pyracarbolid — see Sicarol*.
Pyracarbolide — see Sicarol*.
Pyracide* Insecticide (demephion) — Discontinued by BASF AG.
Pyraclufos — see Voltage.
Pyracur* FL — see Metolachlor; Pyramin*.
Pyracur* L — see Lenacil; Metolachlor; Pyramin*.
Pyradex* Herbicide (chloridazon + di-allate) — Discontinued 1989 by BASF AG.
Pyradex* T — see Pyramin*.

Pyramat*
Identification
 EXP. CODE NUMBER: G 23330.
 OTHER CODE NUMBERS: CAS 2532-49-2; SHA 575300.

Chemistry
 COMPOSITION: 6-Methyl-2-propyl-4-pyrimidinyl dimethyl-carbamate.
Action/Use
 ACTION: Insecticide.

Pyramin*
 BP: BASF AG (Pyramin*)

Identification
 COMMON NAMES: Chloridazon (ISO-E, BSI), pyrazon (ANSI, WSA); chloridazone (ISO-F); PAC (JMAF).
 CODE NUMBERS: CAS 1698-60-8; SHA 069601; EINECS 216-920-2.
 ADDITIONAL TRADE NAME: Predazon* (Chimac-Agriphar S.A.); Bonus* (Sostram Corp.).
 DISCONTINUED NAME: Pyrat* (+ ethofumesate) (BASF AG)
Chemistry
 COMPOSITION: 5-amino-4-chloro-2-phenyl-3-(2H)-pyridazinone (CAS).
 FAMILY: Pyridazinone.
 PROPERTIES: Tech. a.i.: Solid, brown, approx. odorless, melting point approx. 198-202°C.



Chloridazon

Action/Use
 ACTION: Herbicide.
 USE: Preemergence and early postemergence weed control in beets (fodder, red, sugar), and some ornamentals.
 FORMULATIONS: Flowable (SC), water dispersible granule, wettable powder.
 COMBINATIONS: Lenapac* and Pyrasur* (+ lenacil), Fiesta* and Rebell* (+ quinmerac), Magnum* (+ ethofumesate) (BASF AG); Pyracur* FL (+ metolachlor), Pyracur* L (+ lenacil + metolachlor), Pyradex* T (+ tri-allate) (BASF Corp.); Herald* (+ chlorpropham + fenuron + propham) (Rhône-Poulenc); Spectron* (+ ethofumesate).

Environmental Guidelines
 HAZARDS: Fish: LC₅₀ >32-46 mg/l (trout). Bird: LD₅₀ >2000 mg/kg (quail). Bee: Nontoxic.
 SOLUBILITY: Low, 0.034 g/100g water. Formulations water dispersible.

Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: III.
 TOXICITY: Form (Rat): Oral LD₅₀ ca. 2200 mg/kg. Dermal LD₅₀ >2500 mg/kg.
 PROTECTIVE CLOTHING: Goggles, long-sleeved shirt and pants, and boots when handling the undiluted and diluted product. Rubber gloves when handling the undiluted product.
 HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes, skin, clothing, foodstuffs. Keep out of reach of children.
 SPILL CONTROL/CLEANUP: Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.
 PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.
Emergency Guidelines
 ANTIDOTE: Unknown.
 FIRST AID: Get medical aid. **Eyes**, flush immediately with water for at least 15 minutes. **Skin**, remove contaminated clothing, wash skin with soap and water. **Inhalation**, remove to fresh air. **Ingestion**, do NOT induce vomiting unless advised by a physician.

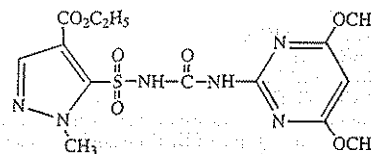
EMERGENCY TELEPHONE: 800-832-4357 (BASF). 800-424-9300 (CHEMTREC).

Pyrasur* — see Lenacil; Metolachlor.
Pyrat* Herbicide (chloridazon + ethofumesate) — Discontinued by BASF AG.
Pyrax* ABB — see Dusts; Pyrophyllite.
Pyrazolate — see Sanbird*.
Pyrazon — see Alicep*; Pyramin*.
Pyrazophos — see Afugan*; Carbendazim; Impact*.
Pyrazosulfuron-ethyl
 BP: Lucky Ltd.

Nissan Chemical Industries, Ltd. (Agreen*, Sirius*)

Identification
 COMMON NAME: Pyrazosulfuron-ethyl (ISO draft, BSI).
 EXP. CODE NUMBER: NC-311 (Nissan Chemical Industries, Ltd.).
 OTHER CODE NUMBER: CAS 93697-74-6

Chemistry
 COMPOSITION: Ethyl 5-(4,6-dimethoxypyrimidin-2-ylcarbamoylsulfamoyl)-1-methylpyrazole-4-carboxylate.
 FAMILY: Sulfonylurea.
 PROPERTIES: White crystalline solid; melting point 181-182°C. Soluble in chloroform and ethyl acetate.



Pyrazosulfuron-Ethyl

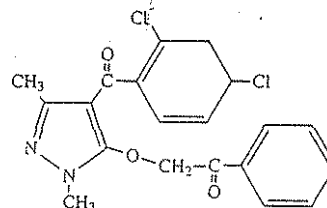
Action/Use
 ACTION: Preemergence and postemergence herbicide.
 USE: Controls annual, perennial broadleaf weeds, and sedges in direct-seeded and transplanted paddy rice.
 FORMULATIONS: Granule, suspension concentrate, wettable powder.

Environmental Guidelines
 SOLUBILITY: In water, 1494 ppm at 25° C, pH7.
Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: III.
 TOXICITY: Sirius*: (Rat) Oral LD₅₀ >5000 mg/kg. Dermal >2000 mg/kg.
 PROTECTIVE CLOTHING: Goggles or face shield and gloves during handling.
 HANDLING AND STORAGE CAUTIONS: Avoid eye, skin contact. Avoid water and moisture contamination. Store in original container, tightly closed, in a cool, dry, and well ventilated place. Keep out of the reach of children. Do not store with feeds or foodstuffs.

Pyrazothion*
 (Discontinued 1968 by Ciba-Geigy Ltd.)
Identification
 EXP. CODE NUMBER: G-24027.
 OTHER CODE NUMBER: CAS 108-35-0.

Action/Use
 ACTION: Systemic insecticide.
Pyrazoxon* Insecticide — Discontinued by Ciba-Geigy Ltd.

Pyrazoxyfen
 BP: Ishihara Sangyo Kaisha, Ltd.
Identification
 COMMON NAMES: Pyrazoxyfen (ISO-E draft, BSI); pyrazoxyfene (ISO-F).
 EXP. CODE NUMBER: SL-49.
 ADDITIONAL TRADE NAME: Paicer*.
Chemistry
 COMPOSITION: 4-(2,4-dichlorobenzoyl)-1,3-dimethyl-5-phenacyloxy-1H-pyrazole (IUPAC).



Pyrazoxyfen

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Herbicide.
USE: Preemergence and early postemergence for annual and perennial weeds in paddy rice.
FORMULATIONS: Granule.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 1644-1690 mg/kg.
Pyrazoxyfène — see Pyrazoxyfen.

Pyrellin* E.C.

BP: Webb Wright Corp. (CCT Corp., Dist.- Western U.S./Mexico)

Identification

CODE NUMBER: SHA 30573-2.

Chemistry

COMPOSITION: Pyrethrins, rotenone.
PROPERTIES: Light amber with strong natural medicinal odor.

Action/Use

ACTION: Insecticide.
USE: For fruit, nuts, vegetables, field crops, greenhouse crops.
FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

HAZARDS: Fish: Highly toxic.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 1500 mg/kg.
PROTECTIVE CLOTHING: Long sleeved shirt and long pants, chemical-resistant gloves, shoes plus socks. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

HANDLING AND STORAGE CAUTIONS: Keep out of heat and cold. Store only in the original container. Keep away from fertilizer, food, other pesticides & feed. Keep out of reach of children & animals. Do not contaminate water, food or feed by storage or disposal. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. Do not contaminate water by cleaning equipment or disposal of wastes.

Emergency Guidelines

FLASHPOINT: 32°F.
FIRE EXTINGUISHING MEDIA: Water or dry chemical.
FIRST AID: Get medical aid. **Eyes,** flush immediately with copious amounts of water. **Skin,** flush thoroughly with copious amounts of water. **Ingestion,** contact a physician at once. **Inhalation,** remove from contact & seek medical attention.
EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Pyrenone*

BP: Roussel Uclaf Corp. (Pyrenone* Crop Spray)

Chemistry

COMPOSITION: Pyrethrum + piperonyl butoxide.
Action/Use
ACTION: Insecticide.
USE: In agricultural insecticides for vegetable gardens.
FORMULATIONS: Pressurized sprays, solutions, emulsions, dusts, wettable powders, and paper coatings.
 Available in oil-soluble, water soluble, and dry forms.

Pyrenone* Crop Spray — see Pyrenone*.

Pyresote*

Action/Use
ACTION: Wood preservative with high resistance to fire.

Pyrethrins — see Pyrethrum.

Pyrethroids

Pyrethroids are synthetic compounds produced to duplicate or improve more or less successfully on the biological activity of the active principles of the pyrethrum plant. These compounds include: allethrin, alphamethrin, barthrin, bioallethrin, bioresmethrin, biopermethrin, cis-methrin, cyfluthrin, cypermethrin, deltamethrin, dimethrin, esbioI, fenothrin, fenpropanate, fenvalerate, flucythrinate, fluvalinate, furethrin, indothrin, permethrin, phthalthrin, resmethrin, tetramethrin, tralomethrin.

Pyrethrum

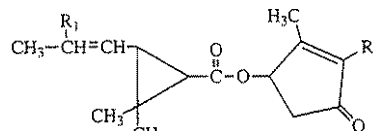
BP: Agropharm Ltd.
 McLaughlin Gormley King Co. (Pyroicide*)
 Prentiss Incorporated (Prentox* Pyrethrum Extract 20%)
 Roussel Uclaf Corp. (Synerol*)

Identification

COMMON NAMES: Pyrethrins, pyrethrum.

Chemistry

PROPERTIES: A botanical insecticide whose active principles are pyrethrins I and II (esters of pyrethrolone and chrysanthemic acid and pyrethroic acid), cinerins I and II (esters of cinerolone and chrysanthemic and pyrethroic acids), and jasmolin I and II (jasmoline and chrysanthemic and pyrethroic acids), collectively known as the "pyrethrins." The plant *Chrysanthemum cinerariaefolium*, and the flowers are the source of the principles. The flowers and extracts therefrom are imported from Kenya, Rwanda, Tanzania and Ecuador, principally. Pyrethrum dried flowers contain .9-1.3% pyrethrins. The crude extract or oleoresin contains 50-60% pyrethrins and most refined grade (pale) about 60% (20% in U.S.) pyrethrins by dewaxing and decoloring. Formerly the dried flowers were known as Dalmatian insect flowers; the powdered flowers as "insect powder."



Pyrethrins

	R ₁	R ₂
Pyrethrin I	CH ₃	CH ₂ CH=CHCH=CH ₂
Jasmolin I	CH ₃	CH ₂ CH=CHCH ₂ CH ₃
Cinerin I	CH ₃	CH ₂ CH=CHCH ₃
Pyrethrin II	COOCH ₃	CH ₂ CH=CHCH=CH ₂
Jasmolin II	COOCH ₃	CH ₂ CH=CHCH ₂ CH ₃
Cinerin II	COOCH ₃	CH ₂ CH=CHCH ₃

Action/Use

ACTION: Contact insecticide.
USE: Because of their safety, pyrethrum extracts are used extensively in stock sprays, pet sprays, household sprays, and aerosols, industrial sanitation sprays, and to protect stored food in warehouses, etc. These pyrethrins may be extracted in kerosene, alcohol, acetone or ethylene dichloride for formulation in dust, sprays, etc. They are incompatible with lime and ordinary soaps because acids and alkalis speed up the processes of hydrolysis. Pyrethrins have proved to be stable for long periods in water-base aerosols where modern emulsifiers give neutral water systems. Pyrethrins are oxidized on exposure to the air and stored flowers may lose 20% of their activity in a year. Impregnated and stabilized dusts are less susceptible to oxidation than dusts made from ground flowers. Oxidation is not a problem in stabilized oil concentrates. Oxidation can be inhibited with materials such as hydroquinone, pyrogallol, isopropyl cresol, tannic acid, and other antioxidants.
FORMULATIONS: Concentrate in oil and water, usually containing synergists; in impregnated and stabilized dust concentrates; and in dilute dusts made from ground flowers. In recent years a low-color, 20% pyrethrin extract in oil has become the "standard" item of the industry, although less concentrated solutions in oil are still available.
COMBINATIONS: Synergists such as piperonyl butoxide or N-octyl bicycloheptene dicarboximide (MGK* 264) are necessary to produce a good kill at an economical level. Butacide* (piperonyl butoxide) and/or N-octyl bicycloheptene dicarboximide are added to pyrethrins in 2:1 to 10:1 ratios. The two synergists are often used in combination — the most useful combination being 1:2:3.3 parts pyrethrins; piperonyl butoxide; N-octyl bicycloheptene dicarboximide. Duracide* 15 (+ piperonyl butoxide) (Endura S.p.A.); Pyrenone* (+ piperonyl butoxide) (Roussel Uclaf); Prentox* Pyronyl* (+ piperonyl butoxide) (Prentiss Incorporated); Py-Rin* (+ piperonyl butoxide) (Wilbur-Ellis Co.); PT* 1100. PT* 1600A (+ piperonyl butoxide) (Whitmire Research Laboratories).

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic (EC). Nontoxic (sprays-repellen effect).

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 1500 mg/kg. Dermal LD₅₀ >1800 mg/kg. Low order of toxicity to warm-blooded animals; not hazardous to apply and produces no harmful residues on food crops. Tolerances exist for

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

its use on milk and meat animals and for use in sanitation sprays in food processing and food warehousing situations.

PROTECTIVE CLOTHING: None for household level sprays or aerosols. U.S. Bureau of Mines approved type of mask or respirator required for application of fogging concentrates.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin. Keep out of any body of water. Do not contaminate water by cleaning of equipment or disposal of waste. Do not reuse empty container. Destroy by perforating or crushing. Bury or discard in a safe place away from water supplies.

Emergency Guidelines

FLASHPOINT: 160°F.

ANTIDOTE: Treatment is symptomatic. Antihistamines are of value. If sufficient pyrethrum has been ingested to cause nervous manifestations, pentobarbital should be used. The diarrhea that occurs may be controlled with atropine sulfate.

FIRST AID: Eyes, Skin, flush affected areas with water.

Pyriban* — see Chlorpyrifos.

Pyriclor — see Daxtron*.

Pyridaben — see Sanmite*.

Pyridaphenthion — see Ofunack*.

Pyridate

BP: Agrolinz (Austria)
Agrolinz, Inc. U.S.A.

Identification

COMMON NAME: Pyridate (ISO, BSI, WSSA).

EXP. CODE NUMBER: CL-11344 (Chemie Linz).

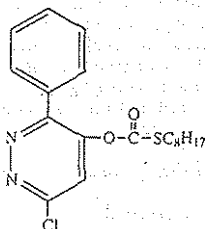
OTHER CODE NUMBERS: CAS 55512-33-9; SHA 128834.

ADDITIONAL TRADE NAMES: Lentagran* (Gowan Co.); Tough* (Cedar Chemical).

Chemistry

COMPOSITION: O-(6-chloro-3-phenyl-4-pyridazinyl) S-octyl carbonothioate (CAS).

PROPERTIES: Tech: Brown oily non-volatile liquid, melting point 20-25°C. Soluble in most organic solvents.



Pyridate

Action/Use

ACTION: Herbicide.

USE: Controls broadleaf weeds in corn, wheat, peanuts, cole crops, alfalfa, turf, grassland, chickpeas, oil-seed rape, asparagus, orchards, vineyards, forest nurseries, onions and poppy.

FORMULATIONS: Emulsifiable concentrate, wettable powder.

COMBINATIONS: Binex M* (+ thifensulfuron-methyl), Duogran* (+ bromoxynil), Granat*, Prado* (+ atrazine).

Registration Notes

U.S.: Full registration (Section 3) granted by EPA on November 1992.

OUTSIDE U.S.: Duogran*, Prado*, Antiten Mix.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 81 mg/l (96 h) (rainbow trout); 100 mg/l (bluegill). Bee: Nontoxic.

SOLUBILITY: In water, 1.5 mg/l.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2000 mg/kg. (Rabbit): Dermal LD₅₀ 3400 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in original container in cool, dry area out of the reach of children and animals. Dry formulations are stable under normal storage conditions. Liquid formulations should not be subjected to freezing.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush with water for 15 minutes. Skin, wash with soap and water. Ingestion, induce vomiting.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Pyridines

New herbicide class under development by Rohm and Haas. Dithiopyr, registered in 1991, and thiazopyr (proposed common name) offer

low soil mobility, low application rates, and long-lasting control of grasses and small-seeded broadleaf weeds in many major crops.

Pyrifenox

BP: Ciba, Ltd. (Boxer*, Corona*, Dorado*, Furado*)

Identification

COMMON NAME: Pyrifenox (ISO draft, ANSI, BSI).

EXP. CODE NUMBERS: RO 15-1297 (Dr. R. Maag Ltd); CGA 179945 (Ciba, Ltd.).

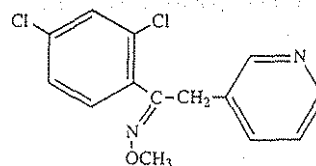
OTHER CODE NUMBER: CAS 88283-41-4.

DISCONTINUED NAMES: Corado* (Dr. R. Maag Ltd.).

Chemistry

COMPOSITION: 2',4'-Dichloro-2-(3-pyridyl) acetophenone O-methylloxime (IUPAC); 1-(2,4-dichlorophenyl)-2-(3-pyridinyl)ethanone O-methylloxime (CAS).

PROPERTIES: Tech a.i.: Tan-colored, slightly viscous liquid. Boiling point >150°C at 0.1 mm Hg, density 1.28 g/ml at 20°C, vapor pressure 1.9 mPa at 25°C. Solubility: In hexane (<1%), soluble in most other organic solvents.



Pirifenox

Action/Use

ACTION: Systemic fungicide with protective and eradicant properties.

USE: For control of fungal diseases of pome and stone fruit, soft fruit, grapes, vegetables, peanuts, and sugar beets. Diseases controlled: powdery mildews, scab, blossom blight, and some leaf spot diseases.

FORMULATIONS: Emulsifiable concentrate and wettable powder.

COMBINATIONS: Rondo* (+ captan), Rondo M* (+ mancozeb) (Ciba, Ltd.).

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: Fish, algae: Highly toxic. *Daphnia*: Highly toxic. Birds: Nontoxic. Bees: Nontoxic. Earthworms: Nontoxic.

SOIL PARTICLE ADSORPTION: Low mobility in soil. Low leaching potential. Moderately degradable in soil, not readily degradable in aquatic environments.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III (WHO), practically of no acute toxicity.

TOXICITY: Tech. (Rat): Oral LD₅₀ 2900 mg/kg. Dermal LD₅₀ >5000 mg/kg. (Rabbit): Non irritant to eyes. Slight irritant to human skin.

PROTECTIVE CLOTHING: Goggles, long-sleeved shirt and pants. Rubber gloves (undiluted EC formulations).

HANDLING AND STORAGE CAUTIONS: Avoid skin contact and vapor inhalation.

Emergency Guidelines

FLASHPOINT: 45-51° C (EC formulations).

FIRST AID: Get medical attention. Eyes, wash with plenty of water. Skin, wash with water and remove contaminated clothing. Ingestion, administer medicinal charcoal in large quantities of water. Treat symptomatically.

Pyrimicarbe — see Pirimor*.

Pyrimidines

A group of systemic fungicides active against powdery mildews, including ethirimol (Milgo* and Milstem*), dimethirimol (Milcurb*), and triarimol.

Pyriminil — see Vacor*.

Pyrimithate — see Diothyl.

Pyriban* — see Chlorpyrifos.

Py-Rin* — see Piperonyl Butoxide; Pyrethrum.

Py-Rin* Growers Spray — see Pyrethrum.

Pyrixex* — see Chlorpyrifos.

Pyrinuron — see Vacor*.

Pyrobor* Herbicide (borax) — Discontinued by Kerr-McGee.

Pyrocatechol — see Catechol.

Pyroicide* — see Pyrethrum.

Pyrolan* Insecticide — Discontinued by Ciba-Geigy Ltd.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Pyrophyllite

BP: R.T. Vanderbilt Co., Inc. (Pyrax* ABB)

Chemistry

COMPOSITION: A hydrous aluminum silicate, therefore closely related to the clays chemically. Approximately neutral in reaction.

PROPERTIES: Physically pyrophyllite is more like talc than the clays. Made up of flat or plate-like particles.

Action/Use

ACTION: Diluent of major importance used in formulating dry pesticides.

Pyroquilon

BP: Ciba, Ltd. (Coratop*, Fongorene*)

Identification

COMMON NAMES: Pyroquilon (ISO-E, BSI); pyroquilone (ISO-F).

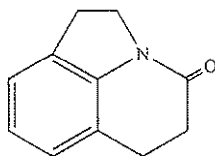
EXP. CODE NUMBER: CGA-49104 (Ciba, Ltd.).

OTHER CODE NUMBER: CAS 57369-32-1.

Chemistry

COMPOSITION: 1,2,5,6-tetrahydro-4H-pyrrolo[3,2,1-ij]quinolin-4-one.

FAMILY: Quinoline derivative.

PROPERTIES: White crystals, melting point 112°C. Vapor pressure 1.2×10^{-5} mm/Hg at 20°C. Soluble in most organic solvents.

Pyroquilon

Action/Use

ACTION: Systemic fungicide.

USE: For control of rice blast (*Pyricularia oryzae*); seed treatment, into-water granules, foliar spray.

FORMULATIONS: Granules, wettable soluble with color, wettable powder.

Registration Notes

OUTSIDE U.S.: In Brazil, Colombia, Japan, Indonesia, Uruguay, South Korea and Thailand.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bird: Nontoxic.

SOLUBILITY: In water at 20°C 4000 mg/l.

Safety Guidelines

SIGNAL WORD: WARNING (Tech).

TOXICITY CLASS: II (Tech).

TOXICITY: Tech (Rat): Oral 321 mg/kg. Dermal >3100 mg/kg.

Pyroquilone — see Pyroquilon.

Pyrozophos* — see Afugan*.

Pyrroles

The pyrroles are a new class of insecticides being developed by American Cyanamid. These broad-spectrum compounds are applied as a low dosage foliar spray, which insects absorb through ingestion.

Qamlin* — see Permethrin.

Qikron*

(Discontinued 1987 by Nippon Soda Co., Ltd.)

Identification

COMMON NAMES: Chlorfenethol (ISO, BSI, ESA); BCPE (JMAF).

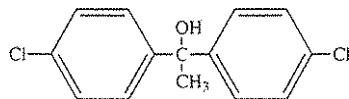
CODE NUMBER: CAS 80-06-8; EINECS 2012463.

ADDITIONAL TRADE NAMES: DCPC, DMC, Dimite* (Sherwin-Williams Co.)

DISCONTINUED NAME: Mitran* (+ chlorfenson), Milbex* (+ chlorfensulphide) (Nippon Soda Co., Ltd.).

Chemistry

COMPOSITION: 1,1-bis(4-chlorophenyl)ethanol (IUPAC).



Chlorfenethol

Action/Use

ACTION: Acaricide with ovicidal and especially strong larvicidal action.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 926-1391 mg/kg.**Quadrol***

BP: BASF Corp. (Quadrol*)

Chemistry

COMPOSITION: N,N,N',N'-Tetrakis(2-hydroxypropyl)ethylenediamine.

PROPERTIES: Chelate, solubilizes.

Action/Use

ACTION: Surfactant solubilizer, chelation, neutralizing agent.

USE: Chelating agent, neutralizing agent, viscosity modification, solubilization.

Safety GuidelinesTOXICITY: LD₅₀ 3.9 g/kg. Slightly toxic.

HANDLING AND STORAGE CAUTIONS: Store in closed container to avoid moisture pick up from air.

Emergency Guidelines

FIRST AID: Ingestion, induce vomiting. Get medical aid.

Quant* G.m. — see RAK* 5.

Quant* L.b. — see RAK* 2.

Quartz* — see Isoproturon.

Quartz GT* — see Diflufenican; Isoproturon.

Quassia**Identification**

OTHER NAME: Bitterwood.

Action/Use

ACTION: Insecticide.

USE: Water extracts of West Indian quassia wood chips were used formerly especially in Europe, to control aphids and various other horticultural insect pests. The extracts were of indifferent value, however. Bitterwood was at one time used as a substitute for hops in beer manufacture.

Quaternary Ammonium Compounds

A type of organic nitrogen compound in which the molecular structure includes a central nitrogen atom joined to four organic groups as well as an acid group of some sort.

Nitrogen forms such pentavalent compounds as shown in the simplest example, ammonium chloride (NH₄Cl). When the hydrogen atoms are replaced by organic radicals, the compound is known as a quaternary ammonium compound, e.g., tetramethyl ammonium chloride. These compounds are in contrast to trivalent nitrogen compounds where the nitrogen combines with only three hydrogen atoms, as in ammonia, or these are replaced by one to three radicals, e.g., the carbamate structure. Many quaternary ammonium compounds are fungicides, bactericides, and surface active agents.

See Carbamate Herbicides.

Quel* Growth Regulator (a-rest) — Discontinued by Elanco Products Co.

Queletox* Insecticide (fenthion) — Discontinued 1994 by Bayer AG.

Quest*

BP: Helena Chemical Co.

Chemistry

COMPOSITION: Proprietary blend of the ammonium salts of polyacrylic, hydroxycarboxylic, and phosphoric acids.

Action/Use

ACTION: Water conditioning agent.

USE: Add to water of poor quality water in pesticide sprays.

Quicklime — see Calcium Oxide.

Quickphos* — see Aluminum Phosphide.

Quicksan C*

(Discontinued by Stecker Chemical, Inc.)

Chemistry

COMPOSITION: Solution of chloromethoxypropylmercuric acetate.

Action/Use

USE: Cereal grain treatment.

Quikfume* — see Aluminum Phosphide.

Quilan* — see Benefin.

Quinal* — see Quinalphos.

Quinalphos

BP: All India Medical Corp. (Quinatos*)

Hanwha Corp.

Hubei Sanonda Co., Ltd.

Paushak Ltd. (Paushaquin*)

Sandoz Agro Ltd. (Ekalux*)

Sudarshan Chemical Industries Ltd. (Suquin*)

United Phosphorus Ltd. (Kinalux*)

Identification

COMMON NAMES: Quinalphos (ISO, BSI); chinalphos (France).

EXP. CODE NUMBERS: Bay 77049, SAN 6538 I, SAN 6626 I.

OTHER CODE NUMBERS: CAS 13593-03-8; ENT-27394.

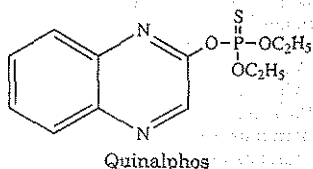
Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

ADDITIONAL TRADE NAMES: Terminate* (Agsin Pte. Ltd.); Deviquin* (Devidayal (Sales) Pvt. Ltd.); Khatau Quin* (Khatau Junker Ltd.); Quinal* (Sulphur Mills Ltd.).
DISCONTINUED NAMES: Bayrusil* (Bayer AG).

Chemistry

COMPOSITION: O,O-diethyl O-2-quinoxaliny phosphorothioate.
FAMILY: Organophosphorus, quinoxaline.

PROPERTIES: Made by the reaction of ophenylenediamine, chloroacetic acid and O,O-diethyl phosphorochloridothioate, the pure compound is a colorless crystalline solid, melting point 31-32°C, boiling at 142°C at 3.10⁴ Torr under decomposition, vapor pressure 3 × 10⁶ Torr at 20°C; specific gravity d 20/4°C = 1.235, refractive index 1.5624 (supercooled melt). It is stable under ambient storage conditions, when diluted in nonpolar organic solvents and in presence of stabilizing agents. Susceptible to hydrolysis. Half life periods in aqueous buffer systems at 24°C, 56 days at pH 5, 40 days at pH 7, and 30 days at pH 9. Soluble in toluene, xylene, and other aromatic hydrocarbons, diethyl ether, ethylacetate, acetone, acetonitrile, methanol, and ethanol, slightly soluble in light petroleum.



Action/Use

ACTION: Contact and stomach insecticide and acaricide.
USE: For many insect pests belonging to the orders Lepidoptera, Coleoptera, Diptera, Hemiptera etc. For caterpillars on vegetables, groundnuts, and cotton, as well as scales and caterpillars on fruit trees.
FORMULATIONS: Emulsifiable concentrate, ULV, granular, dusting powder, wettable powder.

COMBINATIONS: Ekanon* and Knave* (+ disulfoton), Tombel* (+ thiometon) (Sandoz Agro Ltd.).

Environmental Guidelines

HAZARDS: Bee: Toxic. LC₅₀ 1.6 mg/kg.
SOIL PARTICLE ADSORPTION: Readily degraded.
SOLUBILITY: In water at 24°C, 22 ppm.

Safety Guidelines

SIGNAL WORD: WARNING.
TOXICITY CLASS: II.
TOXICITY: (Rat): Oral LD₅₀ 71 mg/kg. Dermal 1750 mg/kg.
HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Atropine with PAM or atropine with obidoxime chloride.
FIRST AID: In all cases, get medical aid.

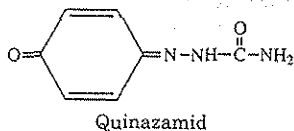
Quinatox* — see Quinalphos.

Quinazamid

Identification
COMMON NAMES: Quinazamid (ISO-E, BSD); quinazamide (ISO-F).
EXP. CODE NUMBERS: RD-86841; BTS-8684.
OTHER CODE NUMBER: SHA 281200.

Chemistry

COMPOSITION: p-Benzoquinone monosemicarbazone (IUPAC and CAS 8CI).



Action/Use

ACTION: Fungicide.
Quinazamide — see Quinazamid.
Quinclorac — see Facet*; Propanil.
Quinex*
 (Discontinued 1969 by Metalsalts Corp.)

Chemistry

COMPOSITION: Phenylmercury oxyquinolate.

Action/Use

ACTION: Fungicide.
Quinine hydrochloride — see Nevibes*.

Quinmerac

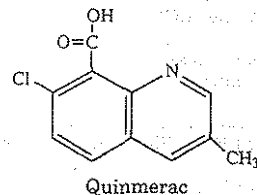
BP: BASF AG

Identification

COMMON NAME: Quinmerac (ISO draft, BSD).
EXP. CODE NUMBER: BAS 518 (BASF AG).
OTHER CODE NUMBER: CAS 90717-03-6.

Chemistry

COMPOSITION: 7-chloro-3-methyl-8-quinolinecarboxylic acid.
PROPERTIES: Tech: White-gray solid; melting point 239°C.



Action/Use

ACTION: Herbicide.
USE: Specific pre- and postemergence herbicide for control of *Galium aparine*, *Veronica* spp., *Aethusa cynapium*, and other weeds in cereals, oilseed rape and sugarbeets.
FORMULATIONS: WP, SC.
COMBINATIONS: Fiesta* and Rebel* (+ chloridazon), Butisan Star* and Novall* (+ metazachlor) (all BASF AG).

Registration Notes

OUTSIDE U.S.: Belgium, France, Germany, Netherlands: Novall*.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96h) 87 mg/l (trout). Bird: Oral LD₅₀ >2000 mg/kg body wt. Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: IV.
TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg. Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children, keep away from food, drink, and animal feedstuffs.

SPILL CONTROL/CLEANUP: Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** do NOT induce vomiting unless advised by a physician. Avoid giving reabsorption stimulating substances like fats (milk, castor oil) or alcohol, etc. Give activated charcoal (medical charcoal).

Quinoclamine — see Mogeton G*.

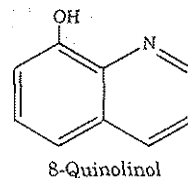
Quinoline — see Oxyquinoline Citrate.

8-Quinolinal

(Discontinued 1978 by Ashland Chemical Co.)

Identification

COMMON NAMES: Bioquin (copper and zinc salts), chinisol (sulfate), oxine, quinophenol (copper and zinc salts).
CODE NUMBERS: CAS 148-24-3; SHA 059803.
ADDITIONAL TRADE NAME: Tumex*.



Action/Use

ACTION: Fungicide, bactericide.
8-Quinolinal Sulfate — see Chinisol.
Quinomethionate — see Morestan*.
Quinophenol — see 8-Quinolinal.

Quinoxaline

Identification

OTHER NAME: Phenpiazine.

Chemistry

COMPOSITION: 1,4-Benzodiazine.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Acaricide.

Quintar* 540F Fungicide (dichlone) — Discontinued 1987 by Hopkins Agricultural Chemical Co.

Quintex* Herbicide (IPC + CIPC + fenuron) — Discontinued by Murphy Chemical Ltd.

Quintox* Fungicide (PCNB) — Discontinued by Pyosa.

Quintozene* — see PCNB.

Quitt* — see Bentazone; MCPA.

Quizalofop-ethyl

BP: Almidar S.A. (Tolan*)

Nissan Chemical Industries, Ltd. (Targa*)

Identification

COMMON NAME: Quizalofop-ethyl (ISO draft, ANSI, BSI).

EXP. CODE NUMBERS: DPX-Y6202, EXP. 3864, FBC-32197, NC-302, NCI-96683.

OTHER CODE NUMBERS: CAS 76578-14-8; SHA 128201.

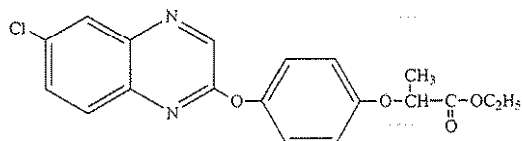
ADDITIONAL TRADE NAMES: Assure* (Du Pont); Pilot* (Hoechst Schering AgrEvo GmbH).

Chemistry

COMPOSITION: Ethyl 2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy]propionate (IUPAC).

FAMILY: Phenoxy propionic ester.

PROPERTIES: White crystalline solid, melting point 91°C. Solubility: acetone, 11.1 g/100 ml at 20°C. Xylene, 12.1 g/100 ml at 20°C.



Quizalofop-ethyl

Action/Use

ACTION: Herbicide.

USE: Postemergence grass weed control in broadleaf crops.

FORMULATIONS: Emulsifiable concentrate, soluble concentrate.

Registration Notes

U.S.: Assure* for soybeans (1988).

Environmental Guidelines

HAZARDS: Fish: Highly toxic to freshwater fish. Bee: Relatively nontoxic. Bird: Practically nontoxic.

SOIL PARTICLE ADSORPTION: Half life 139 days (silty clay loam); 145 days (silt loam).

SOLUBILITY: Water, 0.3×10^{-4} g/100 ml at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 1670 mg/kg (male); 1480 mg/kg (female).

HANDLING AND STORAGE CAUTIONS: Avoid breathing vapors or spray mist; skin, eyes, clothing contact. Remove and wash contaminated clothing before reuse. Do not apply directly to water or wetlands or contaminate water by cleaning equipment or disposal of wastes. Combustible. Keep away from heat, sparks, and open flames. Store >32°F.

Quizalofop-P-ethyl

BP: Almidar S.A. (Herban* LPU, Mostar*)

Nissan Chemical Industries, Ltd. (Targa Super*)

Identification

COMMON NAME: Quizalofop-P-ethyl (ISO draft, BSI).

EXP. CODE NUMBERS: NCI-816094, DPX-Y6202-31, D(+) NC-302.

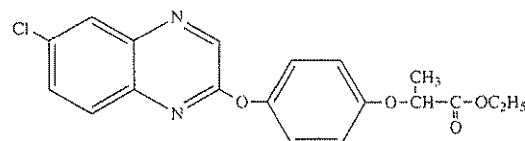
OTHER CODE NUMBER: CAS 100646-51-3.

ADDITIONAL TRADE NAMES: Assure* II (Du Pont); CoPilot*, Pilot Super*, Targa D+*.

Chemistry

COMPOSITION: Ethyl (R)-2-[4-(6-chloroquinoxalin-2-yloxy)phenoxy] propionate (IUPAC).

PROPERTIES: Crystalline solid, melting range 76-77°C. Soluble in methylene chloride, relatively soluble in toluene and acetone.



Quizalofop-P-ethyl

Action/Use

ACTION: Herbicide.

USE: Postemergence grass weed control in broadleaved crops.

FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

SOLUBILITY: Water 0.4 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1210 mg/kg (male); 1182 mg/kg (female).

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Avoid breathing vapors or spray mist; skin, eyes, clothing contact. Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Do not apply directly to water or wet lands or contaminate water by cleaning equipment or disposal of wastes. Combustible. Keep away from heat, sparks, and open flames.

88-R — see Aramite*.

R6 Triplo* — see Fosetyl-Aluminum.

R 11 — see Spreader; Sticker.

R 50 (DDT) — Discontinued by Rumianca S.p.A.

R 242 — see Sulphenone*.

R-1303 — see Trithion*.

R 1504 — see Phosmet.

R 1513 — see Azinphos-ethyl.

R 1582 — see Azinphos-methyl.

R 2061 — see Tillam*.

R 2063 — see Cycloate.

R 2170 — see Oxydemeton-methyl.

R 4572 — see Molinate.

R 7465 — see Napropamide.

Rabbit & Dog Chaser*

BP: Faesy & Besthoff, Inc.

Chemistry

COMPOSITION: Naphthalene + tobacco + blood.

PROPERTIES: Brown powder, moth flake odor. Incompatible with strong alkali or strong mineral acid.

Action/Use

ACTION: Animal repellent.

USE: For rabbits, dogs.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

TOXICITY: (Rat) Oral LD₅₀ >11,000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in original container, in cool, dry area. Use in well-ventilated areas. Avoid eye, skin contact.

Emergency Guidelines

FLASHPOINT: 174°F (CC).

FIRE EXTINGUISHING MEDIA: Dry chemical, water fog, CO₂, regular foam.

FIRST AID: Get medical aid as necessary. **Eyes,** flush with large amounts of water. **Skin,** remove clothing, wash skin with large amounts of water. **Ingestion,** induce vomiting.

Rabcide*

BP: Kureha Chemical Industry Co., Ltd.

Identification

COMMON NAME: Fthalide.

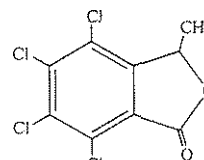
EXP. CODE NUMBER: KF-32.

OTHER CODE NUMBER: CAS 27355-22-2

Chemistry

COMPOSITION: 4,5,6,7-tetrachlorophthalide.

PROPERTIES: White crystalline solid. Melting point 209-210°C.



Fthalide

Action/Use

ACTION: Fungicide.

USE: For rice blast disease caused by *Pyricularia oryzae*.

FORMULATIONS: Dust, fine granule, wettable powder, and suspension liquid.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

COMBINATION: Kasurabicide* (+ kasugamycin) (Hokko Chemical Industry Co., Ltd.).

Environmental Guidelines

SOLUBILITY: (25°C) in water, 2.49 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat/Mouse): Oral LD₅₀ >10,000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in cool, dark place.

Rabon* — see Tetrachlorvinphos.

Facemate*

Chemistry

COMPOSITION: Cis-2-isopropenyl-1-methyl-cyclobutane-ethanol.

Action/Use

ACTION: Synthetic pheromone/attractant for cotton boll weevil.

Racet* — see Acephate.

Rack Granular* Herbicide (atrazine + fenac) — Discontinued by Rhone-Poulenc.

Racumin*

BP: Bayer AG

Identification

COMMON NAME: Coumatetralyl (ISO, BSI).

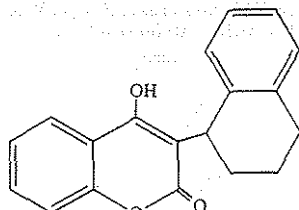
EXP. CODE NUMBER: Bay ENE 11183 B.

OTHER CODE NUMBER: CAS 5836-29-3 (coumatetralyl); SHA 06100; EINECS 227-424-0.

Chemistry

COMPOSITION: 4-Hydroxy-3-(1,2,3,4-tetrahydro-1-naphthalenyl)-2H-1-benzopyran-2-one (CAS).

PROPERTIES: Crystalline. Melting point approx. 180°C. Vapor pressure <10⁻³ mbar at 20°C. Soluble in dichloromethane, 2-propanol. Hardly soluble in toluene. Nearly insoluble in n-hexane.



Coumatetralyl

Action/Use

ACTION: Rodenticide (anticoagulant).

USE: For rat control.

FORMULATIONS: Liquid, bait concentrate, ready-made bait, powder.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 48 mg/l (96 h) (rainbow trout).

SOLUBILITY: Nearly insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 17-30 mg/kg; Dermal LD₅₀ approx. 40 mg/kg.

PROTECTIVE CLOTHING: See label. Store in original container, preferably in locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Vitamin K₁, e.g. Konaktion* (Hoffman-la-Roche).

Racuz*

Chemistry

COMPOSITION: Methyl, 3,6-dichloro-o-anisate.

Action/Use

ACTION: Sugarcane ripener.

RADA

Chemistry

COMPOSITION: Rosin amine D acetate.

Action/Use

ACTION: Algicide.

USE: Controls fresh water algae in irrigation canals; prevents formation of algae on surfaces of humidification systems and irrigation installations.

Radam* Fungicide (guazatine) — Discontinued 1993 by Rhone-Poulenc.

Radapon* Herbicide (dalapon) — Discontinued by Dow Chemical.

Rad-E-Cate* — Trade name to be reused by Vineland Chemical.

Rad-E-Cate* 25 Herbicide (cacodylic acid + sodium cacodylate) — Discontinued by Vineland Chemical.

Rad-E-Cate* 35 Herbicide (sodium cacodylate) — Discontinued by Vineland Chemical.

Radione

Chemistry

COMPOSITION: Naphthylindandione.

Action/Use

ACTION: Rodenticide.

Radozone TL* — see Amitrole; Ammonium Thiocyanate.

RAK*1 Plus

BP: BASF AG (RAK*1 Plus)

Identification

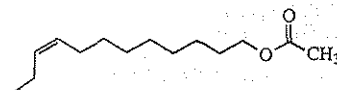
EXP. CODE NUMBER: Z-9-DDA.

ADDITIONAL TRADE NAME: Bocep* Viti (BASF AG).

Chemistry

COMPOSITION: Z-9-dodeceny l acetate.

PROPERTIES: Tech oily colorless liquid, characteristic odor. Solubility in ether, acetone, toluene >200 g/100 g.



Z-9-DDA

Action/Use

ACTION: Pheromone.

USE: Pheromone of the grape-berry moth (*Eupoecilia ambiguella*) for use as a species-specific mating disruptant (disorientation method) to control pest population.

FORMULATIONS: Dispensers.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

SOLUBILITY: In water ca 5.10-3 g/100 g.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg. Nontoxic to nontarget insects.

HANDLING AND STORAGE CAUTIONS: Dispensers packed airtight, impervious to light. Do not open until ready to use to avoid loss of efficacy.

EMERGENCY TELEPHONE: 800-832-4357 (BASF). 800-424-9300 (CHEMTREC).

RAK* 2

BP: BASF AG (RAK* 2)

Identification

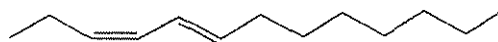
EXP. CODE NUMBER: E7 Z9-12 Ac.

ADDITIONAL TRADE NAME: Quant* L.b. (BASF AG).

Chemistry

COMPOSITION: E7, Z9-dodecadienyl acetate.

PROPERTIES: Tech oily, colorless liquid, characteristic odor. Solubility in toluene, acetone >1000 g/l.



E7 Z9-12 Ac

Action/Use

ACTION: Pheromone.

USE: For use as a species-specific mating disruptant for grapevine moth (*Lobesia botrana*).

FORMULATIONS: Dispensers.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

SOLUBILITY: In water, 0.67 x 10⁻³ g/l at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg. Nontoxic to nontarget insects.

HANDLING AND STORAGE CAUTIONS: Dispensers packed airtight, impervious to light. Do not open until ready to use to avoid loss of efficacy.

EMERGENCY TELEPHONE: 800-832-4357 (BASF). 800-424-9300 (CHEMTREC).

RAK* 5

BP: BASF AG (RAK* 5)

Identification:

ADDITIONAL TRADE NAME: Quant* G.m. (BASF AG).

Chemicals are cross-referenced by common and trade name

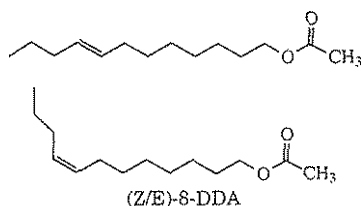
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: (Z/E)-8-dodecenylacetate.

PROPERTIES: Yellow liquid; characteristic odor. Solubility in ether, acetone, toluene >200 g/100 g.

**Action/Use**

ACTION: Pheromone.

USE: Pheromone of the oriental fruit moth *Grapholitha molesta* for use as a species-specific mating disruptant.

FORMULATIONS: Dispensers.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

SOLUBILITY: In water ca. 0.005 g/100 g.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg. Nontoxic on nontarget insects.

HANDLING AND STORAGE CAUTIONS: Dispensers packed airtight; impervious to light. Do not open until ready to use to avoid loss of efficacy.

Rakil* — see Tebuconazole.

Raichlor* — see Alachlor.

Rally* — see Systhane*.

Ralothrin* — see Cypermethrin.

Ramik* — see Diphacinone.

Rampage* — see Cholecalciferol.

Rampart* — see Phorate.

Ramrod* — see Propachlor.

Ramucide* — see Chlorophacinone.

Rancho* — see Hinochloa*.

Randex*

(Discontinued 1984 by Monsanto Agricultural Co.)

Identification

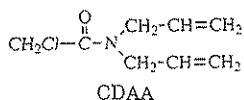
COMMON NAMES: CDAA (JMAF, WSSA); alldochlor (ISO-E, BSI); alldochlore (ISO-F).

CODE NUMBERS: CAS 93-71-0; SHA 019301.

DISCONTINUED NAMES: Randex T* (+ trichlorobenzyl chloride) (Monsanto Agricultural Co.).

Chemistry

COMPOSITION: N,N-diallyl-2-chloroacetamide (IUPAC and CAS 8CI).

**Action/Use**

ACTION: Selective preemergence herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 750 mg/kg.

Randex T* Herbicide (CDAA + trichlorobenzyl chloride) —

Discontinued by Monsanto Agricultural Co.

Ranger*

BP: Monsanto Co., The Agricultural Group (Ranger*)

Identification

COMMON NAME: Glyphosate.

Chemistry

COMPOSITION: Glyphosate (isopropylamine salt).

PROPERTIES: Clear, viscous pale yellow solution. Odorless to slight amine odor.

Action/Use

ACTION: Nonselective, postemergence herbicide.

USE: For control of quackgrass.

Environmental Guidelines

SOLUBILITY: Highly soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 2500 mg/kg. (Rabbit): Dermal >5000 mg/kg. Eyes: severely irritating. Skin: slightly irritating.

PROTECTIVE CLOTHING: Long sleeved shirt, long pants, and protective eyewear. When mixing or loading, also wear waterproof gloves. HANDLING AND STORAGE CAUTIONS: Store above 50°F. Avoid eye, skin, clothing contact. Wash well with soap and water after handling.

Emergency Guidelines

FLASHPOINT: >200°F (Tag CC).

FIRE EXTINGUISHING MEDIA: Water spray, foam, dry chemical. CO₂, any other Class B agent.FIRST AID: Get medical aid. Eyes, immediately flush with plenty of water for at least 15 minutes. Ingestion, may cause gastrointestinal tract irritation. Immediately give water or milk to dilute.

EMERGENCY TELEPHONE: 314-694-4000 (Monsanto Co., The Agricultural Group).

Ransbeck* — see DDVP; Phosalone.

Rapid* — see Pirimor.

Rapid X* — see Monocrotophos.

Rasayaldrin* — see Aldrin.

Rasayanchlor* — see Butachlor.

Rasayansulfan* — see Endosulfan.

Rasikal* (sodium chlorate) — Discontinued.

Rastra* — see Alachlor; Atrazine.

Rat & Mouse Blues II* — see Diphacinone.

Ratak*

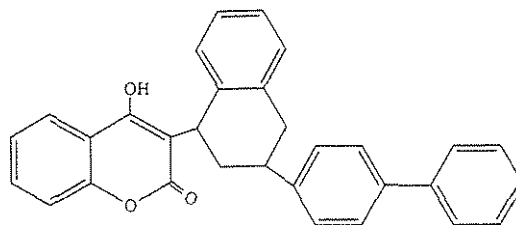
BP: ZENECA Public Health

Identification

COMMON NAME: Difenacoum (ISO, BSI).

EXP. CODE NUMBERS: Neosorexa, PP580, WBA 8107.

OTHER CODE NUMBER: CAS 56073-07-5.



Difenacoum

Chemistry

COMPOSITION: 3-[3-(1,1'-biphenyl)-4-yl]-1,2,3,4-tetrahydro-1-naphthalenyl]-4-hydroxy-2H-1-benzopyran-2-one.

PROPERTIES: Soluble in benzene and chloroform. Moderately soluble in acetone and ethanol. Practically insoluble in petroleum ether.

Action/Use

ACTION: Anticoagulant rodenticide.

USE: For Norway and roof rats, house mice including strains resistant to conventional anticoagulants.

FORMULATIONS: Ready-to-use cereal based bait in pellets, whole and broken grains, waterproof wax blocks, loose or bait packs.

COMBINATIONS: Castrix D* (+ crimidine) (Bayer AG).

Environmental Guidelines

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 1.8 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid all contact by mouth. Wash hands after handling bait. Keep away from food or water supplies, children, domestic animals, and wildlife. Keep container closed for freshness; do not re-use empty container.

After treatment remove and bury uneaten bait and rodent bodies.

Emergency GuidelinesANTIDOTE: Vitamin K₁.

Ratak* Plus — see Brodifacoum.

Rate of Application

The rate at which the pesticide is applied per unit length of row, square foot, acre, bushel, cubic foot, or any other unit (linear, surface, or volume). Sometimes spoken of as dosage, but dosage includes also the quantity (rather than rate) applied to a single organism or to a whole field.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

The maximum dosage is the largest amount of a pesticide chemical that can be safely used without damaging the plant, animal, or object which is being protected and which will not result in excess residues. See Dosage.

Raticate*

(Discontinued 1968 by Tavolek Laboratories)

Identification

COMMON NAMES: Norbormide (ISO-E, ANSI, BSI); norbormide (ISO-F).

EXP. CODE NUMBER: McN-1025.

OTHER CODE NUMBERS: CAS 991-42-4; SHA 086201; ENT-51762.

ADDITIONAL TRADE NAME: Shoxin*.

Chemistry

COMPOSITION: 5-(α -hydroxy- α -2-pyridylbenzyl)-7-(α -2-pyridylbenzylidene)-8,9,10-trinorborm-5-ene-2,3-dicarboximide (IUPAC).

Action/Use

ACTION: Rodenticide.

Environmental Guidelines

HAZARDS: Fish: Nontoxic.

Ratilan* Rodenticide (coumochlor) — Discontinued 1984 by Ciba-Geigy Ltd.

Ratimus* Rodenticide (bromadiolone) — Discontinued 1994 by Tamogan.

Ratol* — see Zinc Phosphide.

Ratomet* — see Chlorophacinone.

Ratoxin* — see Warfarin.

Rattler* — see Glyphosate.

Ravage*

(Discontinued by Velsicol Chemical Corp.)

Identification

COMMON NAME: Buthidazole (ISO, ANSI, BSI, WSSA).

EXP. CODE NUMBER: VEL 5026 (Velsicol Chemical Corp.).

OTHER CODE NUMBERS: CAS 55511-98-3; SHA 115901.

Chemistry

COMPOSITION: 3-[5-(1,1-dimethylethyl)-1,3,4-thiaidiazol-2-yl]-4-hydroxy-1-methyl-2-imidazolinone.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1581 mg/kg.

Raven*

BP: Ecogen Inc. (Raven*)

Identification

COMMON NAME: *Bacillus thuringiensis* var. *kurstaki*.

Action/Use

ACTION: Biological insecticide.

USE: Controls Colorado potato beetle and caterpillar pests on potatoes, tomatoes, and eggplant.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Wildlife: Nontoxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Causes skin and eye irritation.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry area.

Raviac* — see Chlorophacinone.

Ravyon* Insecticide (carbaryl) — Discontinued by Makhteshim-Agan.

Rax* — see Warfarin.

Raxil* — see Tebuconazole.

Raxil* T — see Folicur*[†]; Thiram.

Raydor* — see Carbendazim; Maneb.

Raylig* — see Lignosulfonates

RD-2454 — see Fluorobenzide.

RE 4355 — see Naled.

RE 40885 — see Benchmark*.

RE 45601 — see Select*.

Reach* — see Bayleton*; Chlorothalonil.

Reagron* — see Pheromone.

Reax* — see Dispersant; Lignosulfonates.

Rebelate* — see Dimethoate.

Rebell* — see Butisan S*; Quinmerac.

Rebuttable Presumption Against Registration — see Special Review.

Reclaim* — see Stinger*.

Recoil — see Oxadixyl.

Recommended Maximum Contaminant Level (RCML)

Maximum level of a contaminant in drinking water at which no known or anticipated adverse affect on human health would occur, and which includes an adequate margin of safety. Recommended levels are non-enforceable health goals.

Recop* — see Copper Oxychloride.

Red Shield Crow Repellent* — see Bird Repellent.

Red Squill**Identification**

CODE NUMBERS: CAS 507-60-8; SHA 070801.

ADDITIONAL TRADE NAMES: Dethdiet*, Rodine*.

Chemistry

COMPOSITION: Powdered bulb of *Urginea maritima* (*U. scilla*), a perennial growing in the Mediterranean area. Imported material (now reduced to little or none) is not uniform in potency and must be fortified.

Action/Use

ACTION: Rodenticide.

USE: Mixed in baits. As in many rodenticide operations, a prebaiting procedure is usually recommended, using only the bait base.

FORMULATIONS: Powder, liquid extract.

Safety Guidelines

TOXICITY: Most toxic of several glycosides in red squill is scilliroside. Toxic to rats due to their inability to vomit. Induces vomiting in other warm-blooded animals; nontoxic when used in recommended dosages. See Scilliroside.

Reddon* Herbicide (2,4,5-T) — Discontinued by Dow Chemical Co.

Redeem* — see Triclopyr.

Redentin* — see Chlorophacinone.

Re-Duce*

BP: Helena Chemical Co.

Chemistry

COMPOSITION: Naphtha base petroleum oil + paraffin base petroleum oil + polyol fatty acid esters + polyethoxylated derivatives.

Action/Use

ACTION: Spray adjuvant.

USE: For use with postemergence, non-selective contact herbicides.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

Reducymol* — see A-Rest*.

Reed* 4-41 Brush Killer — Discontinued by PBI/Gordon Corp.

Reed* 10-51 Brush Killer — Discontinued by PBI/Gordon Corp.

Re-Entry Time

EPA defined re-entry standard, effective June 10, 1974, as follows: "The period of time immediately following the application of a pesticide to a field when unprotected workers should not enter."

See Worker Protection Standard article in Section E.

Refined Petroleum Distillate

BP: Agrokemia Sellye Ltd./Int. Com. Div. Starchem Co. Ltd.

(Agrol Plus*, Agrol Plus S*, Agropon*)

Sun Co., Inc. (Sunspray*, Sunspray* Ultra-Fine Spray Oil,

Sunspray* Ultra-Fine Year-Round Pesticidal Oil)

Identification

COMMON NAMES: Mineral oil, paraffinic oil.

CODE NUMBERS: CAS 64741-89-5; 64741-88-4.

Chemistry

COMPOSITION: Solvent refined paraffinic petroleum oil. These oils may also be hydrotreated.

FAMILY: Blend.

PROPERTIES: Colorless-light amber liquid, little odor.

Action/Use

ACTION: Insect and mite management.

USE: Controls a wide range of mite and insect pests in the immature stage such as: spider and eriophyid mites, armored and soft scales, mealybugs, psyllids, whiteflies, aphids, leafrollers, leaf tiers, webworms, cankerworms, plant bugs, leafhoppers and adelgids on citrus crops, deciduous fruit trees, shade trees and shrubs, vegetables, field crops, greenhouse ornamentals, interiorscapes, small fruits and nuts, tropical and subtropical crops. Agrol Plus* as fungicide and insecticide adjuvant and winter dormant spray oil for fruit insect control. Agrol Plus S* as summer oil for fruit and vegetable insect control. Agropon* as herbicide adjuvant.

FORMULATIONS: Emulsifiable spray oil.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Miscible in water.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

SIGNAL WORD: CAUTION (all Sunspray products).
TOXICITY CLASS: III; IV (all Sunspray products).
TOXICITY: (Rat): Oral LD₅₀ >15,000 mg/kg. (Rabbit) Dermal >5000 mg/kg.

PROTECTIVE CLOTHING: Glasses or goggles and gloves.
HANDLING AND STORAGE CAUTIONS: Store in cool, dry, secure area out of reach of children and animals. Keep container tightly closed to prevent entry of water or other contaminants. Avoid prolonged or repeated contact with skin since this can remove the natural oils and fats, causing irritation. Wash thoroughly after handling. Excessive inhalation exposure may cause irritation of the nose, throat or eyes. Contact with eyes may cause irritation.
SPILL CONTROL/CLEANUP: Absorb on inert material. Shovel, sweep or vacuum spill.
PRODUCT/WASTE DISPOSAL: Follow Federal, State and Local regulations. Not a RCRA hazardous waste if uncontaminated. Do not flush to drain/storm sewer. Contract to authorized disposal service. Product forms emulsion in water.

Emergency Guidelines

FLASHPOINT: >200°F.
FIRE EXTINGUISHING MEDIA: Water fog, chemical foam, dry chemical powder, carbon dioxide.
FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water until no odor remains. Remove contaminated clothing and shoes. Wash clothing before reuse. **Inhalation,** remove to fresh air. **Ingestion,** do NOT induce vomiting. Do NOT give liquids. Small amounts which accidentally enter the mouth should be rinsed out until taste is gone.

Reflex* — see Fomesafen.

Regesan* — see DCNA.

Regim-8* Plant Growth Regulator (TIBA) — Discontinued by IMC.

Registered Pesticides

Pesticide products which have been approved by the Environmental Protection Agency for the uses listed on the label.

Registration

Formal listing with EPA of a new pesticide before it can be sold or distributed in intra- or inter-state commerce. The product must be registered under the Federal Insecticide, Fungicide, and Rodenticide Act. EPA is responsible for registration (pre-market licensing) of pesticides on the basis of data demonstrating that they will not cause unreasonable adverse effects on human health or the environment when used according to approved label directions.

Registration Standards

Published reviews of all the data available on pesticide active ingredients.

Reglone* — see Diquat Dibromide.

Reglox* — see Diquat Dibromide.

Regulaid*

BP: Kalo, Inc. (Regulaid*)

Chemistry

COMPOSITION: Principal agents: polyoxyethylenepolypropoxypropanol, 2-butoxyethanol, dihydroxy propane.
PROPERTIES: Nonionic.

Action/Use

ACTION: Adjuvant, spreader-activator.
USE: For foliar applied growth regulator chemicals and streptomycin applications.

Environmental Guidelines

SOLUBILITY: Complete in water.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
HANDLING AND STORAGE CAUTIONS: Causes eye irritation. Avoid prolonged contact with skin.

Emergency Guidelines

FIRST AID: **Eyes,** immediately flush with water.

Regulox* — see Maleic Hydrazide.

Relative Humidity

The ratio of the quantity of water vapor present in the atmosphere to the quantity which would saturate at the existing temperature. The relative humidity, even at a uniform vapor level, changes with a shift in temperature because the quantity to produce saturation changes.

Relax*

BP: JH Biotech

Action/Use

ACTION: Wetting agent.
USE: Reduce the surface tension of foliar applied products and stress of plants.

Reldan* — see Chlorpyrifos-Methyl.

Release*

BP: Abbott Laboratories (Release*)

Identification

COMMON NAME: Gibberellic acid GA₃.
CODE NUMBERS: CAS 6814-58-0; SHA 207100.

Chemistry

FAMILY: Gibberellin.

PROPERTIES: Insoluble in alcohols.

Action/Use

ACTION: Plant growth regulator.
USE: Topical seed treatment for rice.
FORMULATIONS: 10% soluble powder.
COMBINATIONS: Compatible with most commonly applied fungicides. Incompatible with products containing zinc oxide and copper hydroxide.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. Inhalation LC₅₀ 4 hrs. 6.2 mg/l. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** drink one or two glasses of water.

Rely* Herbicide (triclopyr) — Discontinued by Hoechst-Roussel Agri-Vet.

Remasan Chloroble M — see Maneb.

Remedy* — see Trichlopyr.

Remiat*

F: Comercial Tecnica Aralf S.A.

Chemistry

COMPOSITION: Petroleum hydrocarbons, xylene and octyl phenoxy-polyethoxyethanol.

FAMILY: Aliphatic hydrocarbons and surfactant.

PROPERTIES: Pale yellow flammable liquid. 100% soluble in aliphatic hydrocarbons.

Action/Use

ACTION: Latex stain remover.
USE: For cleaning and degreasing all hard surfaces of latex stained equipment used in fruit packing.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic. Bird: Toxic.

SOLUBILITY: Emulsifiable in water.

Safety Guidelines

PROTECTIVE CLOTHING: Synthetic rubber gloves and glasses.
HANDLING AND STORAGE CAUTIONS: Avoid mixing or storing with strong oxidizing agents. Keep airborne vapor concentration below 100 ppm. Avoid frequent or prolonged skin contact.

Emergency Guidelines

FLASHPOINT: 78°F.

COMBUSTION PRODUCTS: CO, CO₂.

FIRST AID: **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water.

EMERGENCY TELEPHONE: 506-32-7954 (Comercial Tecnica).

Remtal* SC — see Simazine; Trietazine.

Renegade* — see Fastac*.

Renex*

BP: ICI Surfactants

Action/Use

ACTION: Series of surfactants.
USE: Used in formulation of pesticides.
 See Emulsifier.

Rep* Insect Repellent (N,N-diethylbenzamide) — Discontinued by Quimica Estrella.

Repellent (Insect)

A material used primarily for the control of insects, birds and other vertebrates. Oil of citronella, prior to World War II, was the standard insect repellent. Now, many other compounds, much more effective, are in use. These include benzyl benzoate for chiggers; dimethyl phthalate for mosquitoes and mites; and ethyl hexandiol, indalone and

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

dimethyl carbate for mosquitoes, chiggers, and fleas. Various combinations of these are used as all-purpose repellents.

See Methyl Nonyl Ketone.

Rephon* — see Ethephon.

Repulse* — see Baytan*; Disulfoton.

Reregistration

Reevaluation and relicensing of existing pesticides originally registered prior to current scientific and regulatory standards. EPA reregisters pesticides through its Registration Standards Program.

Rescue* — see Naptalam.

Residual Herbicide

A weed killer that persists in the soil and injures or kills germinating weed seedlings over a relatively short period of time.

See Persistent Herbicide.

Residual Insecticide

A compound that kills insects which may come in contact with the insecticide which remains on or in a treated location even after a long time.

Residue

That quantity of a substance, especially of active pesticide, remaining on or in a surface or crop (including livestock products). A residual deposit to last for considerable time on a wall surface may be desirable as opposed to a residue on a food crop which should disappear by harvest. An illegal residue is that amount of active ingredient above the tolerance which remains on a crop at harvest. In some cases, any amount of pesticide present on the crop is considered illegal.

See Contamination; Tolerance.

Residuren Extra*

(Discontinued 1976 by Farm Protection Ltd.)

Action/Use

ACTION: Herbicide.

Resisan* — see DCNA.

Resistance

The degree to which a species of insect or other organism tolerates a toxic substance. Exposure of a population to a substance at such strength that only weaker individuals are killed raises the level of tolerance in the breeding survivors and the organism in that area may increase its tolerance to the substance.

Reslin* — see Permethrin.

Resmethrin

BP: Mitchell Cotts Chemical Ltd. (Pynosect*)

Roussel Uclaf Corp. (SBP-1382*, Synthrin*, Vectrin*)

Sumitomo Chemical Co., Ltd. (Benzofuroline*, Chryson*)

Identification

COMMON NAMES: Resmethrin (ISO-E, ANSI, BSI, ESA, JMAF); resmethrine (ISO-F).

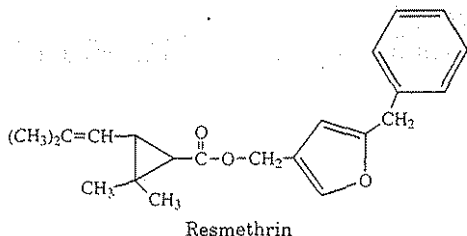
EXP. CODE NUMBER: FMC 17370 (FMC Corp.); NIA 17370.

OTHER CODE NUMBERS: CAS 10453-86-8; SHA 097801.

Chemistry

COMPOSITION: ([5-(phenylmethyl)-3-furanyl]methyl 2,2-dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylate) or 5-benzyl-3-furylmethyl (1RS)-cis,trans-chrysanthemate.

PROPERTIES: Waxy off-white to tan solid synthetic pyrethroid with characteristic chrysanthemate odor. Insoluble in water, 10% in kerosene, very soluble in xylene, methylene chloride, isopropyl alcohol and aromatic petroleum hydrocarbons.



Action/Use

ACTION: Insecticide.

USE: Flying and crawling insect control for household, greenhouse, indoor landscaping, mushroom houses, industrial, stored product insects, and mosquito insect control.

COMBINATIONS: Tetralate* (+ tetramethrin), Scourge* and Derringer* (+ piperonyl butoxide) (all Roussel Uclaf Corp.).

Registration Notes

U.S.: For USDA meat and poultry inspection programs.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ >2500 mg/kg. Dermal LD₅₀ >3000 mg/kg. (Guinea Pigs): Skin sensitization, negative.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin. Store in cool, dry area. Waste may be disposed of on-site or at an approved disposal facility.

Emergency Guidelines

ANTIDOTE: Antihistamines are of value. If sufficient resmethrin has been ingested to cause nervous manifestations, pentobarbital should be used. The diarrhea that occurs may be controlled with atropine sulfate.

FIRST AID: Symptomatic treatment. **Eyes, Skin**, flush affected areas with water. Get medical aid if symptoms persist.

See Pyrethroids.

Resmethrine — see Resmethrin.

Resolve*

BP: American Cyanamid Co. (Resolve*)

Chemistry

COMPOSITION: Imazethapyr + dicamba.

Action/Use

ACTION: Herbicide.

USE: Co-pack product for weed control in IMI-Corn* hybrids. Expected to be available as premix in 1995.

Respirator — see Gas Mask.

Respond* Biostimulant — Discontinued 1993 by United Agri Products.

Responsar* — see Beta-cyfluthrin.

Res-Q*

(Discontinued 1985 by PBI/Gordon Corp.)

Chemistry

COMPOSITION: Maneb + hexachlorobenzene + captan with or without insecticide.

Action/Use

ACTION: Seed protectant, disinfectant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 8000 mg/kg. Dermal >1000 mg/kg.

Restricted Use Pesticide (RUP)

As determined by the U.S. Environmental Protection Agency (EPA) or a state agency, a pesticide which is available for purchase and use only by certified pesticide applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification. This group of pesticides is not available for use by the general public because of the very high toxicities and/or environmental hazards associated with these materials.

Retard* — see Maleic Hydrazide; Potassium Salt of Maleic Hydrazide.

Retardants

A class of plant growth regulators useful especially in plant height control; especially in commercial greenhouse-grown floricultural crops.

Revenge* Herbicide/Plant Growth Regulator (dalapon sodium salt + dalapon magnesium salt + TCA sodium salt) — Discontinued 1994 by Hopkins Agricultural Chemical Co.

Reward* Biostimulant — Discontinued by United Agri Products.

Reward* Herbicide — see Diquat Dibromide.

RH-124 (butrizol) — Discontinued by Rohm and Haas Co.

RH-787 — see Vacor*.

RH-0265 — see Compete*.

RH-2161 — see Sisthane*.

RH-2915 — see Goal*.

RH-3866 — see Systhane*.

RH-5992 — see Mimic*.

RH-6201 — see Blazer*.

RH-7592 — see Indar*.

Rhino* — see Atrazine; Butylate.

Rhizoctol*

(Discontinued by Bayer AG)

Identification

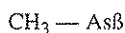
ADDITIONAL TRADE NAMES: Asozin*, MAS*, Monkil* WP, Urbasulf*.

Chemistry

COMPOSITION: Methylarsenic sulfide.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.



Active Ingredient of Rhizoctol*

Action/Use

ACTION: Fungicide, seed treatment.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 100 mg/kg. (Rabbit): Dermal 1400 mg/kg.**Rhodacal* Dispersants**

BP: Rhone-Poulenc Surfactants & Specialties (Antarox*, Igepal*, Rhodacal*, Rhodapol*, Rhodasurf*, Supofor*)

Identification

DISCONTINUED NAME: Nekal* Dispersants (GAF Chemicals).

Action/Use

ACTION: Anionic wetting agents.

See Dispersant.

Rhodafac* Surfactants

BP: Rhone-Poulenc Surfactants & Specialties (Rhodafac*)

Identification

DISCONTINUED NAME: Gafac* Surfactants (GAF Chemicals).

Chemistry

COMPOSITION: Complex organic phosphate ester (free acid).

Action/Use

ACTION: Anionic emulsifiers.

USE: Rhodafac* PE, RE, RM, and RS are emulsifiers for agricultural pesticides, especially herbicides. Rhodafac* RM-510 and RM-710 for 2,4-D and 2,4,5-T herbicides. Rhodafac* RS products are for toxicants in liquid fertilizer combinations.

FORMULATIONS: Pure liquid of various concentrations with water.

Rhodanic Acid — see Rhodanine.**Rhodanine****Identification**

OTHER NAME: Rhodanic acid.

Chemistry

COMPOSITION: 2-Thioxo-4-thiazolidinone.

Action/Use

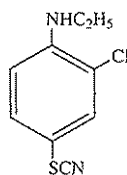
ACTION: Fungicide.

Rhodapol* — see Dispersant; Rhodacal* Dispersants.**Rhodax*** — see Fosetyl-Aluminum.**Rhodasurf*** — see Dispersant; Rhodacal* Dispersants.**Rhodethanil****Identification**

COMMON NAMES: Rhodethanil (ISO-E, BSI); rodéthanil (ISO-F).

Chemistry

COMPOSITION: 3-Chloro-4-(ethylamino)phenyl thiocyanate (CAS 8 and 9 CI).



Rhodethanil

Action/Use

ACTION: Herbicide.

Rhodéthanil — see Rhodethanil.**Rhodia* Herbicide (2,4-D)** — Discontinued 1984 by Rhone-Poulenc**Rhodiace* Insecticide (ethion)** — Discontinued 1994 by Rhone-Poulenc Ag Co.**Rhodiacuvire* Fungicide (copper oxychloride)** — Discontinued by Rhone-Poulenc.**Rhodianébe** — see Maneb.**Rhodianebe* Fungicide (maneb)** — Discontinued by Rhone-Poulenc.**Rhodiasan Express*** — see Thiram.**Rhodiatox*** — see Parathion.**Rhodocide*** — see Ethion.**Rhodopol* 23** — see Xantham gum.**Rhodorsil*** — see Foam Suppressant.**Rhomene*** — see MCPA.**Rhonox*** — see MCPA.**Rhothane*** — see TDE.**Ricetrine***

(Discontinued 1989 by Applied Biochemists, Inc.)

Identification

COMMON NAME: Copper TEA complex.

Chemistry

COMPOSITION: Copper triethanolamine complex in liquid form. Chelated copper.

Action/Use

ACTION: Algicide, photosynthetic inhibitor.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 0.50-2.00 ml/kg.**Rico*** — see Anilofos.**Ridall-Zinc*** — see Zinc Phosphide.**Rideon* Herbicide (diphenamid)** — Discontinued 1989 by Chemol Trading Ltd. Co.**Ridomil*** — see Metalaxyl.**Ridomil* MZ**

BP: Ciba (Ridomil* MZ, Pace*)

Ciba, Ltd. (Fubol*, Ridomil* MZ)

Chemistry

COMPOSITION: Metalaxyl + mancozeb.

Action/Use

ACTION: Fungicide (systemic and protectant).

USE: For control of foliar diseases caused by oomycetes. Offers downy mildew and blight control of many field crops, vegetables and fruits.

Pace*: For use on turf.

FORMULATIONS: Wettable powder.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 5189 mg/kg. (Fish and wildlife): relatively nontoxic.**Ridomil*/Bravo*** — see Chlorothalonil; Metalaxyl.**Rifle*** — Discontinued by Ciba.**Riflex*** — see Metoxuron.**Rigo Oil Concentrate* (surfactant)** — Discontinued by Rigo Co.**Rimidin*** — see Rubigan*.**Rimifoot***

F: Jewnin-Joffe Industry Ltd. (Rimifoot*, Rimi-Trap*)

Chemistry

COMPOSITION: Polybutenes.

Action/Use

USE: Fruit fly monitor, control in fruit groves.

FORMULATIONS: Sticker paste, sticky trap.

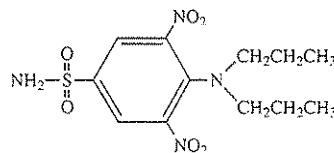
Rimilure* — see Pheromone.**Rimi-Trap*** — see Rimifoot*.**Rion*** — see Malathion.**Riozeb* Cobre WP** — see Copper; Mancozeb.**Riozeb* Fuerte WP** — see Carbendazim; Mancozeb.**Ripcord*** — see Cypermethrin.**Ripenthol*** — see Endothal.**Ripost*** — see Oxadixyl.**Ripost* M** — see Cymoxanil; Mancozeb; Oxadixyl.**Risalin****Identification**

COMMON NAME: Oryzalin (ISO, ANSI, BSI, WSSA).

Chemistry

COMPOSITION: 3,5-Dinitro-N,N-di(n-propyl) sulfanilamide.

PROPERTIES: Orange crystals, melting point 137-138°C.



Oryzalin

Action/Use

ACTION: Selective preemergence herbicide.

USE: To control grasses.

Riselect* — see Propanil.**Risk Assessment**

Qualitative and quantitative evaluation performed in an effort to define the risk posed to human health and/or the environment by the presence or potential presence and/or use of specific pollutants.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Risk Management

The process of evaluating alternative regulatory and non-regulatory responses to risk and selecting among them. The selection process necessarily requires the consideration of legal, economic and social factors.

Riton* — see DDVP.

Rival* — see Captan; PCNB; Thiabendazole.

Rival*/Sprint*/Stanza L* — see Fenpropimorph; Prochloraz.

Rivonex* — see Isoproturon.

Rizolex*

BP: Sumitomo Chemical Co., Ltd.

Identification

COMMON NAME: Tolclofos-methyl (ISO, BSI).

EXP. CODE NUMBER: S-3349.

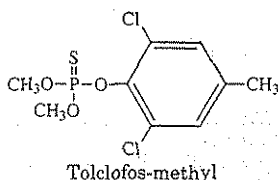
OTHER CODE NUMBER: CAS 57018-04-9.

ADDITIONAL TRADE NAME: Basilex* (Fisons Ltd.).

Chemistry

COMPOSITION: O-(2,6-Dichloro-4-methylphenyl) O,O-dimethyl phosphorothioate (IUPAC).

PROPERTIES: White crystalline solid. Melting point 78-80°C. Soluble in common solvents such as acetone and xylene.



Action/Use

ACTION: Fungicide.

USE: For control of soil-borne diseases caused by Rhizoctonia, Sclerotium and Typhula on potatoes, sugar beets, bulbs, coffee, cotton, peanuts, vegetables, cereals, ornamentals, turf, and lawn by both soil treatment and seed treatment.

FORMULATIONS: Wettable powder, dust, flowable, emulsifiable concentrate.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 5000 mg/kg. Dermal LD₅₀ > 5000 mg/kg (male); > 5000 mg/kg (female).

R.L. Concentrado*

BP: CEQSA Especialidades Quimicas S.A.

Chemistry

PROPERTIES: Pale yellow flammable liquid.

Action/Use

ACTION: Emulsifiable latex stain remover.

USE: For cleaning all hard surfaces of latex stained equipment.

FORMULATIONS: Aliphatic hydrocarbon xilen and nonyl-phenoxy-polyethexiethanal.

RMCL — see Recommended Maximum Contaminant Level.

RO 15-1297 — see PyrifenoX.

Roach-Chek* — see Hercon* Insectape with Propoxur.

Roach-Tape* — see Hercon* Insectape with Propoxur.

Roccal* — see Benzalkonium Chloride.

Rochlor* — see Trichlorfon.

Rock Salt — see Sodium Chloride.

Rockett-Ultra* — see Calixin*; Fenpropimorph.

Rocyper* — see Cypermethrin.

Rodamine* — see 2,4-D.

Rodazim* — see Carbendazim.

Rodent

A member of the animal group (Order Rodentia) to which rats, mice, gophers, and porcupines belong.

Rodent Cakes* Rodenticide (diphacinone) — Discontinued by Bell Labs.

Rodent Pellets* — see Zinc Phosphide.

Rodenticide

A material used primarily for the control of rodents (rats, mice, etc.) and related animals (such as rabbits).

A classification of rodenticides is as follows:

1. Coumarins: dicumarol, warfarin, coumachlor, coumatetralyl.
2. Indandiones: chlorophacinone, Pival*.
3. Organochlorines: DDT, endrin.
4. Botanicals: red squill, strychnine.

5. Organophosphates: Gophaide*.

6. Pyriminilureas: Vacor*.

7. Miscellaneous: antu, phosphorus, sodium fluoroacetate, thallium sulfate.

Rodenticide AG* Mole and Gopher Bait — see Zinc Phosphide.

Rodeo* — see Glyphosate.

Rodethanil — see Rhodethanil.

Rodex* — see Cov-R-Tox*; Fluoroacetamide; Warfarin.

Rodine* — see Red Squill.

Rody* — see Fenpropathrin.

Roethyl-P* — see Parathion.

Rofon* — see Bayleton*.

Ro-Gibb* — see Gibberellic Acid.

Rogodan* Insecticide (dimethoate) — Discontinued 1989 by Agrimont S.p.A.

Rogodial* Insecticide (dimethoate + phenthoate) — Discontinued 1989 by Agrimont S.p.A.

Rogor* — see Dimethoate.

Rogue* (propanil) — Discontinued.

Rometa* — see Methamidophos.

Romethoate* — see Dimethoate.

Romethyl-P* — see Methyl Parathion.

Romicarb* — see Pirimicarb.

Romycin* Fungicide (validamycin A) — Discontinued by Rotam Group.

Romyl* — see Benomyl.

Rondo* Fungicide — see Captan; PyrifenoX.

Rondo* Herbicide — see Glyphosate.

Rondo M* — see Mancozeb; PyrifenoX.

Ro-Neet* — see Cycloate.

Ronicur* Fungicide (metiram + vinclozolin + cymoxanil) — Discontinued 1989 by BASF AG.

Ronilan* — see Vinclozolin.

Ronilan* M Fungicide (maneb + vinclozolin) — Discontinued 1992 by BASF AG.

Ronilan* ME Combi Fungicide (metiram + vinclozolin) — Discontinued 1989 by BASF AG.

Ronilan* S Fungicide (vinclozolin + sulfur) — Discontinued 1989 by BASF AG.

Ronilan* SP — see Sulfur; Vinclozolin.

Ronilan* Spezial — see Chlorothalonil; Vinclozolin.

Ronilan* T Combi Fungicide — see Thiram; Vinclozolin.

Ronnel

(Discontinued by Dow Chemical Co.)

Identification

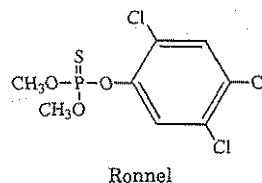
COMMON NAMES: Ronnel (ANSI, ESA, Canada); fenclorophos (ISO, BSI, BAN, France, USSR); fenclorlofos.

CODE NUMBERS: CAS 299-84-3; SHA 058301; OMS 123 (WHO); ENT-23284.

ADDITIONAL TRADE NAMES: Etlolene*, Nankor*, Korlan*, and Trolene* (Dow), Ectoral*, Viozene*.

Chemistry

COMPOSITION: O,O-Dimethyl O-(2,4,5-trichlorophenyl) phosphorothioate.



Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1740 mg/kg. (Rabbit): Dermal LD₅₀ 1000-2000 mg/kg.

Ronstar* — see Oxadiazon.

Roost No More*

(Discontinued 1993 by Roussel Bio Corp.)

Chemistry

COMPOSITION: Emulsion: polyisobutylene (a.i.) + water + emulsifier + defoamer. Paste: petroleum distillates + aluminum soaps of fatty acids + polyisobutylene + titanium dioxide.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Bird repellent. Not a toxicant.

Environmental Guidelines

SOLUBILITY: Slight-to-moderate in water depending on formulation.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Emergency Guidelines

FIRST AID: Ingestion, induce vomiting.

Rootect Oil* — see Chloropicrin; Nemamort*.

Rootone* — see 1-Naphthaleneacetic Acid.

Ropax* — see Brodifacoum.

RoPel*

BP: Burlington Bio-Medical & Scientific Corp. (RoPel*)

Chemistry

COMPOSITION: Benzyl-diethyl [(2,6-xylyl-carbamoyl)methyl]ammonium saccharide, thymol, inert ingredients.

PROPERTIES: Extremely vile, bitter taste.

Action/Use

ACTION: Contact animal, rodent, bird repellent.

USE: For ornamental trees, shrubs, flowers, grass, plants, seeds, seedlings, and bulbs.

Registration Notes

U.S.: Non-edible crops only.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children and animals.

Emergency Guidelines

FIRST AID: Eyes, flush immediately with plenty of water. Skin, wash first with rubbing alcohol, then with soap and water. Ingestion, gargle with water.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Rophosate* — see Glyphosate.

Roquat* — see Mepiquat Chloride.

Rosanil* (propanil) — Discontinued by Quimica Estrella.

5-Roses* — see Sulfur.

Rospin* Acaricide (chloropropylate) — Discontinued by Ciba-Geigy Ltd.

Rotacide* — see Piperonyl Butoxide; Rotenone.

Rotary-type Hand Duster

A popular type of duster carried in front of the operator on the lower chest by a neck strap. A hand crank revolves a fan to provide positive feed from the dust chamber to the delivery tube ahead of the operator. See Knapsack Duster.

Rotate* Insecticide (bendiocarb) — Discontinued 1993 by NOR-AM.

Rotenone

BP: Prentiss Incorporated (Prentox* Prenfish*, Prentox*

Rotenox*, Prentox* Synpren*-Fish Toxicant)

Roussel Uclaf Corp. (Noxifire*, Noxfish*, Rotenone FK-11)

Tifa Ltd. (Chem-Fish* Regular, Chem Fish* Special,

Chem Fish* Synergized, Cube Powder*, Rotenone

Extract*)

Identification

COMMON NAME: Rotenone.

CODE NUMBERS: CAS 83-79-4; SHA 071003.

ADDITIONAL TRADE NAMES: Derris*, Nicouline*, Tubatoxin*.

Chemistry

PROPERTIES: Cubé is now the only commercial source in the U.S. of rotenone for insecticide production, although derris, timbo, and other related rotenone-containing plants have been utilized. Peru is the major source of the root of the plant which may be ground as a dust, or extracted to provide concentrates, etc. Other rotenone related compounds such as deguelin, tephrosin, and toxicarol have been isolated from various parts of rotenone-containing plants, mostly legume shrubs. Roots are prepared for use in insecticides by grinding and applying as a dust (using a non-alkaline carrier) or by extracting the insecticidal principles with acetone, carbon tetrachloride, benzene, or other solvents and incorporating the extracts in spray preparations. Rotenone is biodegradable.

Action/Use

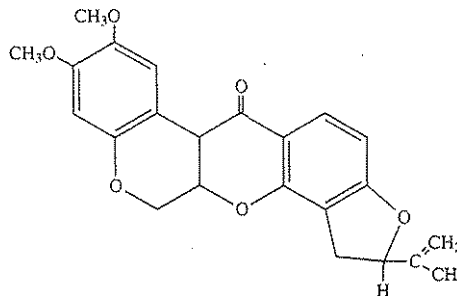
ACTION: Selective contact insecticide with some acaricidal properties.

USE: Long used as dusts for garden insects, lice, and ticks on animals. On vegetable crops for Colorado potato beetles and aphids. For use on ornamentals, flowers, fruits and berries. Rotenone emulsions are used for eliminating or partially eradicating fish populations in the management of bodies of water to result in improved fishing. Noxifire*

when used as a drench is effective in controlling fire ants in lawns, gardens, agricultural land.

FORMULATIONS: Cube, powder.

COMBINATIONS: Nusyn-Noxfish* and PB-Nox* (+ piperonyl butoxide), Foliafume* (+ pyrethrum) (all Roussel Uclaf Corp).



Rotenone

Environmental Guidelines

HAZARDS: Fish: Very toxic. Bee: Nontoxic, except in combination with pyrethrum.

Safety Guidelines

SIGNAL WORD: CAUTION; DANGER (Form., EC).

TOXICITY CLASS: III; I (Form., EC).

TOXICITY: (Rat): Oral LD₅₀ 132-1500 mg/kg. (Mouse): 350 mg/kg. Rotenone is nonphytotoxic, moderately toxic to most animals, and very toxic to swine, but produces no harmful residues on vegetable crops. Action is slow, and the material deteriorates rapidly in sun, air, and water. Formulations lose their effectiveness within a week after application.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin. Wash skin, clothing after handling. Toxic to fish. Keep out of any body of water. Do not contaminate water by cleaning of equipment or disposal of waste. Waste must be disposed as directed on label.

Emergency Guidelines

FIRST AID: Get medical aid as necessary. Inhalation, remove from exposure. Noxfish*, Prenfish* Toxicant, Nusyn-Noxfish*, Synpren* Fish Toxicant (containing aromatic petroleum hydrocarbons): Ingestion, do NOT induce vomiting. Dusts, brittle extract: Ingestion, give activated charcoal and/or induce vomiting.

Rotenone Extract* — see Rotenone.

Rotenone FK-11 — see Rotenone.

Rotetra* — see Tetradifon.

Rothalonil* — see Chlorothalonil.

Rothox* — see Fenitrothion.

Rotox* (methyl bromide) — Discontinued by Ferguson Fumigants, Inc.

Rotraz* — see Amitraz.

Roundup* — see Glyphosate.

Rout*

BP: Grace-Sierra Crop Protection Co.

Chemistry

COMPOSITION: Goal* + Surfian*.

Action/Use

ACTION: Herbicide.

USE: Preemergent for ornamentals.

FORMULATIONS: Granules.

Registration Notes

U.S.: Not registered for vegetables or edible fruit-bearing crops, turf, bedding plants or flowering plants.

Rovral* — see Iprodione.

Rovral* R — see Iprodione.

Rowmate*

(Discontinued by Rhone-Poulenc)

Identification

COMMON NAME: Dichlormate (ISO, ANSI, BSI, WSSA) for the pure compound (3,4-dichlorobenzyl methylcarbamate).

EXP. CODE NUMBER: UC 22463A (pure compound); UC 22463 (tech) (Union Carbide Corp.).

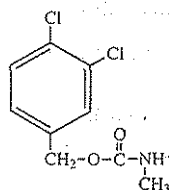
OTHER CODE NUMBERS: CAS 62046-37-1 (pure compound); CAS 1966-58-1 (tech); SHA 293200.

ADDITIONAL TRADE NAME: Sirmate*.

Chemistry

COMPOSITION: 3,4-and 2,3-Dichlorobenzyl methylcarbamate.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.



Active Ingredient of Rowmate*

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat) Oral LD₅₀ 1879 mg/kg.**Roxion*** — see Dimethoate.**Roxyl*** — see Metalaxyl.**Royal MH-30*** — see Maleic Hydrazide.**Royal MH-30 SG*** — see Maleic Hydrazide.**Royal Slo Gro*** — see Maleic Hydrazide.**Royaltac***

BP: Uniroyal Chemical Co., Inc. (Royaltac*, Royaltac* M)

Identification

DISCONTINUED NAMES: Royaltac*-85, Royaltac* M-2 (Uniroyal Chemical Co., Inc.).

ChemistryCOMPOSITION: n-Decyl alcohol or n-decanol and mixed fatty alcohols of C₈C₉C₁₀C₁₂.**Action/Use**

ACTION: Growth regulators.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 12,800 mg/kg. (Mouse): 6500 mg/kg.**Royaltac*-85 Plant Growth Regulator (royaltac)** — Discontinued by Uniroyal Chemical Co., Inc.**Royaltac* M** — see Royaltac*.**Royaltac* M-2 Plant Growth Regulator (royaltac)** — Discontinued 1992 by Uniroyal Chemical Co., Inc.**Rozol*** — see Chlorophacinone.**10465 RP** — see Kilval*.**11561 RP** — see Carbetamide.**17623 RP** — see Oxadiazon.**26019 RP** — see Iprodione.**32545 RP** — see Fosetyl-Aluminum.**RP 2929**

(Discontinued by Rhone-Poulenc.)

Chemistry

COMPOSITION: Dimethyl amino-4-thiocyanobenzene.

Action/Use

ACTION: Herbicide.

RP 11974 — see Phosalone.**PAR** — see Special Review.**RPH*** — see Thiabendazole.**RP-Thion* Insecticide (ethion)** — Discontinued 1994 by Voltas Ltd., Chemicals & Agro Products.**RP-Thi-Protect-L*** — see Thiram.**RTU* Flowable** — see Thiram; Thiabendazole.**RTU*-Baytan*-Thiram** — see Baytan*; Thiram.**RTU*-PCNB** — see PCNB.**RTU*-Vitavax*-Thiram** — see Carboxin; Thiram.**RU 22974** — see Decis*; K-Othrine*.**Ruban*** — see Bancol*.**Rubenal*** — see Phenmedipham.**Rubetram*** — see Ethofumesate.**Rubigan***

BP: DowElanco

Identification

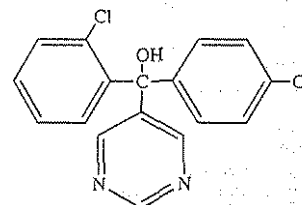
COMMON NAME: Fenarimol (ISO, ANSI, BSI).

EXP. CODE NUMBER: EL-222 (Eli Lilly).

OTHER CODE NUMBERS: CAS 60168-88-9; SHA 206600.

ADDITIONAL TRADE NAME: Rimidin*.

DISCONTINUED NAME: Tebulan* (+ dodine) (Rhone-Poulenc).

ChemistryCOMPOSITION: α -(2-chlorophenyl)- α -(4-chlorophenyl)-5-pyrimidinemethanol (CAS).PROPERTIES: Pure: white crystalline solid, melting point 117-119°C. Vapor pressure is $< 2.2 \times 10^{-7}$ mm/Hg at 25°C. Soluble in most organic solvents.

Fenarimol

Action/Use

ACTION: Foliar fungicide.

USE: AS for turfgrasses, ornamentals, various tree crops. EC for scab, powdery mildew, rusts of apple and pear; powdery mildew of grapes; leafspot, powdery mildew of cherries.

FORMULATIONS: Aqueous suspension (AS), emulsifiable concentrate (EC), wettable powder (WP).

Environmental GuidelinesHAZARDS: Fish: Toxic. LC₅₀ 1.8 mg/l (96 h) (rainbow trout). Bee: Non-toxic.

SOLUBILITY: In water 13.7 ppm at 25°C at pH 7.

Safety Guidelines

SIGNAL WORD: WARNING (EC). CAUTION (WP).

TOXICITY CLASS: II (EC). III (WP).

TOXICITY: Tech (Rat): Oral LD₅₀ 2500 mg/kg. (Mouse): 4500 mg/kg.

PROTECTIVE CLOTHING: Impermeable gloves for product mixing, loading.

HANDLING AND STORAGE CAUTIONS: EC causes eye, skin irritation. Harmful if swallowed, inhaled, or absorbed through skin. Avoid breathing spray mist. Avoid contact with skin, eyes, or clothing. Do NOT store near heat or open flame.

Rubitox* — see Phosalone.**Rufast***

BP: Roussel Uclaf

Roussel Uclaf (Agrovet)

Identification

COMMON NAMES: Acrinathrin (ISO-E draft, BSI); acrinathrine (ISO-F draft).

EXP. CODE NUMBER: RU 38702.

OTHER CODE NUMBERS: CAS 1001007-06-1; CAS 108833-18-7 (incomplete stereochem).

ChemistryCOMPOSITION: [1R-[1 α (S*), 3 α (Z)]]-2,2-dimethyl-3-[3-oxo-3-[2,2,2-trifluoro-1-(trifluoromethyl)ethoxy]-1-propenyl]-cyclopropanecarboxylic acid, cyano [3-phenoxyphenyl]methyl ester (CAS).

FAMILY: Synthetic pyrethroid.

PROPERTIES: White, odorless crystalline powder; molecular weight 541.4; melting point 81.5°C; vapor pressure 3.9 10⁻⁷ Pa at 25°C. Good stability of tech for 2 years at room temperature. Soluble in acetone, dimethylformamide and chloroform.**Action/Use**

ACTION: Acaricide, insecticide.

USE: Controls mites, homoptera and thysanoptera on pome fruit, stone fruit, citrus, deciduous fruits, grapes, vegetables, cotton, ornamentals, small fruits.

FORMULATIONS: EC, WP, SC, EW.

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

SOLUBILITY: Practically insoluble in water 0.02 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat, mice): Oral LD₅₀ > 5000 mg/kg; (Rat): Dermal LD₅₀ > 2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact of eyes with undiluted EC.

Store in original container away from animal feed and foodstuffs.

Rugby*

BP: FMC Corp. (Apache*, Rugby*, Taredan*)

Identification

COMMON NAME: Cadusofas (ISO draft, BSI).

EXP. CODE NUMBER: FMC 67825 (FMC Corp.).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: O-ethyl S,S-di-sec-butyl phosphorodithioate (IUPAC) or O-ethyl S,S-bis(1-methylpropyl) phosphorodithioate (CAS).
FAMILY: Organophosphate.

PROPERTIES: Tech: Colorless to yellow liquid.

Action/Use

ACTION: Nematicide, soil insecticide.

USE: Broad spectrum control of plant parasitic nematodes and soil insects by contact action in many field, vegetable, fruit crops.

FORMULATIONS: Granule, emulsifiable concentrate, solvent-free microemulsion concentrate.

Registration Notes

U.S.: Apache*, Rugby* not marketed.

OUTSIDE U.S.: For bananas, plantains and potatoes.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bird: Toxic.

SOIL PARTICLE ADSORPTION: Half-life of 45 days in silty clay, sandy loam soils.

SOLUBILITY: In water 248 ppm.

Safety Guidelines

SIGNAL WORD: DANGER (250EC). WARNING (10G, 100ME).

TOXICITY CLASS: I (250EC), II (10G, 100ME).

TOXICITY: 10G (Rat): Oral LD₅₀ 679 mg/kg (male), 391 mg/kg (female). (Rabbit): Dermal 155 mg/kg (male), 143 mg/kg (female).

PROTECTIVE CLOTHING: Goggles, clothing, gloves.

HANDLING AND STORAGE CAUTIONS: May be poisonous if swallowed or absorbed through skin or eyes. May cause skin sensitization. Avoid eye, skin, clothing contact. Do not contaminate water by cleaning equipment or disposal of waste.

Emergency Guidelines

FLASHPOINT: 129.4°C (Seta CC).

ANTIDOTE: Atropine. Product is a cholinesterase inhibitor. Use of theophylline, morphine, barbituates, phenothiazines, reserpine, succinyl choline is contraindicated.

FIRST AID: In all instances, get immediate medical aid. Eyes, flush with water for 15 minutes. Skin, wash with plenty of soap and water. Inhalation, give mouth-to-mouth artificial respiration if not breathing. Granular: Ingestion, if conscious give 1-2 glasses of water, induce vomiting by touching back of throat with finger. EC: Ingestion, do NOT induce vomiting unless supervised by medical professional.

EMERGENCY TELEPHONE: 716-735-3765 (FMC Corp.).

Ruik* — see Methomyl.

Rukseam* — see DDT.

Rumblin* — see Onic*.

RUP — see Restricted Use Pesticide.

Ruphos* Insecticide (dioxathion) — Discontinued by Hercules Inc.

Rutgers 612* Insect Repellent (ethyl hexanedio) — Discontinued by Union Carbide Corp.

Ryan 50* — see Ryania.

Ryania

BP: AgriSystems International (Natur-Gro R-50*, Natur-Gro Triple Plus*)
Dunhill Chemical Co. (Ryan 50*)

Identification

COMMON NAME: Ryania (ground stemwood of *Ryania speciosa*).

DISCONTINUED NAMES: Natur-Gro R-100* (AgriSystems International).

Action/Use

ACTION: Insecticide.

USE: Target specific (e.g., codling moth, European corn borer, citrus thrips).

Environmental Guidelines

HAZARDS: Fish: Toxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1200 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat, respirator when spraying.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Ryanodine**Identification**

CODE NUMBER: SHA 071502.

Action/Use

USE: The alkaloid of primary importance among the insecticidal principles of *Ryania*.

Ryzelan* Herbicide (oryzalin) — Discontinued.

Ryzelan* Herbicide (oryzalin) — Discontinued.

Ryzelon* Herbicide (oryzalin) — Discontinued.

RyzUp*

BP: Abbott Laboratories (RyzUp*)

Identification

COMMON NAME: Gibberellic acid.

CODE NUMBERS: CAS 77-06-5; SHA 043801.

Chemistry

FAMILY: Gibberellin.

Action/Use

ACTION: Plant growth regulator.

USE: Foliar application to semi dwarf rice varieties to stimulate early season growth.

FORMULATIONS: 4% liquid concentrate.

COMBINATIONS: Compatible with most commonly applied rice herbicides.

Registration Notes

U.S.: Registered May 1990.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ > 5000 mg/kg.

Inhalation LC₅₀ 4 hrs. (Rabbit): Dermal LD₅₀ > 2000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, face shield or full face respirator, butyl rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area away from water, food, or feed and out of reach of children and animals.

Emergency Guidelines

FLASH POINT: 53°F.

FIRE EXTINGUISHING MEDIA: Appropriate medium for underlying cause of fire.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water.

42-S Thiram Fungicide-Repellent* — see Thiram.

S-47 — see Sumiherb*.

S-410 — see Metasystox-S*.

S-767 — see Dasanit*.

S-1605 — see Diethofencarb.

S-1752 — see Fenthion.

S-1814 — see Sumi-Alpha*.

S-2940 — Discontinued 1992 by Sumitomo Chemical Co.

S-2957 — see Chlorthophos.

S-3206 — see Fenpropathrin.

S-3349 — see Rizolex.

S-4084 — see Cyanophos.

S-4087 — see Surecide*.

S-4347 — see Sumiherb*.

S-4400 — see Agritox*.

S-5602 — see Fenvalerate.

S-5660 — see Fenitrothion.

S-6000 — see Clobber*.

S-6176 — see Ethiolate.

S-6876 — see Folimat*.

S-7131 — see Procymidone.

S-9115 — see Outfox*.

S-10145 — see Propanil.

S-15076 — see Ethiolate.

S-22012 — see Gatnon*.

S-25128 — see Tribunil*.

S-32165 — see Diethofencarb.

S-2539 Forte* — see d-Phenothrin.

S-2703 Forte* — see Gokilaht*.

S-3307D — see Uniconazole.

S-3308L — see Diniconazole.

S-4068SF — see Etoc*.

SAA

Standards Association of Australia.

See Common Name.

Sabadilla

BP: Danali International Ltd. (Veratrin-D*)

Identification

OTHER NAME: Schoenocaulon officinale plant. Name derived from the Spanish cevadilla "little barley" which the dried sabadilla resembles.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Botanical insecticide.

ChemistryCOMPOSITION: Seeds of a lily-like Caribbean plant of the genus *Schoenocaulon* obtained principally from Venezuela. A complex group of alkaloids known collectively as veratrin are the a.i.; two of these are cevadine and veratridine.**Safety Guidelines**

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Sabet* — see Cycloate.

Sable* — see Glyphosate; MCPA.

Sabre* — see Bromoxynil.

Sacernid* — see Acetochlor.

SADH — see Daminozide.

Safeguard*

(Discontinued by Rothwell Plant Health Ltd.)

Action/Use

ACTION: Non-mercurial seed dressing.

Safety Guidelines

TOXICITY: Low-toxicity.

Safener

A substance which prevents objectionable changes when two or more substances must be mixed which otherwise would not be compatible. See Water Modifier.

Safer* Aphid-Mite Attack — see Soaps, Pesticidal.

Safer* Attack Insecticidal Soap — see Soaps, Pesticidal.

Safer* BioNEEM

BP: Ringer Corp.

Identification

TRIVIAL NAME: Azadirachtin.

Chemistry

COMPOSITION: Proprietary combination of 0.3% azadirachtin and 99.7% inert ingredient.

PROPERTIES: Brown to orange liquid with fragrant odor.

Action/Use

ACTION: Botanical insecticide concentrate.

USE: Control of juvenile leaf chewing and other insect pests on flowers, lawns, and ornamentals.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Do not contaminate water, food or feed by storage or disposal. Do not reuse container.

Emergency Guidelines

FLASHPOINT: 55.6°F.

COMBUSTION PRODUCTS: Keep away from heat, sparks, open flame. Avoid acids, acid chlorides, oxidizing agents, reducing metals, alkali metals.

FIRE EXTINGUISHING MEDIA: Alcohol, CO₂, dry chemical, polymer foam.FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Ingestion, drink one or two glasses of water and induce vomiting. Inhalation, excessive exposure may cause drowsiness, remove to fresh air.Safer* Bt Leaf Beetle Attack — see *Bacillus thuringiensis* var. *tenebrionis*.Safer* Caterpillar Attack — see *Bacillus thuringiensis* var. *kurstaki*.

Safer* Fruit & Vegetable Insect Attack — see Soaps, Pesticidal.

Safer* Garden Fungicide

BP: Ringer Corp.

Identification

CODE NUMBER: EPA 42697-18.

Chemistry

COMPOSITION: Proprietary with 12% sulfur.

PROPERTIES: Brownish yellow, slight sulfur odor.

Action/Use

ACTION: Fungicide.

USE: Control of black spot, rust, powdery mildew on roses, fruits, and vegetables.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Incompatible with oxidizers, ammonium nitrate or oils.

Emergency Guidelines

FLASHPOINT: 335°C.

FIRE EXTINGUISHING MEDIA: Sand, CO₂, water fog.

Safer* Insecticidal Soap — see Soaps, Pesticidal.

Safer* Insecticide Concentrate — see Fatty Acids, Pesticidal.

Safer* Moss & Algae Killer — see Fatty Acids, Pesticidal.

Safer* Rose & Flower Insect Attack — see Soaps, Pesticidal.

Safer* Tree & Shrub Insect Attack — see Soaps, Pesticidal.

Safer* Vegetable Insect Attack — see *Bacillus thuringiensis* var. *kurstaki*.**Safer* Yard & Garden Insect Attack***

BP: Ringer Corp.

Identification

CODE NUMBER: EPA 42697-34.

Chemistry

COMPOSITION: Proprietary formulation of 0.20% pyrethrins and 20.0% potassium salts of fatty acids in water/alcohol base.

PROPERTIES: Pale amber.

Action/Use

ACTION: Contact insecticide.

USE: Non-selective contact insecticide for yard and garden pests.

Safrotin* — see Propetamphos.

Safroxan**Chemistry**

COMPOSITION: 4-(3,4-Methylenedioxyphenyl)-5-methyl-m-dioxane.

Action/Use

ACTION: Pyrethrin synergist.

Safroxane**Chemistry**

COMPOSITION: 4-(3,4-Methylenedioxy-6-propylphenyl)-5-methyl-1,3-dioxane.

PROPERTIES: An analog of piperonyl butoxide.

Action/Use

ACTION: Synergist.

Safsan*

F: Jewnin-Joffe Industry Ltd. (Safsan*)

Identification

COMMON NAME: Sodium fluosilicate.

CODE NUMBER: CAS 16893-85-9.

OTHER NAME: Sodium silicofluoride.

Action/Use

ACTION: Insecticide.

USE: For cotton leafworm (*Spodoptera littoralis*), *Agrotis* spp., and mole crickets.

FORMULATIONS: Wet, dry or granular bait.

Environmental Guidelines

SOLUBILITY: Very slightly soluble in water.

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: (Rat/Rabbit): Oral LD₅₀ 125 mg/kg.

HANDLING AND STORAGE CAUTION: Keep in a closed, dry store.

SAF-T-SIDE*

BP: Brandt Consolidated

Identification

CHEMICAL NAME: Paraffinic petroleum oil emulsion.

COMMON NAMES: Summer oil emulsion, superior oil emulsion.

Action/Use

ACTION: Insecticide, acaricide, fungistat.

USE: As a summer oil insecticide to control eggs, crawlers and adults of a wide variety of insects on field, greenhouse and orchard crops and ornamentals. May be used as a dormant spray.

SAGA* — see Tralomethrin.

Salsan* Fungicide (drazoxolon) — Discontinued by ICI Agrochemicals.

Sakkimol* — see Molinate.

Sai Ammoniac — see Ammonium Chloride.

Safan* — see Clofentezine.

Salbiwang* — see Fenpyroximate.

Salithion — see Salithion*.

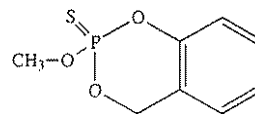
Salithion*

(Discontinued 1992 by Sumitomo Chemical)

Identification

COMMON NAMES: Dioxabenzofos (ISO draft, BSI); salithion (JMAF).

CODE NUMBERS: CAS 3811-49-2; SHA 427500.



Salithion*

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: 2-methoxy-4H-1,3,2-benzodioxaphosphorin 2-sulfide (CAS).

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

Salut* — see Chlorpyrifos; Dimethoate.

Salute*

BP: Miles Inc.

Chemistry

COMPOSITION: Metribuzin + trifluralin.

FAMILY: Triazinone/dinitroaniline herbicides.

PROPERTIES: Miscible with most organic solvents; true emulsifiable concentrate.

Action/Use

ACTION: Selective herbicide.

USE: For control of problem grass and broadleaf weeds in soybeans.

FORMULATIONS: Emulsifiable concentrate.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1995 mg/kg (male), 1561 mg/kg (female). (Rabbit): Dermal > 2000 mg/kg.

PROTECTIVE CLOTHING: Goggles should be used to prevent liquid splashes from getting into eyes, and wear chemical-resistant gloves. Avoid skin contact. Wear long sleeve shirt and trousers.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry area. Minimum temperature 20°F and maximum temperature not to exceed 100°F average temperature for 30 days. Store away from excessive heat and open flame. Store in an area designated specifically for pesticides. Do NOT store near any materials intended for use or consumption by humans or animals. Consult label for further instructions and directions for disposal of containers and waste.

Emergency Guidelines

FLASHPOINT: 123°F. (TCC).

EMERGENCY TELEPHONE: 816-242-2582 (Miles Inc.).

Saluthion* — see Chlorpyrifos; Dimethoate.

Salvo* — see 2,4-D.

Sambarin* — see Tilt*.

Samourai* — see Lambdacyhalothrin.

Samurai* Insecticide/Acaricide (lambdacyhalothrin) — Discontinued by ZENECA Professional Products.

SAN 285 — see Gustol*.

SAN 619 F — see Cyproconazole.

SAN 9789 H — see Norflurazon.

SAN 155 I — see Thiocyclam-Hydrogenoxalate.

SAN 197 I — see Etrinfos.

SAN 6538 I — see Quinalphos.

SAN 6626 I — see Quinalphos.

SAN 52139 I — see Propetamphos.

Sanacarb* — see Aldicarb.

Sanachlor* — see Alachlor.

Sanaphen-D* — see 2,4-D.

Sanaphen-M* — see MCPA.

Sanathrin* — see Permethrin.

Sanawett* — see Penetrant.

Sanazil* — see Imazalil.

Sanazine* — see Atrazine.

Sanbird*

BP: Sankyo Co., Ltd. (Sanbird*)

Identification

COMMON NAMES: Pyrazolate (JMAF); pyrazolynate (ISO-E draft, BSI).

CODE NUMBER: CAS 58011-68-0.

Chemistry

COMPOSITION: 4-(2,4-dichlorobenzoyl)-1,3-dimethylpyrazol-5-yl p-toluenesulfonate (IUPAC); (2,4-dichlorophenyl)[1,3-dimethyl-5-[(4-methylphenyl) sulfonyloxy]-1H-pyrazol-4-yl]methanone (CAS).

FAMILY: Pyrazole.

PROPERTIES: Colorless, rod-shaped crystal; melting point 117.5-118.5°C; vapor pressure <1 X 10⁻⁷ mmHg at 20°C. Solubility in ethanol 14.0 g/l at 25°C; in n-hexane 0.6 g/l at 25°C; in ethyl acetate 118.0 g/l at 25°C; in 1,4-dioxane 256.0 g/l.

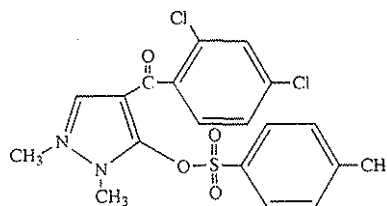
Action/Use

ACTION: Herbicide.

USE: Preemergence on paddy rice.

FORMULATIONS: Sanbird* 10% GR.

COMBINATIONS: Kusakarín 25* GR and Kusakarín 35* GR (+ butachlor), Kusahope D* GR (+ dimethametryne + pretilachlor) (Sankyo Co., Ltd.).



Pyrazolynate/Pyrazolate

Registration Notes

U.S.: Not registered.

OUTSIDE U.S.: First marketed in Japan 1980.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 92 ppm (carp).

SOIL PARTICLE ADSORPTION: Half-life in soils under laboratory and field conditions, 10-20 days.

SOLUBILITY: In water 0.056 mg/l at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 9550 mg/kg (male); 10,233 mg/kg (female); (Rat): Dermal > 5000 mg/kg. (Mice): Oral LD₅₀ 10,070 mg/kg (male); 11,092 mg/kg (female).

HANDLING AND STORAGE CAUTIONS: Readily hydrolyzed when dissolved in water.

Sancap*

(Discontinued by Ciba-Geigy Ltd.)

Identification

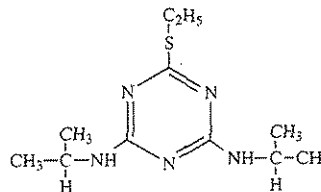
COMMON NAMES: Dipropetryn (ISO-E, ANSI, BSI, WSSA); dipropetryne (ISO-F).

EXP. CODE NUMBER: GS-16068 (Ciba-Geigy).

DISCONTINUED NAMES: Cotofor* (Ciba-Geigy Ltd.).

Chemistry

COMPOSITION: 2-ethylthio-4,6-bis(isopropylaminol-s-triazine (CAS 8CI).



Dipropetryn

Action/Use

ACTION: Selective herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Dipropetryn tech (Rat): Oral LD₅₀ 7144 mg/kg. (Rabbit): Dermal LD₅₀ > 10,000 mg/kg. (Rabbit): No eye irritation.

Sancap* 80W (Rat): Oral LD₅₀ 7144 mg/kg. (Rabbit): Dermal LD₅₀ > 3000 mg/kg. (Rabbit): No eye irritation.

Sancopax* — see Ametryn.

Sancozeb* — see Mancozeb.

San-Cyan* — see Sodium Cyanate.

Sandofan* — see Oxadixyl.

Sandothion* — see Anthio*; Fenitrothion.

Saneb* — see Maneb.

Saniclor* 30 Fungicide (PCNB) — Discontinued 1970 by Rhone-Poulenc.

Sanifume* — see Aluminum Phosphide.

Sanipa* Fungicide (milneb) — Discontinued by Du Pont Agricultural Products.

Sanithion* — see Fenitrothion.

Sanmarton* — see Fenvalerate.

Sanmite*

BP: Nissan Chemical Industries, Ltd. (Sanmite*)

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Identification

COMMON NAME: Pyridaben (ISO draft, BSI).
 EXP. CODE NUMBERS: BAS 300 I, BAS 9078 I (BASF); NC-129, NCI-129 (Nissan Chemical).
 OTHER CODE NUMBER: CAS 96489-71-3.
 ADDITIONAL TRADE NAME: Nexter* (BASF AG).

Chemistry

COMPOSITION: 2-tert-butyl-5-(4-tert-butylbenzylthio)-4-chloropyridazin-3(2H)-one (IUPAC).

FAMILY: Pyridazinone.

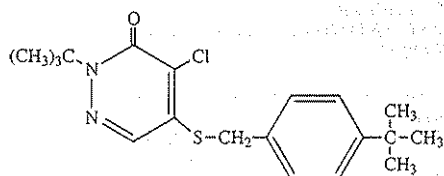
PROPERTIES: White crystalline solid. Melting point 111-112°C. Soluble in methylene chloride, relatively soluble in acetonitrile and ethanol.

Action/Use

ACTION: Acaracide; insecticide.

USE: For various mites, whiteflies, leafhoppers, aphids, thrips on fruit trees, vegetables, ornamentals, other field crops.

FORMULATIONS: Emulsifiable concentrate, suspension concentrate, wettable powder.



Pyridaben

Environmental Guidelines

SOLUBILITY: In water 1.2×10^{-6} g/100 ml (20°C).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1350 mg/kg. Dermal > 2000 mg/kg; non-irritating to eyes or skin.

Pyridaben: (Rat): Oral LD₅₀ 353-435 mg/kg; Inhalation LC₅₀ 0.62-0.66 mg/l (4h); Dermal LD₅₀ > 2000 mg/kg; non-irritating to eyes or skin.

PROTECTIVE CLOTHING: Goggles, face shield, gloves.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes or skin. Store in original container in a cool, dry well-ventilated place out of reach of children.

SPILL CONTROL/CLEANUP: Pyridaben: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations. Nexter*: Large liquid spillage should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations. PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Sanoxynil* — see Bromoxynil.

Sanson* — see Nicosulfuron.

Sanspor* Fungicide (captan) — Discontinued 1989 by ICI Agrochemicals.

Santar* Fungicide (mercuric oxide) — Discontinued by Sandoz Ltd.

Santobrite* Molluscicide/Wood Preservative (PCP) — Discontinued by Monsanto Agricultural Co.

Santobrite Beads* Wood Preservative (sodium pentachlorophenate) — Discontinued by Monsanto Agricultural Co.

Santobrite Fines* Wood Preservative (sodium pentachlorophenate) — Discontinued by Monsanto Agricultural Co.

Santocel* Carrier (silicates) — Discontinued.

Santophen* Molluscicide/Wood Preservative (PCP) — Discontinued by Monsanto Agricultural Co.

Santophen I* (Discontinued 1983 by Monsanto Agricultural Co.)

Identification

CODE NUMBERS: CAS 87-86-5; SHA 063001.

Chemistry

COMPOSITION: o-Benzyl-p-chlorophenol.

Action/Use

ACTION: Disinfectant, germicide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 2.8 grams/kg.

Santox* — see Tartar emetic.

Sanulam* — see Asulam.

Sanuron* — see Diuron.

Sanvalerate* — see Fenvalerate.

Sanvex* — see Cartap Hydrochloride.

Sapecron* — see Chlorfenvinphos.

Sapecron* C

(Discontinued by Ciba-Geigy Ltd.)

Identification

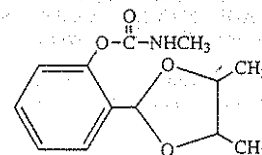
EXP. CODE NUMBER: C-10015 (Ciba-Geigy Ltd.).

OTHER CODE NUMBERS: CAS 7122-04-5; ENT-27410.

DISCONTINUED TRADE NAME: Fondaren.*

Chemistry

COMPOSITION: 2-(4,5-dimethyl-1,3-dioxolan-2yl)phenyl methylcarbamate (IUPAC).



Active Ingredient of Sapecron* C

Action/Use

ACTION: Soil insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 110 mg/kg. Dermal > 2000 mg/kg.

Saphate* — see Acephate.

Saphi-Col* Aphicide (menazon) — Discontinued by ICI Agrochemicals.

Saphire* — see Fludioxonil.

Saphizon* Aphicide (menazon) — Discontinued by ICI Agrochemicals.

Saphos* Aphicide (menazon) — Discontinued by ICI Agrochemicals.

Sappiran* — see Chlorfenson; Ovex.

Saprol* — see Triforine.

Sarclax* — see Linuron.

Sarcline* — see Trifluralin.

Sarin

Identification

CODE NUMBER: CAS 107-44-8.

Chemistry

COMPOSITION: Isopropylmethyl phosphonofluoridate.

Sarolex* — see Diazinon.

SAS 2074 — see Morestan*.

Satanil* — see Propanil; Saturn*.

Satecid* — see Propachlor.

Sathomyl* — see Methomyl.

Satisfar* — see Ekamet*.

Satochlor* Herbicide (Alachlor) — Discontinued 1994 by Chemol Trading Ltd. Co.

Satunil* — see Propanil; Saturn*.

Saturall 85*

BP: Conklin Co., Inc. (Saturall 85*)

Chemistry

COMPOSITION: Alkylaryl polyoxyethylene glycol, glycol ethers, polyoxypropylene polyoxyethylene block copolymer; polyalkylene oxide modified dimethyl polysiloxane, acetylenic diol, dimethylpolysiloxane, and fatty acids.

PROPERTIES: Opaque liquid. High concentration (> 85% a.i.) of non-ionic surfactants. Neutral pH.

Action/Use

ACTION: Wetting agent.

USE: Highly concentrated nonionic surfactant that meets or exceeds most postemergent pesticide requirements. Improves effectiveness of ag chemicals, decreases runoff, provides more uniform spray coverage and assists in suspension of wettable powders and flowables.

FORMULATIONS: Liquid.

Environmental Guidelines

SOLUBILITY: 100% water soluble, biodegradable.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

PROTECTIVE CLOTHING: NIOSH approved organic vapor respirator.

HANDLING AND STORAGE CAUTIONS: May cause skin and eye irritation. Wash thoroughly after handling. Extended storage only in

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

the original container. Freezing will not affect performance but store at > 32°F.

Emergency Guidelines

FLASHPOINT: 212°F (COC).

FIRE EXTINGUISHING MEDIA: CO₂, foam, dry chemical, water spray.

FIRST AID: Eyes, flush with water; get medical aid. Ingestion, get immediate medical aid.

Saturn*

BP: Kumiai Chemical Industry Co., Ltd. (Bolero*, Saturn*, Saturno*)

Identification

COMMON NAMES: Benthicarb (JMAF); thiobencarb (ISO-E, ANSI, BSI, WSSA); thiobencarbe (ISO-F).

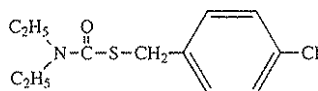
CODE NUMBERS: CAS 28249-77-6; SHA 108401.

ADDITIONAL TRADE NAMES: Abolish* 8EC, Bolero* (Valent U.S.A.); Veg-fru Saturn* (Pesticides India).

Chemistry

COMPOSITION: S-4-chlorobenzyl diethylthiocarbamate (IUPAC).

PROPERTIES: Soluble in most organic solvents.



Thiobencarb

Action/Use

ACTION: Preemergent and early postemergent herbicide.

USE: For grasses, broadleaf weeds which infest rice fields, both transplanting and direct-seeding.

FORMULATIONS: Emulsifiable concentrate, granule.

COMBINATIONS: Wolf Ace* (+ mefenacet) (Bayer AG); Satunil*, Satunil*, Saturno* Plus (+ propanil) (Kumiai Chemical Industry).

Registration Notes

U.S.: For rice. Celery, endive (escarole), lettuce (Florida only).

Environmental Guidelines

SOLUBILITY: In water at 20°C approx. 30 mg/l.

Safety Guidelines

SIGNAL WORD: CAUTION

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1130 mg/kg. Dermal > 2000 mg/kg.

Emergency Guidelines

FLASHPOINT: Bolero* 8 EC, 172°F; Saturn* 90EC, 330 °F.

FIRST AID: Ingestion, get medical aid. Induce vomiting. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air.

Saturno* — see Saturn*

Saturno* Plus — see Propanil; Saturn*.

Savage* — see 2,4-D.

Saverit* Herbicide (vernolate) — Discontinued by Chemol Trading Ltd. Co.

Savey* — see Hexythiazox.

Savirad* — see Metoxuron.

Savirox* Herbicide (vernolate) — Discontinued by Chemol Trading Ltd. Co.

Savit* Insecticide (carbaryl) — Discontinued by Griffin Agricultural Chemicals Group.

Sayfor* Aphicide (menazon) — Discontinued by ICI Agrochemicals.

Sayfos* Aphicide (menazon) — Discontinued by ICI Agrochemicals.

Sayphos* Aphicide (menazon) — Discontinued by ICI Agrochemicals.

SBP-1382* — see Resmethrin.

SC

Abbreviation for Suspension Concentration.

See Suspension.

SC-0224 — see Touchdown*.

Scabrin**Chemistry**

COMPOSITION: N-Isobutyl 2,4,8,10 (or 12), 14-octadecapentane amide.

Action/Use

ACTION: Insecticide.

Scaldip* — see Coraza*.

Scaletrap* Insect Trapping System (trapest*) — Discontinued 1994 by ISAGRO.

Scentry* Monitoring Products

F: Ecogen Inc.

Action/Use

ACTION: Pheromone lure dispensers for insect monitoring.

USE: For artichoke plume moth, boll weevil, cabbage looper, clearing borers, codling moth, corn earworm, cotton bollworm, elm bark beetle, eyespotted budmoth, fall armyworm, false codling moth, fruit-tree leafroller, grape berry/grapevine moth, gypsy moth, Indian meal moth, lesser peachtree borer, Nantucket pine tip moth, oblique-banded leafroller, Old World bollworm, Oriental fruit moth, pink bollworm, red-banded leafroller, soybean looper, spotted tentiform leafminer, spruce budworm, sunflower moth, tobacco budworm, tomato fruitworm, tomato pinworm, true pinworm, true armyworm, tufted apple budmoth, western pine shoot borer, among other insects.

FORMULATIONS: Hollow plastic microtube capillaries mounted on adhesive tape and filled with a synthetic pheromone or chemical insect attractant used as a lure in survey trapping and mass trapping. Rubber septum and polycap formulations. In another form, individual hollow fiber dispensers containing pheromones are broadcast on crops for specific pests.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Store in cool area (at or below 72°F/22°C).

Scepter*

BP: American Cyanamid Co. (Scepter*)

Identification

COMMON NAMES: Imazaquin (ISO-E, ANSI, BSI); imazaquina (ISO-F).

EXP. CODE NUMBERS: AC 252,214; CL 252214.

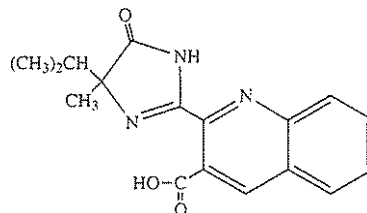
OTHER CODE NUMBERS: CAS 81335-37-7; SHA 128848.

Chemistry

COMPOSITION: ±2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-quinolinecarboxylic acid (CAS).

FAMILY: Imidazolinone.

PROPERTIES: Melting point 219°-222°C. Liquid at room temperature. Slightly soluble in some organic solvents. Tech is an odorless white solid.



Scepter*

Action/Use

ACTION: Selective soil applied and postemergence herbicide.

USE: PPI, PE, and postemergence in soybeans for a broad spectrum of broadleaf weeds.

FORMULATIONS: Liquid concentrate (1.5 ASU); disposable granule (70DG).

COMBINATIONS: Basagran* Plus (+ bentazone) (BASF AG); Scepter* O.T. (imazaquin + acifluorfen).

Environmental Guidelines

SOLUBILITY: Water solubility is 60 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION (Scepter*).

TOXICITY CLASS: III (Scepter*).

TOXICITY: Tech (Rat): Oral LD₅₀ 5000 mg/kg. (Rabbit): Dermal 2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, and clothing. Wash thoroughly with soap and water after handling.

Emergency Guidelines

EMERGENCY TELEPHONE: 201-835-3100 (American Cyanamid).

See Imidazolinone Herbicides.

Scepter* O.T. — see Scepter*.

Schradan**Identification**

COMMON NAMES: Schradan (ISO, BSI, ESA, JMAF), schradane (ISO-F).

CODE NUMBERS: CAS 152-16-9; SHA 058601.

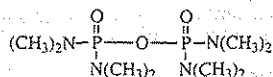
ADDITIONAL TRADE NAMES: OMPA, Sytam*.

DISCONTINUED NAMES: Pestox III* (Fisons Ltd.); Silmurin* (Sandoz Ltd.).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: Octamethylpyrophosphoramidate.



Schradan

Action/Use

ACTION: Systemic insecticide, acaricide.

Schradane — see Schradan.

Schweinfurt Green — see Paris Green.

Scilliroside

(Discontinued 1980 by Sandoz Ltd.)

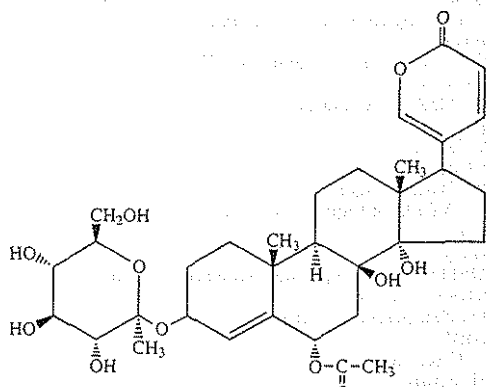
Identification

COMMON NAME: Scilliroside.

CODE NUMBER: CAS 507-60-8.

Chemistry

COMPOSITION: 3β,6β-6 acetyloxy-3-(β-D-glucopyranosyloxy)-8,14-dihydroxybufa-4,20,22-trienolide.



Scilliroside

Action/Use

ACTION: Rodenticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 0.7 mg/kg (male); 0.43 mg/kg (female). Pigs and cats survived 16 mg/kg; fowls, 400 mg/kg. May be toxic to birds.

FIRST AID: Get medical aid. Ingestion, treat poisoning same as a cardiac glycoside overdose. Nausea and vomiting will result.

Scimitar* — see Lambda-cyhalothrin.

Scipio* — see Cypermethrin; Ethion.

Sclex*

(Discontinued by Sumitomo Chemical Co., Ltd.)

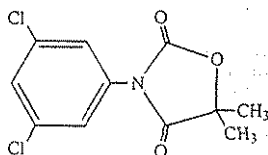
Identification

COMMON NAME: Dichlozoline (ISO, BSI, JMAF).

CODE NUMBERS: CAS 24201-58-9; SHA 328200.

Chemistry

COMPOSITION: 3-(3,5-Dichlorophenyl)-5,5-dimethyl-1,3-oxazolindione-2,4-dione (IUPAC).



Dichlozoline

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3000 mg/kg.

Scogal*

(Discontinued by Shell Chemicals UK Ltd.)

Chemistry

COMPOSITION: MCPA + cyanazine.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

Score* — see Difenoconazole.

Scorpion* — see Broadstrike*.

Scotts Progrow* — see Goal*; Prowl*.

Scotts Proturf* K-O-G — see Banvel*.

Scourge* — see Piperonyl Butoxide; Resmethrin.

Scout* — see Chlorpyrifos.

Scout X-TRA* — see Tralomethrin.

Scythe* Herbicide

BP: Mycogen Corp. (Scythe* Herbicide)

Chemistry

COMPOSITION: Pelargonic acid and related fatty acids.

Action/Use

ACTION: Herbicide.

USE: For control or burndown of a broad spectrum of weeds on contact.

FORMULATIONS: Liquid concentrate.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic. Bird: Nontoxic.

Safety Guidelines

SIGNAL WORD: Warning.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: See label. Avoid extreme temperatures.

SD 3562 — see Dicrotophos.

SD 4402 — see Telodrin*.

SD 7859 — see Chlorfenvinphos.

SD 8447 — see Tetrachlorvinphos.

SD 8530 — see Trimethacarb.

SD 9129 — see Monocrotophos.

SD 11831 — see Planavin*.

SD 14114 — see Fenbutatin-Oxide.

SD 14999 — see Methomyl.

SD 15418 — see Cyanazine.

SD 30053 — see Suffix*.

SD 41706 — see Fenpropathrin.

SD 43775 — see Fenvalerate.

SD 208304 — see Fortress*.

Secbumeton — see Etazine*.

Sec-butylamine — see Deccotane*.

Sectagon II* — see Metam-Sodium.

Sectagon 42* — see Metam-Sodium.

Security* (calcium arsenate + lead arsenate) — Discontinued by Woolfolk Chemical Works.

Security* Lime Sulphur — see Lime Sulfur.

Sedit F* 435 — see Carbaryl.

Seduron* — see Diuron.

SEE*

BP: Agrolinz (Austria) (Lentemul*)

Chemistry

COMPOSITION: Water based formulation of the iso-octylester of 2,4-D, MCPA, MCPP, 2,4-DB, 2,4-DP alone or in combinations.

PROPERTIES: Milky looking stable emulsions of phenoxyesters in water containing no organic solvent.

Action/Use

ACTION: Systemic postemergent herbicide.

USE: Controls annual and perennial weeds in various crops. Can be mixed and applied with liquid fertilizers.

FORMULATIONS: Solventless ester micro emulsions.

Registration Notes

OUTSIDE U.S.: Lentemul*.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): LD₅₀ 2650 mg/kg. Low toxicity to mammals.

PROTECTIVE CLOTHING: Goggles or face shield and coveralls.

HANDLING AND STORAGE CAUTIONS: Do not store near feed or foodstuffs. If allowed to freeze, warm to room temperature and agitate thoroughly before using. Freezing does not affect efficiency of product.

Emergency Guidelines

EMERGENCY TELEPHONE: 1-800-424-9300 (CHEMTREC).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Seed Guard* — see Copper 8-Quinolinolate.

Seed Protectant

A pesticide chemical applied to seed before planting to protect them from injury or destruction by insects, fungi, and other soil pests, and to prevent seed decay and damping-off of new seedlings.

Seed Shield* Isopro* — see Captan; Lindane.

Seed Shield* Maneb Planter Box 50 — see Maneb.

Seed Shield* Maneb/Lindane — see Lindane; Maneb.

Seed Shield* Potato Seed Treater 7.5 — see Captan.

Seed Shield* Potato Seed Treater with Captan — see Captan.

Seed Shield* Potato Seed Treater with Captan/Streptomycin Bactericide/Fungicide (captan + streptomycin) — Discontinued 1994 by Cornbelt Chemical.

Seed Shield* Potato Seed Treater M-Z — see Mancozeb.

Seed Shield* Protox — see Captan; Lindane.

Seed Shield* Vitavax/Captan 20-20 — see Captan; Carboxin.

Seedox* — see Bendiocarb; Mycotox*.

Seedrin* Liquid Insecticide (aldrin) — Discontinued by Rhone-Poulenc Inc.

Seedtox* — see PMA.

Seedvax*

(Discontinued)

Chemistry

COMPOSITION: 2-Amino-4-methyl-5-carboxanilidothiazole.

Action/Use

ACTION: Systemic seed treatment.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1410 mg/kg.

Selectron — see Curacron*.

Select*

BP: Tomen Corp. (Select*)

Identification

COMMON NAME: Clethodim (ISO-E, ANSI, BSI).

EXP. CODE NUMBER: RE 45601.

OTHER CODE NUMBER: CAS 99129-21-2.

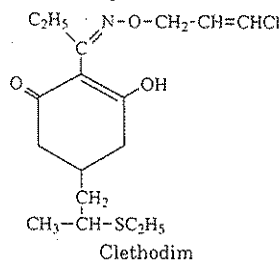
ADDITIONAL TRADE NAME: Select* (Valent U.S.A.).

Chemistry

COMPOSITION: (E,E)-(±)-2[[[(3-chloro-2-propenyl)oxy]imino]propyl]5-[2 (ethylthio)propyl]-3-hydroxy-2-cyclohexen-1-one (CAS).

FAMILY: Cyclohexanedione (enol) oxime ether.

PROPERTIES: Clear amber liquid. Soluble in most organic solvents.



Action/Use

ACTION: Systemic postemergence herbicide.

USE: Controls annual and perennial grasses in broadleaf crops (soybeans, cotton).

FORMULATIONS: Emulsifiable concentrate.

COMBINATIONS: Addition of crop oil concentrate (>15% emulsifier) recommended.

Registration Notes

U.S.: Marketed by Valent U.S.A.

OUTSIDE U.S.: Marketed by Tomen Corp.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ (96h, sunfish) >120 mg/l. Bee: LD₅₀ >100 µg/bee (formulation). Bird: LC₅₀ >6000 ppm (mallard); >6000 ppm (bobwhite).

SOLUBILITY: pH dependent in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: 2E: (Rat): Oral LD₅₀ 3610 mg/kg (male); 2920 mg/kg (female). (Rabbit): Dermal LD₅₀ >5000 mg/kg.

PROTECTIVE CLOTHING: Goggles, chemical resistant gloves, long-sleeved shirt and long-legged pants, shoes and socks.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated place. Handle with caution and avoid contact with skin and

eyes.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes**, flush immediately with fresh water for 15 minutes. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation**, remove to fresh air. **Ingestion**, give water or milk to drink, do NOT induce vomiting. Call a physician.

Selective Pesticide

A pesticide that is toxic to some pests, but has little or no effect on other similar species. Example: Some fungicides are so selective that they control only powdery mildews and no other fungi.

Selectivity

That characteristic, especially in many herbicides, whereby certain undesirable species are killed while others such as crop plants or beneficial insects are harmed little.

Selectone D* — see 2,4-D.

Selectone G* — see Banvel*; 2,4-D.

Selectyl 40* — see MCPA.

Selectyl Forte* — see MCPA.

Selectyl MD* — see 2,4-D; MCPA.

Selinon* (DNOC) — Discontinued 1993 by FMC Corp.

Sellers 85*

(Discontinued by DeSoto, Inc. in 1992)

Chemistry

COMPOSITION: Fatty alcohols (C₆, C₈, C₁₀).

Action/Use

ACTION: Growth regulator.

Sellogen*

BP: Henkel Corp.

Action/Use

ACTION: Wetting agents.

FORMULATIONS: Liquid, powder.

Semenon*

Chemistry

COMPOSITION: Isopropylmethylmercury acetate.

Action/Use

ACTION: Fungicide, seed treatment.

Semeron*

BP: Ciba, Ltd.

Identification

COMMON NAMES: Desmetryn (ISO-E, BSI, WSSA), desmetryne (ISO-F, JMAF).

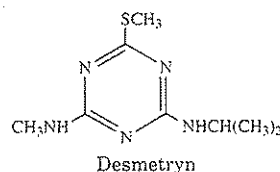
EXP. CODE NUMBER: G 34360.

OTHER CODE NUMBER: CAS 1014-69-3.

Chemistry

COMPOSITION: 2-(isopropylamino)-4-(methylamino)-6-(methylthio)-s-triazine (CAS 8CI).

PROPERTIES: White crystalline solid melting point 84-86°C. Readily soluble in organic solvents.



Action/Use

ACTION: Selective herbicide.

FORMULATIONS: Wettable powder.

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Postemergence for annual broadleaf, grassy weeds in brassicae.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

SOIL PARTICLE ADSORPTION: Brief persistence in soil. Approx. 3 month activity/duration at 2 kg/ha.

SOLUBILITY: In water at room temperature 580 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1390 mg/kg.

Semesan* Fungicide (hydroxymercurichlorophenols) — Discontinued by Du Pont Agricultural Products.

Semesan Bel* Fungicide (hydroxymercurichlorophenols + hydroxymercurini-trophenols) — Discontinued by Du Pont Agricultural Products.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Semiochemicals

The collective term semiochemicals was proposed in 1971 "for chemicals that mediate interactions between organisms." The broad term semiochemicals includes the biological agents used in pest control otherwise known as insect attractants, repellents, and deterrents. Pheromone is a technical term used commonly in this field. Other semiochemicals are classified as allomones, kairomones, synomones, apneumones, etc.

Senate* — see Terbutryn; Trietazine.

Sencor* — see Metribuzin.

Sencoral* — see Metribuzin.

Sencorex* — see Metribuzin.

Sencuron* — see Isoproturon; Metribuzin.

Senthion* — see Fenitrothion.

Sentinel* — see Cyproconazole.

Sentry* Grain Preservative (propionic acid) — Discontinued by Union Carbide Corp.

Seppic Lin* — see Lenacil.

Septene* — see Carbyl.

Sequel* — see Fenpyroximate.

Sequential Treatment

Sequential means having succeeding or consecutive actions or operations. Sequential treatments in weed control are those of a herbicide as a preemergence overlay following preplant application of a different herbicide. The latter is applied before planting, the sequential treatment after seeding and before emergence of the crop plants. This is spoken of as piggyback or an overlay on the preplant treatment. Field corn, cotton, or soybeans may be so treated instead of using a tank mix of both herbicides together.

See Serial Application.

Sequestrants — see Chelating Agents.

Seradix* — see Indole-3-Butyric Acid.

Serafume*

(Discontinued by Dow Chemical Co.)

Chemistry

COMPOSITION: Carbon tetrachloride + carbon disulfide + ethylene dichloride + ethylene dibromide.

Action/Use

ACTION: Grain fumigant.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Seraphos* — see Propetamphos.

Serial Application

Serial application is defined as the use of one pesticide immediately or shortly after the use of another. Clearance by EPA requires a new set of data covering all aspects of the application in a manner similar to clearance of a tank mix.

See Sequential Treatment; Tank Mix.

Seribak* — see Hexachlorophene.

Serinal*

BP: ISAGRO (Serinal*, Manderol*)

Identification

COMMON NAME: Chlozolinate (ISO, BSI).

EXP. CODE NUMBER: M 8164.

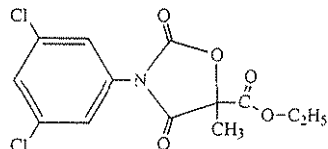
OTHER CODE NUMBER: CAS 84332-86-5.

DISCONTINUED NAMES: Serinal* F (+ folpet), Serinal* M (+ mancozeb), Serinal* Z (+ sulfur) (ISAGRO).

Chemistry

COMPOSITION: Ethyl (RS) 3-(3,5-dichlorophenyl)-5-methyl-2,4-dioxo-1,3-oxazolidine-5-carboxylate (IUPAC).

PROPERTIES: Crystalline solid. Melting point 113-114°C. Vapor pressure 10⁻⁵ torr at 25°C. Soluble in most organic solvents; when dissolved, it hydrolyzes in the range of pH 5 - 9.



Chlozolinate

Action/Use

ACTION: Fungicide.

USE: New fungicide for the control of gray mold (*Botrytis cinerea*), Sclerotinia, and Monilia.

FORMULATIONS: Wettable powder, flowable.

COMBINATIONS: Serinal* T (+ thiram) (ISAGRO).

Environmental Guidelines

SOLUBILITY: Very slightly soluble in water (<2 ppm).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >4500 mg/kg. Dermal LD₅₀ >5000 mg/kg.

PROTECTIVE CLOTHING: Wear appropriate equipment and clothing.

HANDLING AND STORAGE CAUTIONS: Store product in sealed original containers, in well-aired, fresh and dry storehouses or in shaded and possibly well-aired places. Recommended product temperature should not exceed 25-30°C. Keep product away from sources of heat, free flames or spark-generating equipment. Stack containers to permit a free circulation of air at bottom and inside of the piles. Storage areas must be located at a suitable distance from inhabited buildings, animal shelters, and food stores; moreover, they must be inaccessible to unauthorized persons, children and domestic animals. Biological activity of the product remains practically unvaried for 2 years under environmental conditions, provided the product is stored in unopened and undamaged original containers, in shaded and possibly well-aired places.

Emergency Guidelines

FLASHPOINT: <200°C.

Serinal* F Fungicide (chlozolinate + folpet) — Discontinued

1994 by ISAGRO.

Serinal* M Fungicide (chlozolinate + mancozeb) — Discontinued

1994 by ISAGRO.

Serinal* T — see Serinal*; Thiram.

Serinal* Z Fungicide (chlozolinate + sulfur) — Discontinued

1994 by ISAGRO.

Seritard*

BP: Chugai Pharmaceutical Co., Ltd.

Identification

COMMON NAME: Inabenfide (ISO, BSI).

EXP. CODE NUMBER: CGR-811.

OTHER CODE NUMBER: CAS 82211-24-3.

Chemistry

COMPOSITION: 4'-chloro-2'-(α -hydroxybenzyl)isonicotinamide (IUPAC).

PROPERTIES: Light yellow-brown or colorless, nonflavor prismatic crystals. Melting point: 210-212°C. Slightly soluble in methanol, ethanol, acetone, ethyl acetate and N,N-dimethylformamide. Very slightly soluble in benzene, xylene, chloroform, acetonitrile and dichloromethane. Practically insoluble in n-hexane.

Action/Use

ACTION: Plant growth regulator.

USE: To increase lodging resistance of paddy rice.

FORMULATIONS: Granule, wettable powder.

Registration Notes

OUTSIDE U.S.: Japan and Korea.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >20ppm (48 h) (carp).

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat/Mouse): Oral LD₅₀ >15,000 mg/kg; Dermal LD₅₀ >5000 mg/kg. No eye, skin irritation.

Seritox* 50 — see Dichlorprop.

Serk* — see Endosulfan; Thiometon.

Sertan**Chemistry**

PROPERTIES: Polyhedral inclusion bodies of *N. Sertifer* nucleopolyhedrosis virus at .05%.

Action/Use

ACTION: Insecticide.

SES* — see Sesone.

Sesame Oil

Pyrethrin activator. The oil from sesame seed was discovered to activate pyrethrum. The discovery motivated much research on the active ingredients of the oil and on synthesizing related compounds as pyrethrum synergists.

Sesamex**Identification**

TRIVIAL NAME: Sesamex.

ADDITIONAL TRADE NAME: Sesoxane* (Shulton, Inc.).

Chemistry

COMPOSITION: 2-(2-Ethoxyethoxy)ethyl-3,4-(methylenedioxy) phenyl acetal of acetaldehyde.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Synergist for pyrethrins and allethrin.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2000-2270 mg/kg.**Sesamin****Identification**

TRIVIAL NAME: Sesamin.

CODE NUMBERS: CAS 7076-24-6; SHA 298400.

ADDITIONAL TRADE NAME: Asarinin.

Chemistry

COMPOSITION: 2,6-Bis(3,4-methylenedioxyphenyl)-3,7-dioxabicyclo (3,3,0)-octane.

PROPERTIES: Sesamin is the component of sesame oil responsible for synergistic activity of the latter. Sesamolin is a second synergistic component even more effective as a synergist.

Action/Use

ACTION: Pyrethrum synergist.

Sesamolin**Identification**

COMMON NAME: Sesamolin.

Chemistry

COMPOSITION: 2-(3,4-Methylenedioxyphenoxy)-6-(3,4-methylenedioxyphenoxy) cis-3,7-dioxabicyclo (3,3,0) octane.

Action/Use

ACTION: Synergist.

USE: Along with sesamin an ingredient of sesame oil (see sesamin).

Sesin***Identification**

OTHER NAME: Menaphtame.

Chemistry

COMPOSITION: Sodium 2,4-dichlorophenoxyethylbenzoate.

Action/Use

ACTION: Herbicide.

Sesone**Identification**

COMMON NAMES: Sesone, 2,4-DES-Na (BSI), disul-Na (ISO).

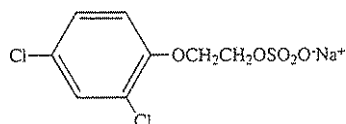
CODE NUMBERS: CAS 136-78-7; SHA 030602.

ADDITIONAL TRADE NAMES: SES*.

DISCONTINUED NAMES: Crag* I (Rhône-Poulenc Ag Co.).

Chemistry

COMPOSITION: Sodium 2,4-dichlorophenoxyethyl sulfate.



Sesone

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Oral LD₅₀ 1230 mg/kg.

Sesoxane* — see Sesamex.

Sethoxydim

BP: Nippon Soda Co., Ltd. (Nabu*)

Identification

COMMON NAMES: Sethoxydim (ISO, BSI); séthoxydime (ISO-F).

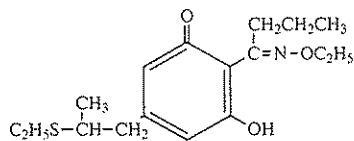
EXP. CODE NUMBER: NP-55 (Nippon Soda); SN-81742.

OTHER CODE NUMBERS: CAS 74051-80-2; SHA 121001.

ADDITIONAL TRADE NAMES: Fervinal*, Gracidim* (S.I.P.C.A.M.); Poast* and Vantage* (BASF Corp.); Aljaden*, Checkmate*, Expand*, Nabu*, Tritex*-Extra.

Chemistry

COMPOSITION: 2-[1-(ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-cyclohexen-1-one (CAS).



Sethoxydim

PROPERTIES: Amber oily liquid. Readily soluble in most organic solvents; freely soluble in methanol, hexane, and xylene.

Action/Use

ACTION: Systemic postemergence herbicide.

USE: For selective postemergence control of annual and perennial grasses (including voluntary cereals) in soybeans, cotton, peanuts, sugar beets, flax, rapeseed (canola/Canada), alfalfa, vegetables (tomatoes, phaseolus beans, dry peas, onion), broadleaved ornamentals, nonbearing fruit, and many other dicotyledoneous crops.

FORMULATIONS: Emulsifiable concentrate.

COMBINATIONS: An addition of a nonphytotoxic crop oil and/or mineral oil concentrate is generally recommended.

Registration Notes

U.S.: BASF Corp. voluntarily cancelled Poast* for ginseng, Plantago ovata.

Environmental Guidelines

HAZARDS: Fish: Moderately toxic (trout); weakly toxic (carp). Bee: Nontoxic.

SOLUBILITY: Readily soluble in water at pH 7, 25 ppm in water at pH 4.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3200-3500 mg/kg. Inhalation LC₅₀ >6.28 mg/l (4 h).Dermal LD₅₀ >5000 mg/kg.

PROTECTIVE CLOTHING: Use mask for powders and gloves, apron, plastic or rubber boots.

HANDLING AND STORAGE CAUTIONS: Keep in a dry, cool, ventilated place. Handle with caution, avoid contact with skin and eye.

Sethoxydime — see Sethoxydim.

Setrete*

(Discontinued by Troy Chemical Corp.)

Identification

OTHER NAMES: Gallotox, PMAA.

Chemistry

COMPOSITION: Phenylmercury ammonium acetate 3.5%.

Action/Use

ACTION: Fungicide (seed treatment).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Oral LD₅₀ 500 mg/kg.

Sevidol* — see Carbaryl; Lindane.

Sevigor* Insecticide (dimethoate) — Discontinued 1989 by Agri-mont S.p.A.

Sevimol* — see Carbaryl.

Sevin* — see Carbaryl.

Sevin* 5 Bait — see Carbaryl.

Sevin* 5 Dust — see Carbaryl.

Sevin* 10 Dust — see Carbaryl.

Sevithion***Chemistry**

COMPOSITION: Sevin* + malathion.

Action/Use

ACTION: Insecticide.

FORMULATION: ULV Spray.

Registration Notes

OUTSIDE U.S.: For desert locusts, grasshoppers, mosquitoes and other pests.

SF-6505 — see Tachigaren.

SHA — see Shaughnessy.

Shadow* Sun Reflector — Discontinued 1989 by Drexel Chemical Co.

Shamrox* Herbicide (MCPA) — Discontinued 1984 by SDS Biotech Corp.

Sharpshooter* (Fatty Acid/Soap) — Discontinued 1994 by Myco-gen Corp.

Shaughnessy (SHA)

Code number issued to an active ingredient by U.S. EPA. Also known as the A.I. number, PC code, or chemical code.

Shed-A-Leaf* Defoliant (sodium chlorate) — Discontinued by Rhône-Poulenc.

Shell Atrazine Herbicide — see Atrazine.

Shibagen* — see Flazasulfuron.

Shield DPA* — see Coraza*.

Shimmer-ex* — see PMA.

Shinmel* Fungicide (PMA) — Discontinued by Nihon Nohyaku Co.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Shirahagen-S*

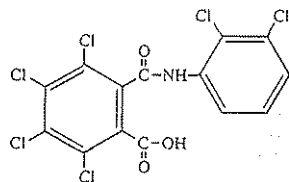
BP: Sankyo Co., Ltd. (Shirahagen-S*)

Identification

COMMON NAMES: Teclotalam (ISO-E, BSI); técloftalame (ISO-F).
EXP. CODE NUMBERS: F-370; SF-7306; SF-7402.
OTHER CODE NUMBER: CAS 76280-91-6.

Chemistry

DISCONTINUED NAME: Shragen*.
COMPOSITION: 3,4,5,6-Tetrachloro-N-(2,3-dichlorophenyl)phthalamic acid (IUPAC); 2,3,4,5-tetrachloro-6-[[2,3-dichlorophenyl]amino-carbonyl]benzoic acid (CAS).
PROPERTIES: Colorless, odorless, solid crystal; melting point 198-199°C; vapor pressure 1×10^{-7} mmHg at 60°C. Solubility in acetone 25.6 g/l.
FAMILY: Phthalamic acid.



Teclotalam

Action/Use

ACTION: Bactericide.
USE: Against rice bacterial leaf blight caused by *Xanthomonas campestris* pv. *oryzae*.
FORMULATIONS: DP, WP.
Registration Notes
U.S.: Not registered.
OUTSIDE U.S.: First marketed in Japan in 1987.

Environmental Guidelines

HAZARDS: Fish: TLM >30 ppm (48h) (carp); >300 ppm (3h) (daphnia).
SOIL PARTICLE ADSORPTION: 50% a.i. loss in 4-10 days.
SOLUBILITY: In water, 14 mg/l at 26°C.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 2340 mg/kg (male); 2400 mg/kg (female).
Dermal LD₅₀ >1500 mg/kg. (Mouse): Oral LD₅₀ 2010 mg/kg (male); 2220 mg/kg (female). Dermal >1000 mg/kg.
HANDLING AND STORAGE CAUTIONS: Stable under neutral or alkaline conditions but is hydrolysed in strongly acidic media.

Shirlan* — see Fluazinam.

Shogun* — see Fluazinam.

Short-stop* Herbicide (terbutryn) — Discontinued by Ciba-Geigy Agricultural Div.

Short Term Exposure Level (STEL)

The maximum concentration of a material to which workers can be exposed without adverse effect for a continuous exposure period of 15 minutes, with a maximum of four such periods per day, with at least 60 minutes between exposure periods (American Conference of Government Industrial Hygienists).

See Threshold Limit Value.

Showrone* — see Dymron.

Showrone M* — see Dymron; CNP.

Shoxin — see Raticate*.

Shragen* — see Shirahagen-S*.

SI-6711 — see Karphos*.

Siacarb* — see Thiobencarb.

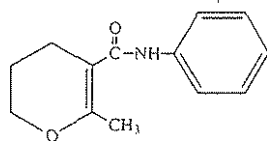
Sibutol* — see Baycor*; Fuberidazole.

Sicarol*

(Discontinued 1984 by Hoechst AG).

Identification

COMMON NAMES: Pyracarbolid (ISO-E, BSI); pyracarbolide (ISO-F).
EXP. CODE NUMBERS: Hoe 6052, Hoe 6053, Hoe 02989, Hoe 13764 (all Hoechst AG).
OTHER CODE NUMBER: CAS 24691-76-7.



Pyracarbolid

Action/Use

ACTION: Systemic fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: Tech in starch mucilage (Rat, female): Oral LD₅₀ >15,000 mg/kg.

Siduron

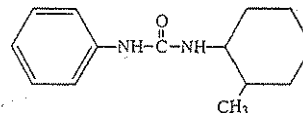
BP: Du Pont Agricultural Products (Tupersan*)

Identification

COMMON NAME: Siduron (ISO, ANSI, BSI, WSSA).
CODE NUMBERS: CAS 1982-49-6; SHA 035509.

Chemistry

COMPOSITION: 1-(2-methylcyclohexyl)-3-phenylurea (IUPAC).
PROPERTIES: White crystals, melting point 133-138°C. Solubility to 10% or more in ethanol, etc.



Siduron

Action/Use

ACTION: Herbicide.

USE: Used for preemergence control of annual weed grasses, such as crabgrass, foxtail, and barnyardgrass, in newly seeded or established plantings of bluegrass, fescue, reedtop, smooth brome, perennial ryegrass, orchard grass, zoysia, and certain strains of bentgrass.

FORMULATIONS: Wettable powder, powder, granulars.

Environmental Guidelines

SOLUBILITY: Soluble to 18 ppm in water at 25°C.

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >7500 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, and clothing. Store in a dry place. Do not contaminate water, food, or feed by storage or disposal. Do not reuse container. Dispose of by using procedures recommended by federal, state, or local authorities.

Emergency Guidelines

EMERGENCY TELEPHONE: 1-800-441-3637 (Du Pont).

Signex* — see Afagan*.

Signature*

Chemistry

COMPOSITION: sec-Butyl 6-methyl-3-cyclohexene-1-carboxylate.

Action/Use

ACTION: Attractant.

USE: For Mediterranean fruit fly.

Signal* — see Sulfur.

Signal Word — see Toxicity (Human).

Silbos* DF — see Thiram.

SilEnergy*

BP: Brewer International Inc.

Chemistry

COMPOSITION: Polyalkyleneoxide modified polydimethylsiloxane and nonionic surfactants.
PROPERTIES: Boiling point 150°C; clear to slight haze with a specific gravity 1.06; vapor pressure 68°F.

Action/Use

ACTION: Advanced silicone wetter, spreader, and penetrant for herbicides and pesticides.

Environmental Guidelines

SOLUBILITY: 100% in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g. suitable incineration, in accordance with local regulations.
PROTECTIVE CLOTHING: PVC-coated gloves, monogoggles, chemical apron.

HANDLING AND STORAGE CAUTIONS: Keep container closed. Use with adequate ventilation. Avoid skin and eye irritation. Store in a cool dry place, avoid high temperatures.

SPILL CONTROL/CLEANUP: Collect and dispose. Avoid discharge in full strength to natural waters.

Emergency Guidelines

FLASHPOINT: 240°F.

COMBUSTION PRODUCTS: Burning can produce carbon monoxide, dioxide, and oxides of silicon. Acute overexposure may result in severe irritation.

Chemicals are cross-referenced by common and trade name

— Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

FIRE EXTINGUISHING MEDIA: Use alcohol-type foams for large fires. Use carbon dioxide or dry chemical for small fires.

FIRST AID: **Ingestion,** give a large amount of water to drink, induce vomiting and immediately call a physician. **Eyes,** flush immediately with clean water for at least 15 minutes. **Skin,** remove contaminated clothing and wash skin with soap and water. **Inhalation,** move to fresh air. Give artificial respiration if needed. Call a physician.
EMERGENCY TELEPHONE: 800 255-3924 (Chem Tel).

Silex*

BP: Exacto Chemical Co. (Silex*, Silex T30*)

Chemistry

COMPOSITION: Active silicone antifoam.

Action/Use:

ACTION: Foodgrade silicone antifoam.

USE: Designed for prevention or suppression of foam formation in aqueous solutions.

FORMULATION: Concentrated liquid.

Silex T30* — see Silex*.

Sil-Fact*

BP: Drexel Chemical Co. (Sil-Fact*)

Chemistry

COMPOSITION: Polyoxyethylene modified polydimethylsiloxane.

Action/Use:

ACTION: Surfactant.

USE: For use on lawns and turf with herbicides, desiccants, defoliants, insecticides, fungicides, plant growth regulators, foliar nutrients. General wetting/spreading, and soil wetting.

FORMULATION: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

Emergency Guidelines

FLASHPOINT: >200°F.

FIRE EXTINGUISHING MEDIA: Dry chemical, CO₂, water spray or foam.

Silica Aerogel — see Dri-Die*.

Silica, Fumed — see Aerosil*; Cab-O-Sil*.

Silicates (synthetic dry)

BP: Barium & Chemicals, Inc.

Celite Corp./World Minerals Inc. (Micro-Cel*)

Degussa Corp. (Sipernat*, Wessalon*)

J.M. Huber Corp., Chemicals Div. (Hubersorb*, Zeofree*,

Zeolex*, Zeosyl*)

Identification

ADDITIONAL TRADE NAMES: Silikil*, Syloid*.

DISCONTINUED NAMES: Flo-Gard*, Hi-Sil* (PPG Industries); Santocel*.

Chemistry

COMPOSITION: Precipitates of hydrated calcium silicates, silicon dioxide, etc.

PROPERTIES: Bulk density, 5-10 pounds/cubic foot. Ultimate particle size, 0.02-0.05 micron. Finely divided and produced in a variety of ways. All Micro-Cel* and Hubersorb* synthetic calcium silicates are soluble in strong acids or alkalis. All Wessalon* and Sipernat* synthetic precipitated silicas are soluble in strong acids or alkalis.

Action/Use

USE: As a carrier for high concentration of toxicant in wettable powders. Conditions powders such as ground sulfur to provide free-flowing dust.

Safety Guidelines

TOXICITY: Wessalon*: Nontoxic, 6 mg/m³ TLV.

PROTECTIVE CLOTHING: Respirator suitable for nuisance dust is recommended.

HANDLING AND STORAGE CAUTIONS: Store in dry area.

Emergency Guidelines

EMERGENCY TELEPHONE: 805-736-1221 (Celite); 410-939-3500 (J.M. Huber).

Silicon Dioxide — see Fumed Silica.

Silikil* — see Silicates (Synthetic Dry).

Silmurin* Insecticide/Acaricide (schradan) — Discontinued 1992 by Sandoz Ltd.

Silone* — see Chlorpropham; Propham.

Silosan* — see Pirimiphos-methyl.

Silvacur* — see Baytan*; Folicur*.

Silvanol* — see Lindane.

Silvex**Identification**

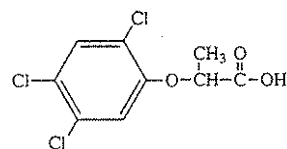
COMMON NAMES: Fenoprop (ISO, BSI), silvex (ANSI, WSSA), 2,4,5-TP (France, USSR).

CODE NUMBERS: CAS 93-72-1; SHA 082501.

DISCONTINUED NAMES: Amchem 2,4,5-TP*, Double Strength* (Union Carbide Corp.); AquaVex* (Pennwalt); Ded-Weed* (TH Agriculture & Nutrition); Fruitone T*, Kuron* (Dow Chemical); Kurosal*, Silvi-Rhap* (Vertac Chemical); 2,4,5-TP* (Nissan Chemical Industries, Ltd.).

Chemistry

COMPOSITION: 4,5-(Trichlorophenoxy)propionic acid.



Silvex

Action/Use

ACTION: Herbicide (hormone type); absorbed by leaves and translocated.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 650 mg/kg.

Silwet* L-77

BP: Helena Chemical Co. (Silwet* L-77)

Chemistry

COMPOSITION: Silicone + polyether copolymer.

Action/Use:

ACTION: Surfactant.

USE: Can be used at lower rates than conventional surfactants.

Safety Guidelines

SIGNAL WORD: DANGER (eye).

Silvicide

A material used primarily for the control of trees and woody vegetation.

Silvi-Rhap* (silvex) — Discontinued 1984 by Vertac Chemical Corp.

Silvisar 510* (cacodylic acid) — Discontinued by Ansul.

Silvisar 550* — see MSMA.

Simadex* Herbicide (simazine) — Discontinued by Schering AG.

Simanex* — see Simazine.

Simatylone* — see Simazine.

Simazat* — see Atrazine; Simazine.

Simazina Atanor* 50 FL — see Simazine.

Simazine

BP: Atanor S.A. (Simazina Atanor* 50 FL)

Ciba (Princep* Caliber* 90, Princep* 4L)

Ciba, Ltd. (Gesatop*, Primatol S*,

Princep*)

Drexel Chemical Co. (Drexel* Simazine)

HELM AG

Hubei Sanonda Co., Ltd.

Makhteshim-Agan (Simanex*)

OXON Italia S.p.A.

Sanachem (Pty) Ltd.

Sostram Corp. (Sim-Trol*)

Tecomag (Nezitec*)

Identification

COMMON NAMES: Simazine (ISO, ANSI, BSI, WSSA); CAT (JMAF).

EXP. CODE NUMBER: G-27692.

OTHER CODE NUMBERS: CAS 122-34-9; SHA 080807.

ADDITIONAL TRADE NAMES: Agrisimazina* (Cequisa); Simatylone* (Chimac-Agriphar S.A.); Totazina* (Diachem S.P.A.).

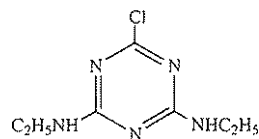
DISCONTINUED NAMES: Framed* (Agrimont S.p.A.); Cekusima* (Cequisa); Aquazine* (Ciba); Tanzene* (+ karbutilate) (Ciba-Geigy); Amizine* (+ amitrole) (Rhône-Poulenc); Simadex* (Schering AG).

Chemistry

COMPOSITION: 2-chloro-4,6-bis(ethylamino)-s-triazine (CAS 8CI).

FAMILY: Triazine.

PROPERTIES: Melting point, 225-227°C. Solubility in chloroform, 900 ppm.



Simazine

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Selective herbicide.

USE: Controls most annual grasses and broadleaf weeds in corn, established alfalfa, established bermudagrass, cherries, peaches, citrus, caneberries, cranberries, grapes, apples, pears, certain nuts, asparagus, certain ornamental and tree nursery stock, in turf grass sod production, fairways, lawns, and similar areas. At higher rates, it is used for nonselective weed control in industrial areas, and in fairways, lawns, and similar areas. Farmco Simazine for control of weeds in orchards, vineyards, berry fruits, asparagus, roses, field lupins, and noncrop situations. Aquazine* 80 W (available from Switzerland) for algae control in ponds.

FORMULATIONS: Wettable powder, water dispersible granule, liquid, and granular.

COMBINATIONS: Terraklene* (+ paraquat); Derby* (+ metolachlor) (Ciba); Simazat* (+ atrazine) (Drexel Chemical Co.); Remtal* SC (+ trietazine) (Hoechst Schering AgrEvo GmbH); Ametrex Extra* (+ ametryn), Simazol* (+ amitrole), Terbutrex Combi* (+ terbutryn) (Makhteshim-Agan); Pathclear* (+ diquat dibromide + paraquat) (ZENECA Agrochemicals).

Environmental Guidelines

HAZARDS: Fish: Nontoxic. LC₅₀ 56 mg/l (48 h) (rainbow trout). Bee: Nontoxic.

SOIL PARTICLE ADSORPTION: Approx. 5-7 months at 4 kg/WP/ha.

SOLUBILITY: Solubility: in water, 3.5 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >3100 mg/kg. Non-irritating to eye, skin.

Princep* Caliber* 90: (Rat): Oral LD₅₀ >5000 mg/kg; Inhalation LC₅₀ 10.0 mg/l (4 h). (Rabbit): Dermal LD₅₀ >2000 mg/kg. Minimal eye, mild skin irritation.

Princep* 4L: (Rat): Oral LD₅₀ >5,000 mg/kg; Inhalation LC₅₀ 9.8 mg/l (4 h). (Rabbit): Dermal LD₅₀ >3000 mg/kg. Non-irritating to eye, minimal to skin.

Sim-Trol*: (Rat) Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg; minimally irritating to eye, slightly irritating to skin. Inhalation LC₅₀ (Rat): >2.4 mg/l (4 h).

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed. Avoid contact with skin, eyes, and clothing. Store in sealed original containers, in well-aired, fresh and dry storehouses or in shaded and possibly well-aired places. Avoid sources of heat, free flames or spark-generating equipment.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Sim-Trol*: Use dry chemical, foam or CO₂.

FIRST AID: Sim-Trol*: Ingestion, give 1 or 2 glasses of water to drink and induce vomiting. Never give anything by mouth to an unconscious person. Apply artificial respiration if necessary. Eyes, immediately rinse eyes with a large amount of running water. Hold eyelids apart to rinse the entire surface of the eye and lids. Skin, wash with plenty of soap and water, including hair and under fingernails. Remove contaminated clothing and wash before reuse. Inhalation, move victim from contaminated area to fresh air. Apply artificial respiration if necessary.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Simazol* — see Amitrole; Simazine.

Simbo* — see Fenpropimorph; Tilt*.

Simeton — see Simateone.

Simateone

Identification

COMMON NAME: Simateone (BSI, WSSA).

CODE NUMBER: CAS 673-04-1.

DISCONTINUED NAMES: Gesadural*, G-30044 (Ciba-Geigy Ltd.).

Chemistry

COMPOSITION: 2,4-bis(ethylamino)-6-methoxy-s-triazine (CAS 8CI).

Action/Use

ACTION: Herbicide.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 535 mg/kg.

Simetryn

Identification

COMMON NAMES: Simetryn (ISO-E, BSI, WSSA), simetryne (ISO-F).

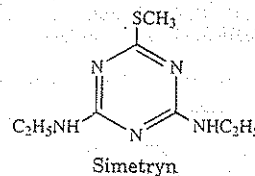
EXP. CODE NUMBER: G-32911.

OTHER CODE NUMBERS: CAS 1014-70-6; SHA 294300.

DISCONTINUED NAME: Gy-bon* (Ciba-Geigy Ltd.).

Chemistry

COMPOSITION: 2,4-bis(ethylamino)-6-methylmercapto-s-triazine (CAS 8CI).



Simetryn

Action/Use

ACTION: Herbicide.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1830 mg/kg.

Sim-Trol* — see Simazine.

Sinbar* — see Terbacil.

Sincocin*

BP: ATL, Appropriate Technology Ltd. (Sincocin*, Hunter*, Terminator*)

Chemistry

COMPOSITION: Mixture of mineral extracts, fatty acids, and plant extracts.

PROPERTIES: Specific gravity .996 (25°C); Boiling point 101°C.

Action/Use

ACTION: Nematode control agent; pathogen suppressant.

USE: Applied as a liquid spray to soils for control of several nematode species.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bird: Nontoxic. Bee: Nontoxic.

Registration Notes

OUTSIDE U.S.: Various Central and South American Countries and Southeast Asia. Peru: Hunter*. Costa Rica: Terminator*.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >20,000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store away from direct sunlight. Do not let freeze.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water and induce vomiting.

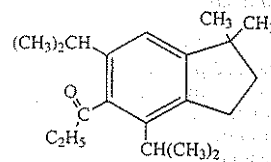
EMERGENCY TELEPHONE: 800-274-8930 (Appropriate Technology Ltd.).

Sindone*

(Discontinued by Rhone-Poulenc)

Chemistry

COMPOSITION: 1,1-Dimethyl-4,6-diisopropyl-5-indanyl ethyl ketone.



Sindone*

Action/Use

ACTION: Preemergence herbicide.

Sinflouran* — see Trifluralin.

Sinituho* — see PCP.

Sinox* (DNOC) — Discontinued 1993 by FMC Corp.

Sinox General* (dinoseb) — Discontinued 1989 by FMC Corp.

Sipaxol* — see Prowl*.

Sipcapiant* — see Thiophanate-Methyl.

Sipcasan* — see Thiophanate-Methyl.

Sipcavit* — see Thiophanate-Methyl.

Siperin* — see Cypermethrin.

Sipernat* — see Silicates (Synthetic Dry).

Sirbon* — see MTF-732.

Sirius* — see Pyrazosulfuron-ethyl.

Sirmate* — see Rowmate*.

Sirocco* — see Fenpropimorph.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Sistan* (metam-sodium) — Discontinued by ICI Agrochemicals.

Sisthane*

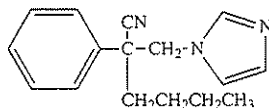
(Discontinued by Rohm and Haas Co.)

Identification

COMMON NAME: Fenapanil (ISO, ANSI, BSI).
EXP. CODE NUMBER: RH-2161 (Rohm and Haas).
OTHER CODE NUMBER: CAS 61019-78-1.

Chemistry

COMPOSITION: α -n-butyl- α phenyl-1H-imidazole-1-propane-nitrile.



Sisthane*

Action/Use

ACTION: Systemic fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 1590 mg/kg. (Rabbit): Dermal LD₅₀ >5000 mg/kg.

Sivat* — see Phosphamidon.

Sixty-Three Special* Insecticide (methyl parathion + parathion) — Discontinued by Hopkins Agricultural Chemical Co.

Skeetal* — see *Bacillus thuringiensis* var. *israelensis*.

SL-49 — see Pyrazoxyfen.

SL-160 — see Flazasulfuron.

SL-236 — see Fluazifop-butyl.

Slaked Lime — see Hydrated Lime.

SLAM* Herbicide — see Asulam; Dalapon.

Slam* Insecticide — see Carbaryl.

Slimicide

A material used primarily for the control of slime and molds.

SLN — see Special Local Need.

Slow Release Algimycin PLL-C* — see Algimycin PLL-C*.

Slug Fest Colloidal 25* — see Metaldehyde.

Slug 'N Snail* — see Metaldehyde.

Slurry

A thick suspension of a pesticide made from wettable powder and water.

Slurry Additive* — Discontinued 1987 by Hopkins Agricultural Chemical Co.

SMA — see Sodium Monochloroacetate.

Smarect* — see Paclobutrazol.

SMCA — see Sodium Monochloroacetate.

SMDC — see Metam-Sodium.

Smectite Clay — see Van Gel*; Veegum*.

Smite* Herbicide (sodium azide) — Discontinued.

SMY 1500 — see Tycor*.

SN 19537 — Discontinued by Schering AG.

SN 34615 — see Carbamult*.

SN 35830 — see Potablan*.

SN 36056 — see Carzol*.

SN 36268 — see Chlordimeform.

SN 38107 — see Desmedipham.

SN 38584 — see Phenmedipham.

SN 41703 — see Previcur*.

SN 49537 — see Dropp*.

SN 52020 — see Bendiocarb.

SN 58132 — see Verdinal.

SN 66752 — see Propamocarb Hydrochloride.

SN 78314 — see Cyprofuram.

SN-81742 — see Sethoxydim.

SN 597265 — see Fluquinconazole.

Snapshot* 80DF

BP: DowElanco (Snapshot*)

Chemistry

COMPOSITION: Isoxaben + oryzalin.

PROPERTIES: Dark orange solid spheres with pungent odor.

Action/Use

ACTION: Herbicide.

USE: Preemergence control of grass and broadleaf weeds in ornamentals.

FORMULATIONS: Dry flowable.

Environmental Guidelines

SOLUBILITY: Disperses in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): LD₅₀ >5000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, impermeable gloves, waterproof boots, long-sleeved shirt and long pants.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water, CO₂, dry chemical.

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation**, remove to fresh air. **Ingestion**, do NOT induce vomiting, administer 6-8 tsp. activated charcoal and large quantity of water.

Snapshot* 2.5TG — see Gallery*; Trifluralin.

Snip* — see Azamethiphos.

SO₂ Generator Fuel — see Sulfur.

SO₂ Generator Grape Preserver (sulfur dioxide) — Discontinued 1993 by Bactec Corp.

Soaps, Pesticidal

BP: Mycogen Corp. (M-Pede*, DeMoss* Moss & Algae Killer*)
Ringer Corp. (Safer* Aphid-Mite-Attack*, Safer* Attack Insecticidal Soap, Safer* Fruit & Vegetable Insect Attack*, Safer* Rose & Flower Insect Attack*, Safer* Insecticidal Soap, Safer* Sharpshooter* Herbicide, Safer* Moss & Algae Killer*, Safer* Tree & Shrub Insect Attack*)

Soaps are potassium salts of fatty acids. Those soaps manufactured particularly for insecticidal usage, i.e., potassium salts of selected fatty acids, kill aphids, spider mites, mealybugs and whitefly on garden vegetables, shrubs and trees as well as house plants. Such pesticides are alternatives to petrochemical pesticides (M-Pede*). Other specially selected soaps may be applied to control moss in lawns and mosses, algae, lichens, and liverworts on roofs, walks, and fences, and in greenhouses. Others control conventional weeds and vegetation.

Sod Webworm Attack* — see *Bacillus thuringiensis* var. *kurstaki*.

Soda Ash

Disinfectant properties. Used in bottle and dish washing. The crude sodium carbonate of commerce.

Sodanit*

BP: Luxembourg Industries (Pamol) Ltd. (Sodanit*)

Identification

CODE NUMBERS: CAS 7784-46-5; SHA 013603.

ADDITIONAL TRADE NAMES: Prodalumnol Double*.

DISCONTINUED NAMES: Chem Pels C*, Chem-Sen 56*, Kill-All*, Penite* (Pennwalt); Atlas "A" (Rhône-Poulenc).

Chemistry

COMPOSITION: Sodium arsenite.

FAMILY: Inorganic arsenicals.

PROPERTIES: Boils at 212°F. Specific gravity (Solution No. 4), 1.44; (Solution No. 6), 1.75.

Action/Use

ACTION: Fungicide.

USE: For dead-arm disease (*cryptoporella viticola*) in vineyards.

FORMULATIONS: Solution.

Registration Notes

U.S.: All other uses banned.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bird: Toxic.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Mammalian): Oral LD₅₀ 10-50 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, or clothing. Wash thoroughly after using. Do not breathe dust or spray mist. Do not use or store in or around the home. Do not allow domestic animals to graze treated areas. Do not contaminate water used for irrigation or domestic purposes. Avoid spray drift to desirable plants. Product is a concentrated solution and may crystallize at temperatures <0°C (32°F). Pesticide or rinsate that cannot be used or chemically processed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies. Consult Federal, state or local disposal authorities for approved alternative procedures.

Emergency Guidelines

FIRST AID: Get immediate medical aid. **Ingestion**, if conscious, drink 1-2 glasses water and induce vomiting by touching back of throat with finger. When vomiting fluid is clear, give two tablespoons Epsom salts or milk of magnesia in water, and plenty of milk and water. NOTE: Some physicians may discourage use of saline emesis.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Sodar* — see DSMA.

Sodium Aluminofluoride — see Cryolite.

Sodium Arsenate

(Discontinued)

Identification

CODE NUMBERS: CAS 7778-43-0; SHA 013505.

Action/Use

ACTION: Insecticide.

Sodium Arsenite — see Sodanit*.

Sodium Azide — see Kazoe*.

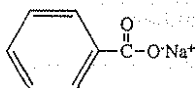
Sodium Benzoate

Identification

CODE NUMBERS: CAS 532-32-1; SHA 009103.

Chemistry

PROPERTIES: White odorless powder with sweetish astringent taste. Soluble in alcohol.



Sodium Benzoate

Action/Use

ACTION: Preservative.

USE: Foods, drugs, tobacco.

Environmental Guidelines

SOLUBILITY: Soluble in water.

Sodium Bisulfate

Identification

COMMON NAME: Sodium acid sulfate.

CODE NUMBERS: CAS 7681-38-1; SHA 073201.

ADDITIONAL TRADE NAME: SulFac DG*.

Chemistry

COMPOSITION: NaHSO₄.

PROPERTIES: Insoluble in alcohol.

Action/Use

ACTION: Disinfectant.

Buffer.

Environmental Guidelines

SOLUBILITY: Solid soluble to about 67 g/100 ml cold water. Very soluble in hot water.

Sodium Bisulfite

Identification

CODE NUMBERS: CAS 7631-90-5; SHA 078201.

Chemistry

COMPOSITION: Sodium metabisulfite.

Action/Use

ACTION: Silage preservative.

USE: Free-flowing powder applied to fresh grass silage; for production of sulfur dioxide in place of employing the gas directly. The sulfur dioxide develops sufficient acidity more quickly than natural fermentation.

Sodium Borate — see Borax.

Sodium Cacodylate

BP: Luxembourg Industries (Pamol) Ltd.

Identification

CODE NUMBERS: CAS 124-65-2; SHA 012502.

DISCONTINUED NAMES: Bolate* and Bophy (+ cacodylic acid) (Cumberland International Corp.); Boils-Eye*, Clean-Boil*, Ezy Pick-in*, Kack*, Phytar 560* (all with cacodylic acid), Broadside* (+ MSMA) (Drexel Chemical); Check-Mate* (+ MSMA), Rad-E-Cate* 25 (+ cacodylic acid) (Vineland Chemical).

Chemistry

COMPOSITION: Sodium salt of cacodylic acid.

PROPERTIES: Colorless crystalline solid. Melting point 200°C.

Action/Use

ACTION: Nonselective herbicide.

USE: General weed control, sod and turf edging renovation, ornamentals, nonbearing citrus.

FORMULATIONS: Concentrated solution.

COMBINATIONS: Cacodylate* (+ cacodylic acid), Herb-All* (+ monosodium methanearsenate + cacodylic acid), Leaf-All* (+ cacodylic acid) (Luxembourg Industries (Pamol) Ltd.); Cotton Aide HC*, Montar* (+ cacodylic acid), Moncide (+ cacodylic acid + MSMA) (Monterey Chemical).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

PROTECTIVE CLOTHING: Rubber gloves, goggles or face shield for eye protection, rubber apron.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. Harmful if swallowed. Avoid inhalation of spray mist. Avoid spray drift to desirable plants. Do not store near fertilizers, seeds, insecticides, or fungicides.

Emergency Guidelines

FIRST AID: Ingestion, induce vomiting and drink lots of water.

See Cacodylic Acid.

Sodium Carbonate — see Soda Ash.

Sodium Chlorate

BP: Caffaro S.p.A. (Dervan*)

Drexel Chemical Co. (Defol*)

Kerr-McGee Chemical Corp. (KM*)

Identification

COMMON NAME: Sodium chlorate.

CODE NUMBERS: CAS 7775-09-9; SHA 073301.

ADDITIONAL TRADE NAMES: Leafex*, Liquid Ureabor* (Plant Health Tech.); De-Fol-Ate*; Drop-Leaf*; Fall*; Kusatol*.

DISCONTINUED NAMES: Atratol 8P* (+ atrazine + sodium metaborate) (Ciba-Geigy); Atlacide*, Chlorax* (+ sodium metaborate), Chlorea* (+ sodium metaborate + diuron), Chlorvar* (+ sodium metaborate + bromacil), Shed-A-Leaf* (all Rhone-Poulenc); Klorex* (KenoGard AB); Hibor C* (+ sodium metaborate + bromacil), Oxy Leafex-3*, Oxycil*, ValDrop* (Occidental Chemical); Chem-Frost* (+ sodium metaborate), Polybor-Chlorate* (+ disodium octaborate) (U.S. Borax); Tumbleleaf* (Wilbur-Ellis); Rasikal*.

Chemistry

COMPOSITION: NaClO₃.

PROPERTIES: Tech sodium chlorate is a white, odorless, crystalline solid.

Action/Use

ACTION: Semi-permanent soil sterilant herbicide; cotton defoliant, desiccant, harvest aid.

USE: Acts as a nonselective contact herbicide, is translocated under some conditions and can kill by root adsorption. Soil applications are best for a sterilant effect; however, it can be sprayed or applied dry to soil or plants, for control of both grasses and broadleaf weeds, annual and perennial, and to kill trees and stumps. Kills all plant growth except moss; persists for 3 to 6 months.

COMBINATIONS: BareSpot* Monobor-Chlorate (+ sodium metaborate), BareSpot* Ureabor (+ sodium metaborate + bromacil), BareSpot* Weed & Grass (+ sodium metaborate + diuron) (J.R. Simplot); Harvest Aid Liquid (+ urea) (Wilbur-Ellis).

Safety Guidelines

SIGNAL WORD: DANGER; WARNING (Defol*).

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 4950 mg/kg (male); 6250 mg/kg (female). (Rabbit): Dermal LD₅₀ 500 mg (24h).

PROTECTIVE CLOTHING: Safety glasses or vented safety goggles, impermeable gloves, washable clothing with pants over rubber boots or shoes.

HANDLING AND STORAGE CAUTIONS: Strong oxidizer—mixing with other materials can produce flammable or explosive mixtures. Care should be taken to avoid impregnation of clothing with chlorates. All contaminated clothing should be kept wet and changed immediately and washed before re-use. Clothing contaminated with chlorate materials should not be burned with ordinary plant wastes in incinerators or under steam boilers. Sodium chlorate must be used with a water-soluble fire retardant such as sodium metaborate, soda ash, magnesium chloride or urea. Store in a cool, dry, fire resistant area; separate from acids, solvents, oils, organic substances, sulfur, sulfides, powdered metals, ammonium salts and away from fire hazards. Sweep up spills immediately into metal containers. Do not contaminate food or feedstuffs by storage. Sodium chlorate should not be disposed of into waterways as fish and plant life may be affected.

Emergency Guidelines

FIRST AID: Get medical aid as necessary. Eyes, holding eyelids open, flush with a directed stream of water for at least 15 minutes. Skin, remove contaminated clothing, wash skin with plenty of soap and water. Inhalation, remove to fresh air. Ingestion, if conscious, drink 1-2 glasses of water and induce vomiting by touching back of throat with finger.

NOTE TO PHYSICIAN: Sodium chlorate is a strong oxidizer and methemoglobin former.

Sodium Chlorate Borate

Identification

DISCONTINUED NAMES: MBC* (Occidental Chemical).

Chemistry

COMPOSITION: Sodium borate + sodium chlorate.

Action/Use

ACTION: Nonselective herbicide.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2330-2700 mg/kg.**Emergency Guidelines**

FIRST AID: Get medical aid. **Eyes**, while holding eyelids open, flush with a directed stream of water for at least 15 minutes. **Skin**, remove contaminated clothing; wash skin with plenty of soap and water. **Ingestion**, do NOT induce vomiting; dilute by drinking water. If vomiting occurs, drink more water.

Sodium Chloride**Identification**

CODE NUMBERS: CAS 7647-14-5; SHA 013905.

OTHER NAMES: Common or table salt, rock salt, etc.

Chemistry

COMPOSITION: NaCl.

Action/Use

ACTION: Herbicide, food preservative.

USE: Used in postemergence weed control in table beets (humid regions).

Sodium Cresylate**Action/Use**

USE: Has been formulated with other ingredients in animal dips.

Registration Notes

U.S.: Food uses cancelled 1969.

Sodium Cyanate**Identification**

CODE NUMBER: CAS 917-61-3.

ADDITIONAL TRADE NAMES: Cyansan*, San-Cyan*, Weecon*, Zassol*.

Chemistry

COMPOSITION: NaO-CN.

Action/Use

ACTION: Herbicide.

Sodium Cyanide

BP: All India Medical Corp. (Cyanogas A*)
ZENECA Agrochemicals (Cymag*)

Identification

CODE NUMBERS: CAS 143-33-9; SHA 074002.

Chemistry

COMPOSITION: Sodium cyanide.

PROPERTIES: Colorless solid. Moisture contact produces hydrogen cyanide.

Action/Use

ACTION: Rodenticide.

USE: For rabbit, rat burrows and holes; termite nests.

FORMULATIONS: Powder.

Registration Notes

U.S.: For use only by trained persons with permit or license.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 6.4 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store closed under lock and key in a cool, well-ventilated place not inhabited by humans or animals.

Emergency Guidelines

ANTIDOTE: Injection of cobalt EDTA (Kelocyanor); inhalation of amyl nitrite.

Sodium Dehydroacetate — see Dehydroacetic Acid.**Sodium Dimethyl Dithiocarbamate****Identification**

CODE NUMBERS: CAS 128-04-1; SHA 034804.

DISCONTINUED NAMES: Dibam*, Dibam A*.

Action/Use

ACTION: Fungicide.

USE: Reacted with zinc sulfate or ferric sulfate for use primarily on vegetables.

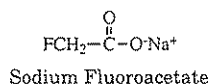
Sodium Dioctyl Sulfosuccinate — see NONIT*.**Sodium Fluoaluminate** — see Cryolite.**Sodium Fluoroacetate**

(Discontinued 1979 by Aceto Chemical Co.)

Identification

CODE NUMBERS: CAS 62-74-8; SHA 075003-4.

ADDITIONAL TRADE NAMES: Compound 1080, FratoI*, Yasoknock*.

**Chemistry**

COMPOSITION: Sodium monofluoroacetate.

Action/Use

ACTION: Field rodenticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 0.22 mg/kg. Extremely toxic to warm-blooded animals. Odorless, tasteless, and fast acting, it acts chiefly on the heart with secondary effects on the central nervous system.**Sodium Fluosilicate** — see Safsan*.**Sodium Hypochlorite****Identification**

CODE NUMBERS: CAS 7681-52-9; SHA 014703.

Chemistry

COMPOSITION: NaOCl.

Action/Use

ACTION: Fungicidal seed treatment.

Sodium Isopropylxanthane**Identification**

CODE NUMBERS: CAS 7558-79-4; SHA 076403.

Action/Use

ACTION: Postemergence contact herbicide.

Sodium Lignosulfonates — see Lignosulfonates.**Sodium Metaborate****Identification**

CODE NUMBERS: CAS 7775-19-1; SHA 011104.

DISCONTINUED NAMES: Atratul 8P* (+ atrazine + sodium chlorate) (Ciba-Geigy); Chlorax* (+ sodium chlorate), Chlorvar* (+ bromacil + sodium chlorate), Chlorea* (+ diuron + sodium chlorate) (all Rhone-Poulenc); Hibor* C (+ bromacil + sodium chlorate), Urebor* 8D (+ diuron) (Occidental Chemicals); Borocil* IV (+ bromacil) (J.R. Simplot).

Action/Use

ACTION: Added to sodium chlorate herbicides and defoliants.

USE: Fire retardant.

COMBINATIONS: BareSpot* Monobor-Chlorate (+ sodium chlorate), BareSpot* Ureabor (+ sodium chlorate + bromacil), BareSpot* Weed & Grass (+ sodium chlorate + diuron) (J.R. Simplot).

Sodium Methanearsonates — see DSMA, MSMA.**Sodium Methylthiocarbamate** — see Metam-Sodium.**Sodium Monochloroacetate****Identification**

OTHER NAMES: SMA, SMCA.

DISCONTINUED NAME: Monoxone* (ICI Agrochemicals).

Action/Use

ACTION: Herbicide.

Sodium Monofluoroacetate — see Sodium Fluoroacetate.**Sodium Oleyl Sulfate****Action/Use**

ACTION: Wetting agent.

Sodium Ortho Phenylphenate — see Dovicide* A.**Sodium Penta** — See Sodium Pentachlorophenate**Sodium Pentachlorophenate**

— BP: ISK Biosciences Corp. (Mitrol* G-ST)

Identification

COMMON NAMES: Sodium pentachlorophenoxide (ISO-E, BSI); pentachlorophénate de sodium (ISO-F).

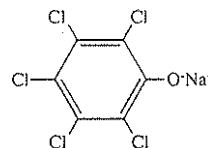
TRIVIAL NAMES: Sodium pentachlorophenate, sodium penta, pentaphenate, pentachlorophenoxy sodium.

CODE NUMBERS: CAS 131-52-2; SHA 063003.

DISCONTINUED NAMES: Permatox 101*, Permatox 181* (Chapman Chemical); Dovicide G-ST* (Dow Chemical); Santobrite Beads*, Santobrite Fines* (Monsanto Agricultural Co.); Napclor G*, Weedbeads*.

Chemistry

PROPERTIES: Buff colored beads or powder with phenolic odor. Molecular weight 288.30.



Sodium Penta

Action/Use

ACTION: Bactericide, fungicide.

USE: Wood preservative.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Registration Notes

U.S.: U.S. registration cancelled.

Environmental Guidelines

SOLUBILITY: Moderate solubility in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Acute oral LD₅₀ 126 mg/kg. (Rabbit): Acute oral LD₅₀ 275-328 mg/kg.

PROTECTIVE CLOTHING: Impervious gloves, apron (PVA, PVC, neoprene, or NBR). Respirator (organic vapors, acid gases) in closed areas. Safety glasses, goggles, or face shield.

HANDLING AND STORAGE CAUTIONS: Keep dry.

Emergency Guidelines

ANTIDOTE: PCP is a metabolic stimulant; treatment is supportive. Forced diuresis may be effective to reduce total body burden. Treat hyperthermia with physical measures. Do NOT give aspirin, phenothiazines, or atropine since they may enhance toxicity.

EMERGENCY TELEPHONE: 901-683-9464 (ISK Biosciences Corp.).

800-424-9300 (CHEMTREC).

See PCP.

Sodium Pentachlorophenoxide — see Sodium Pentachlorophenoxide.**Sodium Polyborates** — see POLYBOR* 3.**Sodium Polysulfide****Identification**

CODE NUMBERS: CAS 1344-08-7; SHA 006902.

Action/Use

ACTION: Fungicide.

Sodium Propionate**Identification**

CODE NUMBER: CAS 137-40-6

Action/Use

ACTION: Fungicide.

USE: Used in garlic production.

Sodium Selenate**Identification**

CODE NUMBERS: CAS 13410-01-0; SHA 072002.

Action/Use

ACTION: Systemic insecticide when applied to soil.

USE: Effective also against non-cystforming nematodes.

Sodium Silicofluoride — see Safesan*.**Sodium TCA**

(Discontinued 1988 by Hopkins Agricultural Chemical Co.)

Identification

COMMON NAMES: Sodium trichloroacetate, sodium TCA.

CODE NUMBERS: CAS 76-03-9; (sodium salt) 650-51-1.

OTHER NAMES: NaTA*, STCA, TCA.

DISCONTINUED NAME: Allied Arcadian Sodium TCA*.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 5000 mg/kg. Eye, skin irritant.**Sodium Tetraborate Decahydrate** — see Borax.**Sodium Thiocyanate****Identification**

CODE NUMBERS: CAS 540-72-7; SHA 068202.

Action/Use

ACTION: Herbicide.

See Ammonium Thiocyanate.

Sodium Trichloroacetate — see TCA.**Sohyaron* Herbicide (dymron + oxadiazon)** — Discontinued

1990 by SDS Biotech.

Soil Application

A herbicide applied primarily to the soil surface rather than to vegetation.

Soil Drench

To soak or wet the surface of the ground with a pesticide chemical. Generally fairly large volumes of the pesticide preparation are needed to saturate the soil to any depth.

Soil Fumigant

A pesticide which, when applied to the soil, forms a gas to destroy many pests.

Soil Incorporation

Labeling for pesticide application sometimes directs to soil incorporate the chemical (cover by tillage).

Soil Injection

Mechanical placement of a pesticide below the soil surface with a minimum of mixing or stirring. Commonly used to apply those liquids which are converted to gases in the soil. Also, the application of pesticide suspensions, solutions, and emulsions below the surface of the soil by means of a pressure device.

Soil Layered

Placement of the herbicide beneath the soil surface with a minimum of mixing or stirring of the soil as with an injection blade, knife, or tine.

Soil Sterilant

From the standpoint of weed control, any material that makes soil incapable of supporting plant growth. Sterilization may be of brief duration or more lasting.

Soil Surfactant Liquid*

BP: Miller Chemical & Fertilizer Corp. (Soil Surfactant Liquid*)

Chemistry

COMPOSITION: Alpha-Alkanoic-hydroOmega-Hydroxy Poly (Oxyethylene).

PROPERTIES: Light amber liquid, fatty odor.

Action/Use

ACTION: Wetting agent.

FORMULATION: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Emergency GuidelinesFIRST AID: Eyes and Skin, flush immediately with plenty of water.Ingestion, If irritation persists get medical attention.**Soil TRIGGRR***

BP: Westbridge Agricultural Products (Foliar TRIGGRR*, Soil TRIGGRR*)

Chemistry

COMPOSITION: Cytokinins (mixed).

PROPERTIES: Concentrated aqueous solution, approx. 5% by weight undissolved solids.

Action/Use

ACTION: Plant growth regulator.

USE: Used as a soil treatment to increase yields in alfalfa, corn, cotton, jojoba, lupine, peanuts, rice, sorghum, soybeans, sugar beets, triticale, wheat, fruits and vegetables. Used to increase growth and development in ornamentals, trees and turf.

FORMULATIONS: Liquid concentrate.

Environmental Guidelines

SOLUBILITY: Approx. 95% in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in a cool place, out of direct sunlight.

Soil Wetting Agent — see Hydro-Wet*.**Soilbrom* (ethylene dibromide)** — Discontinued 1984 by Great Lakes Chemical Corp.**Soilex*** — see Chloropicrin.**Soil-Mend*** — see Lime Sulfur.**Soil-Prep**

F: Wilbur-Ellis Co.

Identification

CODE NUMBERS: CAS 137-42-8.

Chemistry

COMMON NAME: Sodium N-methyldithiocarbamate.

PROPERTIES: Olive liquid with the odor of sulfide.

Action/Use

ACTION: Fumigant.

USE: For control of weeds, plant parasitic nematodes, and soilborne fungi.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Miscible in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

PROTECTIVE CLOTHING: Neoprene or rubber boots, neoprene or nitrile gloves, hat, long sleeved coveralls, and chemical goggles. For manufacture, formulation and application operations, shower at end of work shift.

Emergency GuidelinesFIRE EXTINGUISHING MEDIA: CO₂, dry chemical, foam, water fog.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

FIRST AID: Get prompt medical attention. **Ingestion,** give several glasses of water and induce vomiting. Do NOT induce vomiting if person is unconscious. **Skin,** remove contaminated clothing and wash with soap and water. **Eyes,** flush eyes with water for a minimum of 15 minutes. **Inhalation,** remove victim to fresh air and administer CPR if necessary. **EMERGENCY TELEPHONE:** 800-424-9300 (CHEMTREC).

Sokalan*

BP: BASF Corp. (Sokalan*)

Chemistry

COMPOSITION: A series of homopolymers and copolymers of acrylic acid.

Action/Use

ACTION: Dispersant/viscosity modifier.

USE: For emulsifiable concentrates, wettable powders and aqueous flowables.

Environmental Guidelines

HAZARDS: Fish: $EC_{50} > 200$ mg/l (48 h) (daphnia/minnow).

Safety Guidelines

TOXICITY: (Rat): Oral $LD_{50} > 2$ g/kg.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** drink one or two glasses of water and induce vomiting.

SOK*-BT Insecticide (*Bacillus thuringiensis var. kurstaki*) — Discontinued by Pennwalt.

Sol Alga*

BP: CEQSA Especialidades Quimicas S.A.

Chemistry

COMPOSITION: Quaternary ammonium compounds.

Solabar* — see Barium Polysulfide.

Solacol* — see Validacin*.

Solan* Herbicide (pentanochlor) — Discontinued by FMC Corp.

Solasan 500 — see Metam-Sodium.

Solbar* — see Barium Polysulfide.

Solfac* — see Baythroid*.

Solicam* — see Norflurazon.

Solubility

Solubility of one gas, liquid or solid material in a liquid solvent is the maximum quantity of the substance which will dissolve. Solubility varies with temperature, hence is usually expressed at a standard temperature such as 25°C.

Soluble Castor Oil — see Turkey Red Oil.

Soluble Powder

A powdered material which will dissolve in water directly without necessity for suspension as an oily emulsion or as solid particles.

Solufeed — see Milcurb.

Solut* — see Dimethoate.

Solution

Mixture of one or more substances in another substance (usually a liquid) in which all the ingredients are completely dissolved. For soluble compounds used in a tank mixture, see Tank Mix.

Solution* — see 2,4-D.

Solvaid* Adjuvant — Discontinued by Kalo, Inc.

Solvent

The liquid constituent of a solution of a solid or gas. In the formulation of emulsifiable concentrates, two general types of solvents have been used:

1. Toluene, xylene and similar materials that evaporate after spraying to leave a deposit of the insecticide on the sprayed area. Under some conditions these may constitute a fire hazard. See xylene, aromatic oils.
2. Non-volatile solvents (alkylated naphthalenes, petroleum oil) which leave the treated surface coated with a solution of the insecticide in oil, after the water carrier has evaporated.

See Fuel Oils.

Solvifog* (N.R. 1) Carrier — Discontinued by Makhteshim-Agan.

Solvirex* — see Disulfoton.

Sonalan*

BP: DowElanco (Sonalan*)

Identification

COMMON NAMES: Ethalfluralin (ISO-E, ANSI, BSI, WSSA); ethalfluraline (ISO-F).

EXP. CODE NUMBER: EL-161.

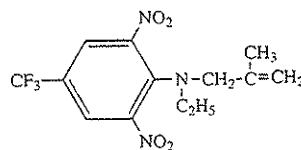
OTHER CODE NUMBERS: CAS 55283-68-6; SHA 113101.

ADDITIONAL TRADE NAME: Curbit* (Platte Chemical).

Chemistry

COMPOSITION: N-ethyl-N-(2-methyl-2-propenyl)-2,6-dinitro-4-(trifluoromethyl)benzenamine (CAS).

PROPERTIES: Pure ethalfluralin is a yellow crystalline solid which melts at 57-59°C. Vapor pressure at 25°C is 8.2×10^{-6} mm/Hg. Readily soluble in organic solvents (acetone, acetonitrile, benzene, chloroform, methanol, methylene chloride, xylene).



Ethalfluralin

Action/Use

ACTION: Selective preemergence herbicide.

USE: Preplant incorporated for soybeans, sunflowers, dry beans, peanuts, and dry peas.

FORMULATIONS: Emulsifiable concentrate, Tech grade, 10 G.

Environmental Guidelines

SOLUBILITY: In water 0.3 ppm. at 25°C at pH 7.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Mouse/Rat): Oral $LD_{50} > 10,000$ mg/kg.

PROTECTIVE CLOTHING: Coveralls, long-sleeved shirt, impermeable gloves for handling.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, clothing, or breathing vapors. Harmful if swallowed or absorbed through the skin. Do not contaminate food, feed. Store in original container at $> 40^{\circ}\text{F}$ (5°C). Avoid freezing; poor weed control may result. Do not store near heat, open flame.

Sonar*

BP: DowElanco

Identification

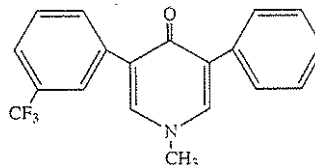
COMMON NAME: Fluridone (ISO, ANSI, BSI, WSSA).

CODE NUMBERS: CAS 59756-60-4; SHA 112900.

Chemistry

COMPOSITION: 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1H)-pyridinone (CAS).

PROPERTIES: White crystalline solid. Melting point 154-155°C. Slightly soluble in organic solvents (methanol, diethyl ether, ethyl acetate, chloroform, hexane) (CAS).



Fluridone

Action/Use

ACTION: Selective aquatic herbicide.

USE: For submersed and emersed vascular plants in ponds, lakes, reservoirs, irrigation canals and drainage canals. Apply where there is little water movement, prior to initiation of weed growth or when weeds begin actively growing. Can be applied on or under the surface, or along the water bottom with specialized equipment.

FORMULATIONS: Aqueous suspension. Slow release pellets.

Environmental Guidelines

HAZARDS: Fish (96 hr.): 4.2-11.7 mg/l (rainbow trout); 12.1-13 mg/l (bluegill). Bird: (Oral) > 2000 mg/kg (bobwhite quail). (8 day Dietary) > 5000 mg/kg (mallard duck, bobwhite).

SOLUBILITY: In water, 12 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Mouse/Rat): Oral $LD_{50} > 10,000$ mg/kg.

HANDLING AND STORAGE CAUTIONS: Keep away from children. Store in original container. Do not contaminate water, food, feed by storage or disposal.

Sonax* Fungicide (etaconazole) — Discontinued by Ciba-Geigy Ltd.

Sophamide**Identification**

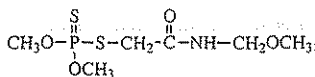
COMMON NAME: Sophamide (ISO, BSI).

CODE NUMBERS: CAS 919-76-6; SHA 059601.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Chemistry

COMPOSITION: S-(N-methoxymethyl)carbamoylmethyl O,O-dimethylphosphorodithioate.



Sophamide

Action/Use

ACTION: Acaricide-insecticide.

Soprabel* — see Lead Arsenate.

Sopragam* Insecticide (parathion + lindane) — Discontinued by SOPRA, France.

Sopranebe* — see Maneb.

Soprathion* — see Parathion.

Soprocide* — see BHC.

Soprophor*

BP: Rhone-Poulenc Surfactants & Specialties (Soprophor*)

Identification

DISCONTINUED NAMES: Soprophor 3D33* (Rhone-Poulenc Surfactants & Specialties).

Chemistry

COMPOSITION: Ethoxylated tristyrylphenol; phosphate esters of ethoxylated tristyrylphenol; sulfates of ethoxylated tristyrylphenol.

Action/Use

ACTION: One of a series of Tristyrylphenol based surfactants.

USE: Emulsifier, dispersant.

Safety Guidelines

TOXICITY CLASS: Exempt under FIFRA.

See Dispersant.

Soprophor 3D33* Dispersant/Emulsifier — Discontinued 1994 by Rhone-Poulenc Surfactants & Specialties.

Sorbacide*

(Discontinued by Uniroyal Chemical Co., Inc.)

Chemistry

COMPOSITION: Inorganic phosphates + phosphates.

Action/Use

ACTION: Spray adjuvant, buffer.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

Sorbent

The expression "sorb" or "sorber" is used to refer to the quality or property of taking up and holding a substance whether by absorption, adsorption, or physical entrapment in a material such as clay or walnut-shell flour.

Sorbic Acid

Chemistry

COMPOSITION: 2,4-Hexadienoic acid.

Action/Use

USE: Used to impregnate polyethylene wrappers for raw farm products.

Sorgan* — see Propachlor; Propazine.

Sorghum Guard* — see Captan; Lindane.

Sorilan* — see Fenpropidin.

South Carolina Hard Clay — see Type 41 Clay*.

Southland Pearson Moly Stand — see Thiram.

Soy-Dex*

BP: Helena Chemical Co. (Soy-Dex*)

Chemistry

COMPOSITION: Soybean oil + nonionic blend of alkoxyated alkylphenols + fatty acids.

PROPERTIES: Red liquid. Cooking oil odor.

Action/Use

ACTION: Adjuvant, spreader-sticker.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

Soy-Dex* Plus

BP: Helena Chemical Co. (Soy-Dex* Plus)

Chemistry

COMPOSITION: Vegetable oil + polyol fatty acid ester + polyethoxylated esters thereof + ethoxylated alkyl aryl phosphate ester + buffering agents.

PROPERTIES: Red liquid. Cooking oil odor.

Action/Use

ACTION: Adjuvant.

USE: For use with pesticides that require the use of an oil concentrate or buffering agent.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

Soy-Plus*

(Discontinued 1990 by Kalo, Inc.)

Chemistry

COMPOSITION: Twice-refined soybean oil + surfactant.

Action/Use

ACTION: Adjuvant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

SP 1103 — see Tetramethrin.

SP 1103 Forte — see Neo-pynamin Forte.

Space Spray

A pesticide product which is applied as a fine spray or mist to a confined area either indoors or outside.

Span*

BP: ICI Surfactants

Action/Use

ACTION: Series of surfactants.

USE: As emulsifier in formulation of pesticides.

Spanone* Insecticide (chlordimeform) — Discontinued by Schering AG.

Sparticide* — see Fluoroimide.

Special Electric* Dusting Sulfur — see Sulfur.

Special Local Need (SLN)

Limited registrations for a given area and a given problem.

Special Review

Formerly known as Rebuttable Presumption Against Registration (RPAR), this is the regulatory process through which existing pesticides suspected of posing unreasonable risks to human health, non-target organisms, or the environment are referred for review by EPA. The review requires an intensive risk/benefit analysis with opportunity for public comment. If the risk of any use of a pesticide is found to outweigh social and economic benefits, regulatory actions—ranging from label revisions and use-restriction to cancellation or suspended registration—can be initiated.

Specific Gravity

Density. The ratio of the mass (weight) of a material to the mass of an equal volume of water at a specified temperature such as 20°C.

Spectracide* — see Diazinon.

Spectro* Fungicide (thiophanate) — Discontinued 1989 by Nippon Soda Co., Ltd.

Spectron* — see Ethofumesate; Pyramin*.

Spectro-San*

(Discontinued by Pfister Chemical)

Action/Use

ACTION: Disinfectant.

Speed Sprayer* — see Mist Blower.

Spendos* — see Endosulfan.

Spergon* Fungicide (chloranil) — Discontinued by Uniroyal Chemical Co., Inc.

Sperlox* Fungicide (sulfur + zineb) — Discontinued by Olin Corp.

Sperm Oil

Identification

CODE NUMBERS: CAS 8002-24-2; SHA 099701.

Action/Use

USE: Formulated with various other ingredients as screwworm remedies.

Spike* — see Tebuthiuron.

Spin-aid* — see Phenmedipham.

Spincid* — see Dicofol.

Spod-X*

BP: InStar Products, Div. of Crop Genetics International (Spod-X*)

Chemistry

COMPOSITION: Naturally occurring *Spodoptera exigua multicapsid* nuclear polyhedrosis virus.

PROPERTIES: Tan to brown color. Mild chemical odor. Neutral pH.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Insecticide.

USE: For control of beet armyworm in various crops.

FORMULATIONS: Liquid concentrate, wettable powder.

Registration Notes

U.S.: Registered.

OUTSIDE U.S.: Registered in Holland (Marketed by Brinkman B.V.).

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

TOXICITY: Essentially nontoxic to mammals and non-target insect species.

PROTECTIVE CLOTHING: Safety glasses with side shields for eye and face protection. If potential exists for significant skin contact, wear imperious clothing, such as whole bodysuit, gloves, apron, and/or boots, as appropriate. Material does not have established exposure limits; if not used in chemical fume hood, and there is a potential for significant exposure, wear a NIOSH/MSHA approved positive pressure air supplied respirator.

HANDLING AND STORAGE CAUTIONS: Use with adequate ventilation. Avoid breathing or generating dust. Avoid contact with eyes, skin, or clothing. Compound not likely to be hazardous by skin contact, but advisable to wash thoroughly after handling. Do not consume food, drink or tobacco in an area where contamination with product is possible. Keep container tightly closed, and store in cool, dark, dry area. Stable under normal temperatures and storage conditions. Incompatible with strong acids, bases or chlorinated water.

Emergency Guidelines

FLASHPOINT: Not fully investigated; handle as fire and explosion hazard.

FIRE EXTINGUISHING MEDIA: Use media appropriate for surrounding material.

FIRST AID: *Eyes*, immediately flush with plenty of water for at least 15 minutes and call physician. *Inhalation*, remove to fresh air. If not breathing, give artificial respiration. If breathing difficult, give oxygen. Call physician. *Ingestion*, call physician immediately.

EMERGENCY TELEPHONE: Medical: 410-381-3800 (InStar Products, Div. of Crop Genetics International).

Sponto*

BP: Witco Corp., Oleo Surfactants Group

Action/Use

ACTION: Series of agricultural emulsifiers.

USE: Formulation of emulsifiable pesticide concentrates.

Sponsor* — see Fenpropidin; Prochloraz.

Spontox* Herbicide (2,4,5-T) — Discontinued by Rhone-Poulenc Ag Co.

Spore

The one-to many-celled reproductive unit of a fungus which corresponds to a seed in higher plants; also the thick-walled resting stage of a bacterium.

Sporgon* — see Prochloraz.

Sportak* — see Prochloraz.

Sportak Alpha* — see Carbendazim; Prochloraz.

Sportak Delta — see Cyproconazole; Prochloraz.

Sportak PF — see Carbendazim; Prochloraz.

Spot Treatment

A treatment directed at specific plants or areas rather than a general application.

Spotless* — see Diniconazole.

Spotrete* — see Thiram.

Spra-Cal* — see Calcium Arsenate.

Spray Ad CVF* Surfactant — Discontinued 1986 by Rigo Co.

Spray Adjuvant — see Adjuvant.

Spray-Aide*

BP: Miller Chemical & Fertilizer Corp. (Spray-Aide*)

Chemistry

COMPOSITION: Alkylaryl polyoxyethylene glycol phosphate ester.

PROPERTIES: Clear liquid, bland odor.

Action/Use

ACTION: Compatibility-acidifying agent.

USE: To improve spray tank compatibility of pesticides and to lower pH of spray tank water or liquid fertilizer solutions.

FORMULATIONS: Concentrate.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Contact may cause eye damage and skin irritation. Harmful if swallowed.

Spray Concentrate

A liquid formulation of a pesticide usually containing a high percentage of active ingredient which can be diluted with another liquid (water, oil) before using.

Spray Deposit

The amount of pesticide chemical that remains on a sprayed surface after the droplets have dried.

Spray Drift

The movement of airborne spray particles from the intended area of application (Weed Science Society of America).

Spray Fuse 90*

F: Cornbelt Chemical Co. (Spray Fuse 90*)

Chemistry

COMPOSITION: Alkylaryl polyoxyethylene glycols + free fatty acids + isopropanol.

PROPERTIES: 90% Nonionic.

Action/Use

ACTION: Spreader, activator.

USE: With insecticides, herbicides, acaricides.

FORMULATIONS: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

HANDLING AND STORAGE CAUTIONS: Causes eye, skin irritation. Avoid prolonged skin contact.

Emergency Guidelines

FLASH POINT: 200°F.

Spray Oils — see Petroleum Oils.

Spray Stay* — see Sticker.

Sprayer — see Bucket Pump; Compressed-Air Sprayer; Hand Sprayer; Knapsack Sprayer; Mist Blower; Power Sprayer; Steam Aerosol Fog; Thermal Aerosol Fog.

Spreader

The AAPCO has adopted this definition: "A substance which increases the area that a given volume of liquid will cover on a solid, or on another liquid." Also termed film extender.

Spreader-Sticker 3-S* — Discontinued by Leffingwell.

Spreader-Sticker with Defoamer* — Discontinued 1987 by Rigo Co.

Spret*

BP: Helena Chemical Co.

Chemistry

COMPOSITION: Alkyl aryl polyoxyethylene glycol ether.

Action/Use

ACTION: Nonionic surface active agent.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

See Penetrant, Sticker, Spreader.

Spring-Bak* — see Nabam.

Springclene* 2 — see Galtak*; Mecoprop.

Sprint* — see Fenpropimorph; Prochloraz.

Spritex* — see DDVP.

Spritex Super* — see DDVP.

Spritex-Hormin* — see 2,4-D.

Sprout Nip* — see Chlorpropham.

Sprout Stop* — see Maleic Hydrazide.

Sprout-Off* (Fair 85*) — Discontinued by Fair Products Inc.

Sprudamone*

(Discontinued by Zoecon Corp.)

Chemistry

COMPOSITION: trans-11-tetradecenyl aldehyde.

Action/Use

ACTION: Attractant.

Spud-Nic* Herbicide (chlorpropham) — Discontinued by Platte Chemical.

Spur* Insecticide (tau-fluvalinate) — Discontinued by Sandoz Agro, Inc.

Squadron*

BP: American Cyanamid Co.

Chemistry

COMPOSITION: Pendimethalin + imazaquin.

Action/Use

ACTION: Herbicide.

USE: On soybeans.

Registration Notes

U.S.: For specified states only. See label.

Environmental Guidelines

SOLUBILITY: Emulsifies in water.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Safety Guidelines

SIGNAL WORD: DANGER (eye).

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal >2000 mg/kg; irreversible eye damage; mild skin irritant.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FLASHPOINT: 200°F (SETA closed cup).

FIRE EXTINGUISHING MEDIA: Water, foam, dry chemical, or carbon dioxide (CO₂).

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water for 15 minutes. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation**, remove to fresh air. **Ingestion**, do NOT induce vomiting.

EMERGENCY TELEPHONE: 201-835-3100 (American Cyanamid).

Squill — see Red Squill.

SR 73 — see Bayluscid*.

SR-406 — see Captan.

SRA 3886 — see Nemacur*.

SRA 5172 — see Methamidophos.

SRA 7502 — see Baythion*.

SRA 7847 — see Edifenphos.

SS 1451 — see Eradex*.

S-Seven*

(Discontinued 1984 by Nissan Chemical Industries, Ltd.)

Identification

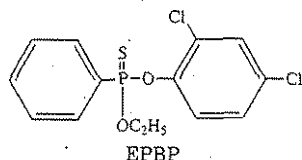
COMMON NAME: EPBP (JMAF).

EXP. CODE NUMBER: S-7.

CODE NUMBER: CAS 3792-59-4.

Chemistry

COMPOSITION: O-2,4-dichlorophenyl O-ethyl phenylphosphonothioate (IUPAC).



Action/Use

ACTION: Insecticide against soil inhabiting insects.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Mouse): Oral LD₅₀ 274 mg/kg.

Sta Brite P*

BP: ISK Biosciences Corp.

Identification

TRIVIAL NAME: I.P.B.C.

CODE NUMBER: CAS 55406-53-6.

Chemistry

PROPERTIES: Clear light yellow liquid with mild amide odor.

COMPOSITION: 3-Iodo-2-propynyl butylcarbamate.

Action/Use

ACTION: Wood preservative.

Environmental Guidelines

SOLUBILITY: Miscible in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 778.8 mg/kg (male); 249.2 mg/kg (female).

Inhalation LC₅₀ 0.9329 mg/L (male); 1.3172 mg/L (female). (Rabbit):

Dermal LD₅₀ >2000-<20,000.

PROTECTIVE CLOTHING: Impervious boots, aprons, hats or chemical suits.

HANDLING AND STORAGE CAUTIONS: Store in secure, well-ventilated area away from extreme heat.

Emergency Guidelines

FLASHPOINT: 140°F (TCC).

FIRE EXTINGUISHING MEDIA: Foam, carbon dioxide, water spray or dry chemical.

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion**, drink large quantities of milk or water and induce vomiting. **Inhalation**, remove to fresh air.

Stacker* — see Methylidyron.

Stacker-D* — see 2,4-D; Methylidyron.

Stam* — see Propanil.

Stampede* — see Propanil.

Stampede* CM — see Propanil.

Stand Seedling Solution*

BP: Stoller, Inc.

Chemistry

COMPOSITION: Organic salt solution.

PROPERTIES: Brownish liquid with no distinct odor.

Action/Use

ACTION: Fungicide.

USE: Increases the resistance of the seedling to invasion by soil fungi and bacteria.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Soluble in water.

Safety Guidelines

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Standak* — see Aldoxycarb.

Stand-Up Plus* Fungicide (molybdenum + thiram) — Discontinued 1987 by Gustafson, Inc.

Stannoram*

(Discontinued by Celamerck)

Identification

COMMON NAME: Decafentín (ISO, BSI).

EXP. CODE NUMBER: CELA A 36 (Celamerck).

OTHER CODE NUMBER: CAS 15652-38-7.

Chemistry

COMPOSITION: Decyltriphenylphosphonium bromochlorotriphenylstannate(IV) (IUPAC).

Action/Use

ACTION: Fungicide, algicide, insect repellent.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 700-800 mg/kg.

Stanoicide*

Chemistry

COMPOSITION: Dialkyl dimethylammonium bromide.

Action/Use

ACTION: Fungicide.

Stantox* — see 2,4-D.

Stanza* — see Fenpropimorph; Prochloraz.

Sta-Put* — see Naico-Trol*.

Starane* — see Fluroxyppyr-meptyl.

Starfire* — see Paraquat.

Starlex* — see Voltage*.

Starlicide*

An avicide that has been used to control starlings in California.

Starycide* — see Alsystin*.

Stathion* — see Parathion.

Stay-On* Fungicide (sulfur) — Discontinued by Pesticide Service Consultants.

STCA — see Sodium TCA.

Steam Aerosol Fog

The steam aerosol generator is a modification of the smokescreen generator of World War II. Equal quantities of water and an oil solution of insecticide are pumped through coils of tubing in a combustion chamber. When the oil-water mixture passes through the chamber heated to 300° to 600°F, the water is converted to steam which exerts pressure. Upon issuing from a small orifice the steam breaks up the hot oil into the minute particles which compose the insecticide fog. See Thermal Aerosol Fog.

Stedfast* — see Fastac*.

STEL — see Short Term Exposure Level.

Steladone* — see Chlorfenvinphos.

Stepspense*

BP: Stepan Co.

Chemistry

COMPOSITION: Free flowing, dry powder or liquid blends of anionic and nonionic surfactants in conjunction with sodium lignosulfonate.

Action/Use

ACTION: Dispersibility and suspendibility in water dispersible granules/dry flowables, wettable powders.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Stepwet*

BP: Stephan Co.

Chemistry

COMPOSITION: Free flowing, dry powder or liquid blends of anionic and nonionic surfactants in conjunction with sodium lignosulfonate.

Action/Use

ACTION: Rapid granule wetting and breakup when added to a pesticidal carrier.

Stereoisomer — see Isomer.**Sterilant**

Any chemical or other agent that destroys all living organisms in a substrate (e.g., soil). Often used to denote a herbicide that destroys all plant life. However, true sterilization is a much more drastic treatment.

Steriweed* Herbicide (bromacil + dalapon + sodium 2,4-D) — Discontinued by ICI, Australia.**Sterol Inhibitors**

Also known as demethylation inhibitors, these fungicides inhibit the synthesis of ergosterol, which is important for membrane structure and function in a fungus. Examples of sterol inhibitors include fenarimol (Rubigan*), triademefon (Bayleton*), propiconazole (Tilt*), and myclobutanil (Nova*).

Stexal* — see Fluroxypyr meptyl; Ioxynil.**Sticker**

A material that increases the retention of sprays or dust deposits on plants by resisting the various factors involved in weather. Included are proteinaceous materials (milk products, wheat flour, blood albumin, gelatin), oils, gums, resins, and fine clays. A sticker may produce an elastic film on leaves which, when added to a mixture, degrades in a layering fashion through polymerization, producing a controlled release of the pesticide which is held suspended within the film. Such an elastic sticker, in the sense of extending the pesticide effect, is called an extender or film extender. Many also possess wetting and spreading characteristics. Some consist of the salts or sulfates of sulfated alcohols, esters of fatty acid, alkyl sulfonates and petroleum sulfonates. The AAPCO has adopted this definition:

"A substance which increases the firmness of attachment of finely-divided solids or other water-soluble materials to a solid surface, and may be measured in terms of resistance to time, wind, water, mechanical, and chemical action."

See Adhesive, Spreaders.

Sticky Trapping Materials

BP: The Tanglefoot Co. (Tangle-Trap* Insect Trap Coating).

Chemistry

COMPOSITION: Adhesive coating for sticky traps is a mixture of several grades of polybutenes and stabilizers.

PROPERTIES: Clear, odorless, viscous gel. Adheres to virtually any trap surface. Formulated to endure repeated wetting and drying cycles and exposure to sunlight. Will not interfere with color or scented attractants.

Action/Use

USE: Adhesive coating for sticky insect traps used in population detection and monitoring. Effective in trapping small flying insects such as whiteflies, fungus gnats, leafminer flies, thrips and apple maggot fly.

FORMULATIONS: Paste, brushable, and aerosol formulations.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Non-Toxic.

HANDLING AND STORAGE CAUTIONS: Keep out of the reach of children and pets.

Emergency Guidelines

EMERGENCY TELEPHONE: 616-459-4139 (Tanglefoot Co.).

Sticky Trapping Systems

BP: The Tanglefoot Co. (Tangle-trap*)

Chemistry

COMPOSITION: Mixture of several grades of polybutenes and stabilizers on yellow plastic cards, cylindrical traps or red sphere traps.

PROPERTIES: Clear, odorless, bright viscous gel.

Action/Use

ACTION: Adhesive insect traps.

USE: Monitoring and trapping insect populations - whiteflies, aphids, carrot rust flies, fungus gnats, leafminer flies, thrips, apple maggot fly.

FORMULATIONS: Plastic cards, plastic cylindrical traps, and sphere traps.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Non-Toxic.

HANDLING AND STORAGE CAUTIONS: Keep out of the reach of children and pets.

Emergency Guidelines

EMERGENCY TELEPHONE: 616-459-4139 (Tanglefoot Co.).

Stik*

BP: Custom Chemicides

Chemistry

COMPOSITION: Alkylaryl polyoxyethylene glycols esters, fatty acids, bis (2-ethylhexyl) benzene dicarboxylate, isopropanol.

Action/Use

ACTION: Spreader, sticker.

USE: For better weatherability of spray deposits.

Safety Guidelines

SIGNAL WORD: CAUTION.

Stik* Plant Growth Regulator (1-Naphthaleneacetic Acid) —

Discontinued by FMC Corp.

Stimukil* — see Methomyl, Muscalure.**Stimulate***

(Discontinued 1992 by Pesticide Service Consultants)

Chemistry

COMPOSITION: Essential plant amino acids (10%), wetting agents and stabilizers (90%).

Action/Use

ACTION: Plant enzymatic activator solution; plant biostimulant and bioregulator.

Stinger*

BP: DowElanco (Lontrel*, Reclaim*, Stinger*, Transline*)

Identification

COMMON NAME: Clopyralid (ISO draft, ANSI, BSI).

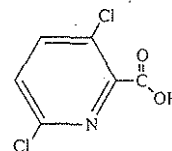
CODE NUMBERS: CAS 1702-17-6; SHA 117403.

DISCONTINUED NAME: Dowco 290* (Dow).

Chemistry

COMPOSITION: 3,6-dichloropicolinic acid (IUPAC); 3,6-dichloro-2-pyridinecarboxylic acid (CAS).

PROPERTIES: Colorless crystals. Melting point 151-152°C. Solubility (20°C) in acetone 153 g/kg; cyclohexanone 387 g/kg; xylene 6.5 g/kg.



3,6-Dichloropicolinic Acid

Action/Use

ACTION: Herbicide.

USE: For polygonaceae, compositae, and leguminosae. Selective postemergence for broadleaf weeds in sugar beets, wheat, barley, oats (not underseeded with legumes), fallow cropland, rangeland, permanent grass pastures, noncropland areas, Conservation Reserve Program (CRP), Christmas trees, plantations, grasses grown for feed.

COMBINATIONS: Broadstrike* Plus (+ flumetsulam), Confront* (+ triclopyr), Curtail*, Lontrel* 205 (+ 2,4-D), Curtail* M (+ MCPA) (DowElanco); Benazalox* (+ benazolin) (Hoechst Schering AgrEvo GmbH).

Registration Notes

U.S.: For small grains in range, pasture, turf, noncropland.

Environmental Guidelines

SOLUBILITY: (20°C): In water 1.0 g/kg.

SOIL PARTICLE ADSORPTION: Clopyralid has seeping or leaching capabilities.

Safety Guidelines

SIGNAL WORD: DANGER (eye); CAUTION (Stinger*).

TOXICITY CLASS: I, III (Stinger*).

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg. Causes eye damage, skin irritation.

PROTECTIVE CLOTHING: Safety glasses.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes, skin or clothes. Avoid breathing spray mists. Wash thoroughly after use. Do not contaminate water, food, or feed by use, storage or disposal of this product. Do not cut or weld container. Do not store or use near heat or open flame.

Emergency Guidelines

FLASHPOINT: Combustible.

FIRST AID: Get medical aid as necessary. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. **Inhalation**, remove to fresh air. **Ingestion**, induce vomiting.**Stinger* 40EC** — see Dimethoate.**Stipend* Insecticide (chlorpyrifos)** — Discontinued by Dow Chemical Co.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Stirofos — see Tetrachlorvinphos.

Stirofos* Insecticide (tetrachlorvinphos) — Discontinued by Fermenta Animal Health Co.

Stirrup*-M

BP: Fermone Corp./Troy Biosciences, Inc.

Action/Use

ACTION: Behavior modifying biochemical.

USE: Applied as a tank mix with any conventional application equipment, with any registered miticide. Causes increased movement of insect resulting in more frequent and prolonged contact with treated foliage.

FORMULATIONS: Controlled release, aqueous flowable.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Oral LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses, chemical resistant gloves. Respiratory protection in confined, poorly ventilated areas.

Emergency Guidelines

FLASHPOINT: >210°F (TCC).

FIRST AID: Get medical aid. **Eyes,** immediately flush with large quantities of water for at least 15 minutes. **Skin,** wash with large amounts of soap and water. **Inhalation,** remove to fresh air. **Ingestion,** NOT induce vomiting. Give water or milk.

Stockade* — see Cypermethrin.

Stocktrine* II

BP: Applied Biochemists, Inc.

Identification

COMMON NAME: Chelated copper.

Chemistry

COMPOSITION: Mixed copper-ethanolamine complex; chelated copper.

FAMILY: Copper & nitrogen compounds.

PROPERTIES: Dark blue liquid. Specific gravity 1.024 pH 10.0.

Action/Use

ACTION: Algicide, photosynthetic inhibitor.

USE: For control of algae in stock watering tanks, troughs and ponds. Does not necessitate interruption of stock watering.

Environmental Guidelines

SOLUBILITY: Complete solubility in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 0.5 - 2.0 ml/kg.

PROTECTIVE CLOTHING: Rubber gloves and protective eyewear when handling concentrate.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. May cause skin damage. Do not get on skin, eyes or clothing. Avoid contamination with acids.

Emergency Guidelines

FIRST AID: Get medical aid as necessary. **Eyes, Skin,** flush with plenty of water.

EMERGENCY TELEPHONE: 800-558-5106 (Applied Biochemists).

Stoddard Solvent

Identification

CODE NUMBERS: CAS 8052-41-3; SHA 063504.

Chemistry

COMPOSITION: Petroleum distillate between gasoline and kerosene, known also as mineral spirits.

PROPERTIES: In the ACGIH Documentation, Stoddard Solvent is described as being a petroleum fraction with a boiling range 150-200°C, which contains about 15% aromatics. (ACGIH = American Conference of Government Industrial Hygienists).

Action/Use

ACTION: Commonly used as a cleaning solvent; sometimes as a herbicide.

Safety Guidelines

TOXICITY: TLV 200 ppm for 1150 mg/cu meter vapor concentration (ACGIH).

Emergency Guidelines

FLASHPOINT: 102-110°F.

See Mineral Spirits.

Stomach Poison

A pesticide that must be eaten by an insect or other animal to kill or control the animal.

Stomp* — see Prowl*.

Stop Scald* Preservative (ethoxyquin) — Discontinued by Monsanto Agricultural Co.

Stopspot* Fungicide (phenylmercury chloride) — Discontinued by ICI Australia Ltd.

Stop-Sprout* — see 1-Naphthaleneacetic Acid.

Storgard*

BP: Trece, Inc. (Storgard*)

Action/Use

ACTION: Insect attractants and monitoring systems.

USE: For monitoring, detecting and surveying insects in stored products. **FORMULATIONS:** Polymeric dispensers with pheromone or food attractants in traps of various designs.

Registration Notes

U.S.: No registrations required; no restrictions.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

Storite* — see Thiabendazole.

Storm* Herbicide — see Bentazone, Blazer*.

Storm* Rodenticide

BP: American Cyanamid Co. (Storm*, Stratagem*)

Identification

COMMON NAMES: Flocoumafen (ISO-E draft, BSI); flocoumafene (ISO-F).

EXP. CODE NUMBER: WL 108366.

OTHER CODE NUMBERS: CAS 90035-08-8; OMS 3047 (WHO).

Chemistry

COMPOSITION: 4-hydroxy-3-[1,2,3,4-tetrahydro-3-[4-(4-trifluoromethylbenzyloxy) phenyl]-1-naphthyl]coumarin (mixture of cis- and trans- isomers).

PROPERTIES: Pure a.i.: Off-white powder. Vapor pressure 133/ (25°C). Soluble in acetone, alcohols, chloroform, dichloromethane.

Action/Use

ACTION: Anticoagulant rodenticide.

USE: Controls wide range of rodent pests including principal commensal species. Effective against rodent pests which are resistant to other anticoagulants. Potency is such that rodent can absorb a lethal dose from ingestion of a single feed of bait containing 0.005% flocoumafen. Also shows high activity against other species of rat (*Bandicota bengalensis*, *R. argiventer*, *R. rattus diardii*, *R. losea*, *R. tiomanicus*, *Pracomys natalensis*, *Arvicanthus niloticus* and *Sigmodon hispidus*). Used for rodent control in urban, industrial and agricultural sectors in addition to use around buildings and in field and plantation crops including cocoa, cotton, oilpalm, rice, sugarcane and cereals.

FORMULATIONS: Ready-to-use cereal based weatherproof block baits and pelleted baits containing 0.005% flocoumafen.

Registration Notes

OUTSIDE U.S.: Storm*, Stratagem*.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: I (a.i.).

TOXICITY: A.I.: (Rat): Oral LD₅₀ 0.25 mg/kg. Dermal LD₅₀ >3 mg/kg. (0.005% Bait): Nonhazardous by all modes of transport.

HANDLING AND STORAGE CAUTIONS: Store in original container. Keep away from children, domestic animals, food, animal feed and wildlife. Wash hands after handling. Avoid all contact by mouth. Do not contaminate food or water supplies. After use, remove and bury or burn all rodent bodies and remains of uneaten bait. Stable under normal storage conditions.

Emergency Guidelines

ANTIDOTE: Vitamin K₁.

Stratagem* — see Storm* Rodenticide.

Stratos* L — see Focus*; Stratos* Ultra — see Focus*.

Strel* — see Propanil.

Streptomycin (sulfate or nitrate)

BP: Aries Agro-Vet Industries Pvt., Ltd. (Plantomycin*)

Merck Ag Vet (Agri-Mycin* 17)

Paushak Ltd. (Paushamycin*)

Identification

COMMON NAMES: Streptomycin (ISO-E, BSI, JMAF, BAN); streptomycine (ISO-F).

CODE NUMBERS: CAS 57-92-1; CAS 3810-74-0 (streptomycin sesquisulfate; SHA 006310).

DISCONTINUED NAME: Seed Shield* Potato Seed Treater with Captan/Streptomycin (+ captan) (Cornbelt Chemical); Bean Seed Protectant* (+ captan + diazinon) (Hopkins Agricultural Chemical Co.); Agri-Strep* (MSD Agvet).

Chemistry

COMPOSITION: Usually streptomycin sesquisulfate.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

PROPERTIES: Off-white powder.

Action/Use

ACTION: Bactericide (antibiotic).

USE: For control of a number of commercially important bacterial plant pathogens including fireblight of pear and apple, walnut blight, tomato canker, bacterial canker, angular leaf blight of cotton, crown gall, olive knot, bacterial rot of begonia, bacterial spot of stone fruit, and bacterial leaf spot of mung and guar. Gram-positive species of bacteria have been found much more susceptible than gram-negative. Do not use with emulsifiable products, alkaline materials, PennCap-M[®].

FORMULATIONS: Water soluble powder.

COMBINATIONS: Streptomycin-oxytetracycline mixture, streptomycin-tetracycline hydrochloride mixture. AGSCO Dustret A[®] (+ maneb) (AGSCO, Inc.); Captan-Streptomycin 7.5-0.1 Potato Seed Piece Protectant[®] (+ captan) (Platte Chemical).

Registration Notes

OUTSIDE U.S.: Agri-Mycin[®] 17.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Oral LD₅₀ 9000 mg/kg. May cause allergic skin reaction.

PROTECTIVE CLOTHING: Dust mask and rubber gloves.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion,** induce vomiting.

ANTIDOTE: Activated charcoal.

Stressguard[®]

BP: CCT Corp. (Stressguard[®])

Chemistry

COMPOSITION: Acrylic polymers.

PROPERTIES: Milky fluid, faint ester odor, boiling point 100°C (212°F), dilutable, specific gravity 1.03.

Action/Use

ACTION: Antitranspirant.

USE: Polymer product designed to coat leaves and provide protection from frost, heat, winds, transplant shock. Also reduces water usage.

FORMULATIONS: Liquid concentrate aqueous suspension.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Nontoxic.

PROTECTIVE CLOTHING: Impermeable gloves and clothing, eye protection.

HANDLING AND STORAGE CAUTIONS: Keep product tightly closed in original container when not in use. Not adversely affected by low temperatures. Do not wear saturated clothing or shoes.

SPILL CONTROL/CLEANUP: Flush into suitable retaining area or container with large quantities of water. Small amounts may be absorbed into an appropriate absorbent. Prevent spill from entering sewers, storm drains or other unauthorized treatment/drainage systems and waterways.

PRODUCT/WASTE DISPOSAL: In accordance with local, state, and federal regulations.

Emergency Guidelines

FLASHPOINT: None wet.

FIRE EXTINGUISHING MEDIA: N/A if wet. For dried solids, use water, foam, CO₂ or dry chemical.

FIRST AID: **Eyes,** flush with mild soap and water. See a physician if irritation persists. **Skin,** wash with water. **Ingestion,** seek medical attention.

EMERGENCY TELEPHONE: 619-929-9228 (CCT Corp.).

Strip-It[®] Adjuvant — Discontinued 1984 by American Colloid Co.

Strobane[®]

(Discontinued 1982 by Tenneco Chemical Inc.)

Identification

COMMON NAME: Terpene polychlorinates.

CODE NUMBERS: CAS 8001-50-1; SHA 020401.

Chemistry

COMPOSITION: Polychlorinates of camphene, pinene and related terpenes.

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 220 mg/kg.

Strobane T-90[®] Insecticide (toxaphene) — Discontinued 1989 by Agro-Quimicas de Guatemala.

Strong[®] — see Isoproturon.

Structural Formula — see Formula (Chemical).

Structural Pests

Pests which attack and destroy buildings and other structures, clothing, stored food, and manufactured and processed goods. Examples: termites, cockroaches, clothes moths, rats, dry-rot fungi.

Strychnine**Identification**

COMMON NAME: Strychnine (ISO, BSI).

TRIVIAL NAME: Nux Vomica.

CODE NUMBERS: CAS 57-24-9; SHA 076901.

Chemistry

PROPERTIES: An alkaloid extracted from the seeds of *Strychnos nuxvomica*. Strychnine is a white crystalline powder, melting at 270-280°C, and is practically insoluble in cold ethanol and ether; slightly soluble in chloroform and benzene. Strychnine sulfate is a white powder melting above 199°C, and is moderately soluble in alcohol; insoluble in ether.

Action/Use

ACTION: Vertebrate poison.

USE: Used chiefly in poison baits set for squirrels, gophers, rabbits, and some lesser rodents. Baits are usually colored grains containing 0.5 to 1% of the sulfate.

Environmental Guidelines

SOLUBILITY: Strychnine is practically insoluble in water. Strychnine sulfate is moderately soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Intensely poisonous; lethal dose to man, 30-60 mg/kg.

STS[®] Soybean Varieties

These soybean varieties, developed by Asgrow, Dairyland, and Stine Seed seed companies in cooperation with Du Pont Agricultural Products, are marketed as part of the Synchrony[®] STS[®] soybean seed/herbicide system. The varieties contain a proprietary trait that enhances the soybean's natural tolerance to Du Pont soybean sulfonylurea herbicides. See Synchrony[®] STS[®].

Stunt-Man[®] — see Maleic Hydrazide.

Styrene Dibromide

(Discontinued 1968 by Mallinckrodt, Inc.)

Identification

CHEMICAL NAME: 1,2-dibromoethyl benzene.

DISCONTINUED NAMES: Dowspray 9[®] (Dow Chemical).

Action/Use

ACTION: Insecticide.

USE: Formerly applied to silks of sweet corn to control earworms.

Su Seguro Carpidor[®] Herbicide (trifluralin) — Discontinued.

Subdue[®] 2E — see Metalaxyl.

Subitex[®] Herbicide/Desiccant (dinoseb) — Discontinued 1987 by Hoechst AG.

Submerge[®]

BP: Exacto Chemical Co. (Submerge[®])

Chemistry

COMPOSITION: Polyacrylamide.

Action/Use

ACTION: Drift control agent, polymer carrier.

USE: For terrestrial applied pesticides. May be applied by boat, aircraft or land applicator.

FORMULATIONS: Concentrated liquid.

See Drift Control Agents.

Submersed Plant

An aquatic plant adapted to grow with all or most of its vegetative tissue below the water surface.

Suchlor[®] — see DDVP.

Sucker Agent 504[®] — see n-Decanol.

Sucker Atak[®] Plant Growth Regulator (maleic hydrazide) — Discontinued by Drexel Chemical Co.

Sucker Plucker[®]

BP: Drexel Chemical Co.

Chemistry

COMPOSITION: C₆ — 0.42%; C₈ — 38.68%; C₁₀ — 45.90%.

PROPERTIES: Density, g/ml at 20°C 0.855.

Action/Use

ACTION: Contact-type tobacco sucker control.

FORMULATIONS: Emulsifiable concentrate.

Safety Guidelines

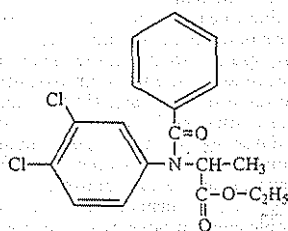
SIGNAL WORD: WARNING.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

TOXICITY CLASS: II.
TOXICITY: Slightly toxic and mild skin and eye irritant.
PROTECTIVE CLOTHING: Glasses.
HANDLING AND STORAGE CAUTIONS: Harmful if swallowed, avoid breathing of spray mist. May cause irritation of nose, throat and skin. Causes substantial but temporary eye injury. Do not get in eyes or on skin and clothing. Wash thoroughly with soap and water after handling. Do not contaminate water, food or feed by storage or disposal. Store under lock and key in a ventilated room and secure from access by unauthorized persons and children. Keep in cool, dry area away from any heat or ignition source.

Emergency Guidelines
FLASHPOINT: (Open cup), 184°F.
FIRST AID: Get medical aid. **Ingestion,** if conscious, drink 1-2 glasses of water and induce vomiting by touching back of throat with finger.
Sucker Stuff* — see Maleic Hydrazide; Potassium Salt of Maleic Hydrazide.
Suffa* — see Sulfur.
Suffix*

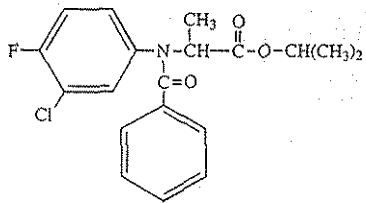
(Discontinued by Shell International Chemical Co. Ltd.)
Identification
COMMON NAME: Benzoylprop-ethyl (ISO, BSI, JMAP).
EXP. CODE NUMBERS: SD 30053, WL 17731.
OTHER CODE NUMBER: CAS (benzoylprop-ethyl) 22212-55-1.
Chemistry
COMPOSITION: Ethyl N-benzoyl-N-(3,4-dichlorophenyl)-DL-alaninate.



Benzoylprop-Ethyl

Action/Use
ACTION: Selective postemergence herbicide for control of Avena spp. (wild oat).
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: Tech (Rat): Oral LD₅₀ 1000 mg/kg. Dermal >1555 mg/kg.
Emergency Guidelines
ANTIDOTE: Activated charcoal with milk or water.
Suffix BW*

BP: American Cyanamid Co. (Suffix BW*)
Identification
COMMON NAME: Flamprop-M-isopropyl (BSI).
EXP. CODE NUMBER: WL 43425.
OTHER CODE NUMBER: CAS 63782-90-1 (flamprop-M-isopropyl).
ADDITIONAL TRADE NAMES: Commando*, Barnon Plus*, Effix*, Super Suffix*.
Chemistry
COMPOSITION: Isopropyl N-benzoyl-N-(3-chloro-4-fluorophenyl)-D-alaninate (IUPAC).
PROPERTIES: White to tan crystalline solid, melting point 70-71°C. Solubility >400 g/l in acetone



Flamprop-M-Isopropyl

Action/Use
ACTION: Selective postemergent grass herbicide.
USE: Postemergent control of wild oats and suppression of other grasses in wheat and barley.
FORMULATIONS: Emulsifiable concentrate.

Registration Notes
 U.S.: Not registered.
Environmental Guidelines
HAZARDS: Fish: LC₅₀ 3 mg/l (96 h) (rainbow trout). Bee: Nontoxic. Bird: Oral >2500 mg/kg (hen).
SOLUBILITY: (20°C) 10 ppm in water.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ >4000 mg/kg.
PROTECTIVE CLOTHING: Overalls, neoprene or PVC gloves.
HANDLING AND STORAGE CAUTIONS: Store in dry, well-ventilated, secure area out of reach of children and animals.

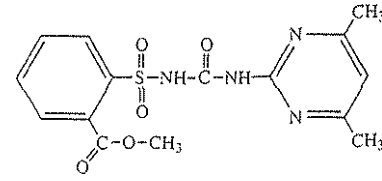
Emergency Guidelines
FIRST AID: No case of human intoxication recorded, treat symptomatically.
Sufos* — see Monocrotophos.
Sulban* — see Chlorpyrifos.
Sulbenz* — see Lindane.
Sulfocarbamide — see Enquik*
Sul-Cide* Fungicide (sulfur) — Discontinued by Chemical Resources.
Sulerex* — see Metoxuron.
Sulfa-Q-20* — see Anti-K*.
Sulfac DG*
 F: Cornbelt Chemical Co.

Chemistry
COMPOSITION: Sodium bisulfate + inert ingredients.
Action/Use
ACTION: Adjuvant, pH buffer.
USE: For spray solutions, with glyphosate products, and wherever alkaline sensitive chemicals may be used.
FORMULATIONS: Water dispersible granules.

Safety Guidelines
SIGNAL WORD: CAUTION.
HANDLING AND STORAGE CAUTIONS: Avoid eye, skin contact. Wash thoroughly after handling. Keep dry, and do not store near strong alkalis.
Sulfacop* — see Copper Sulfate.
Sulfallate — see Vegadex*.
Sulfamate — see Ammate*.
Sulfanex* — see Endosulfan.
Sulfapron* L — see Sulfur.
Sulfaquinoxiline — see Anti-K*.
Sulfaril* — see Carbaryl.
Sulfasan* — see Herbisan* #5.
Sulfenimides — see Dicarboximides.
Sulfex* — see Sulfur.
Sulflox* — see Sulfur.
Sulfocarb — see Aldoxycarb.

Sulfogen*
Identification
OTHER NAME: Diametan (Germany).
Chemistry
COMPOSITION: Sulfur, iron oxide.
Action/Use
ACTION: Fumigant.
USE: When burned, generates sulfur dioxide.
Sulfoluc* — see Sulfur.
Sulfoma* — see Bordeaux Mixture; Maneb.
Sulfometuron-Methyl
 BP: Du Pont Agricultural Products (Oust*)

Identification
COMMON NAME: Sulfometuron-methyl (ISO, ANSI, BSI, WSSA).
CODE NUMBERS: CAS 74222-97-2; SHA 122001.
DISCONTINUED NAME: DPX-T5648.



Sulfometuron-Methyl

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: Methyl 2[[[(4,6-dimethyl-2-pyrimidinyl)amino]carbonylamino]sulfonyl]benzoate.

PROPERTIES: Odorless, white solid, melting point 203-205°C. Slightly soluble in ether and xylene but highly soluble in acetone and acetonitrile.

Action/Use

ACTION: Herbicide.

USE: Controls many annual, biennial and perennial grasses and annual broadleaf weeds growing in noncropland, reforestation areas including certain conifers and hardwoods. Gives contact and residual control. Oust* is used alone and in combination with other residuals for nonselective use. Also recommended for selective weed control in bermudagrass, bahiagrass, crested wheatgrass and smooth brome on noncrop sites. Oust* is effective for control of johnsongrass.

FORMULATIONS: Water dispersible granule.

Environmental Guidelines

SOLUBILITY: In water approx. 10 ppm at pH 5.5 to 70 at pH 7 (25°C).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg.

Emergency Guidelines

EMERGENCY TELEPHONE: 1-800-441-3637 (Du Pont).

Sulfonated Castor Oil — see Turkey Red Oil.

Sulfonated Lignins — see Lignosulfonates.

Sulfonylurea Herbicides

These herbicides inhibit amino acid synthesis in plants, specifically in the shoots and roots. They are applied at very low rates, often less than 0.25 ounce a.i. per acre. Because they act on a single weed enzyme that isn't present in mammals, they have very low mammalian toxicity. Examples of sulfonylurea herbicides include bensulfuron-methyl (Londax*), chlorimuron-ethyl (Classic*), chlorsulfuron (Glean* and Telar*), metsulfuron-methyl (Ally* and Escort*), nicosulfuron (Accent*), primisulfuron-methyl (Beacon*), sulfometuron-methyl (Oust*), tribenuron-methyl (Express*), thifensulfuron-methyl (Pinnacle*), and triasulfuron (Amber*).

Sulfoquinoxaline — see Anti-K*.

Sulforix* — see Lime Sulfur.

Sulfosate — see Touchdown*.

Sulfotep — see Bladafum*.

Sulfox-Cide* Synergist (sulfoxide) — Discontinued by Penick Corp.

Sulfoxide**Identification**

COMMON NAME: Sulfoxide (ESA).

CODE NUMBER: CAS 120-82-7.

DISCONTINUED NAMES: Sulfox-Cide*, Sulfoxyl* (Penick Corp.).

Chemistry

COMPOSITION: 1,2-Methylenedioxy-4-[2-(octylsufinyl)propyl]benzene; also known as the n-octyl sulfoxide of isosafrole.

Action/Use

ACTION: Synergist.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2000-2500 mg/kg.

Sulfoxyl* Synergist (sulfoxide) — Discontinued by Penick Corp.

Sulfur

- BP: All India Medical Corp. (Sulphotox*)
 BASF AG (Kumulus* DF)
 Chemol Trading Ltd. Co.
 Ciech-Agrochemia (Pol-Sulkol*)
 Cuproquim Corp. (Super-Sul* WDG)
 Drexel Chemical Co. (Drexel* Sulfur, Suffa*)
 ELF Atochem Agri S.A. (Microthiol Special*, Microthiol Special Liquide*)
 Excel Industries Ltd. (Sulfex*)
 Fertilizer Corp. of America
 HELM AG
 International Sulphur, Inc. (Red Ball*)
 JULIA Mineral Veredlung GmbH (Sulfoluc*)
 Probelte, S.A. (Sulfapron* L)
 Sandoz Agro, Inc. (Thiolux*)
 Sandoz Ltd. (Thiolux*, Thiovit*)
 Stoller, Inc. (This*, That*)
 Sulphur Mills Ltd. (Cosavet* DF, 5-Roses*, Wettasul* 80)
 Uniroyal Chemical Co., Inc. (Uniflow*)
 Wilbur-Ellis (Dusting Sulfur, Golden Dew*, SO₂ Generator

Fuel, Sulfur DF, Wettable Sulfur 92)

ZENECA Ag Products (Alfa*, Signal*, Special Electric*
 Dusting Sulfur).

Identification

COMMON NAMES: Brimstone. Flowers of sulfur (originally the normal form of sulfur for dusting) is the term for sulfur particles resulting from sublimation (rapid cooling of sulfur fumes generated by heating crude sulfur). Sulfur flour (former term for ground sulfur).

EXP. CODE NUMBER: CA 38082090 (Ciech-Agrochemia).

CODE NUMBERS: CAS 7704-34-9; SHA 077501; EINECS 231-722-6.

ADDITIONAL TRADE NAMES: Acizal* 60F (Agro Chemicals Industries Ltd.); Crisazufre* and Sulfox* (Crystal Chemical Inter-America); Devisulfur* (Devidayal (Sales) Pvt. Ltd.); Tiolene* (Diachem S.P.A.); Cosan*, Elosal* (Hoechst AG).

DISCONTINUED NAMES: Tricarbasul* (+ manganese + zinc) (Atochem Agri BV); Pallitop* S (+ nitrothal-isopropyl) (BASF AG); Sul-Cide* (Chemical Resources); Best* (Chippenham); Wettable Sulfur*, Sulfur 6 F*, (Cuproquim Corp.); Bolda* (+ carbendazim + maneb) (Farm Protection Ltd.); Serinal* Z (+ chlozolinate) (ISAGRO); Magnet* 6 (Stauffer Chemical Co.); Capthion* (+ captan + malathion) (ICI, Australia); Lacco Magic Sulphur*, Lacco Soil Sulfur* #1, Lacco Wettable Sulfur* (Los Angeles Chemical Co.); Sperlox* (+ zineb) (Olin Corp.); Stay-On* (Pesticide Service Consultants).

Chemistry

PROPERTIES: Yellow solid. Melting point 112.8-119.8°C. Soluble in organic solvents. Compatible with most other insecticides and fungicides.

Action/Use

ACTION: Fungicide, acaricide.

USE: Sulfur is liable to cause plant injury at summer temperatures. Effective for control of a variety of plant diseases: brown rot, powdery mildew of peaches, apple scab, peanut leafspot, mildew on roses, powdery mildew on ornamentals, apples, grapes, other crops; rusts, fleahoppers, mites on tomatoes, carrots, alfalfa, melons, beans, almonds, apricots, artichokes, bananas, barley, beets, cabbage, cauliflower, citrus, corn, cotton, dates, eggplant, mangoes, mustard greens, oats, onions, peppers, plums, potatoes, prunes, strawberries, sugar beets, wheat, livestock and agricultural premises.

FORMULATIONS: Various forms of elemental sulfur, water dispersible granules, soluble concentrates, wettable powder.

Finely ground sulfur for dusting is made free-flowing by the addition of 1-5% clay, talc, gypsum, tricalcium phosphate, or similar material. May be made especially fine by micronizing. Sulfur grinding involves a high degree of explosive hazard.

Colloidal sulfurs, smaller particles than those produced by ordinary grinding processes, may be produced in several ways, generally by acidifying lime-sulfur solution or similar reaction.

Flowable sulfur is microfine sulfur formulation in aqueous suspension form. Particle diameter size average not >5 microns via coulter counter measurement. Strong adhesive properties act as a sticker and deposit builder for other spray materials.

Micronized wettable sulfur is specially made into a carefully balanced extremely fine particle size.

Wettable sulfur is prepared by adding wetting and dispersing agents to finely ground sulfur, since sulfur itself cannot be suspended in water.

COMBINATIONS: Ronilan* SP (+ vinclozolin), Magnetic 70* (urea), Kumulan* (+ nitrothal-isopropyl) (BASF), Ben-Sul (+ bentonite), BT 320 Sulfur 25 Dust (+ *Bacillus thuringiensis*), BT 320 Sulfur 50 Dust (+ *Bacillus thuringiensis* + bentonite), Golden Nutrient* (+ zinc sulfate) (Wilbur-Ellis Co.); Jaguar* (+ hexaconazole) (ZENECA Agrochemicals).

Registration Notes

OUTSIDE U.S.: Crisazufre*, Sulfox* (Crystal); Clifton* Sulphur (Clifton).

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

DEGRADATION AND METABOLISM: Natural substance.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Relatively nontoxic. May slightly irritate skin. Kumulus*

FL (Rat): Oral LD₅₀ >5000 mg/kg; Dermal LD₅₀ >5000 mg/kg.

PROTECTIVE CLOTHING: Do not enter treated areas for 24 hours without appropriate protective clothing. Store away from sparks, fire, flame. Isolate from oxidizing materials.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of in accordance with local regulations.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

Emergency Guidelines

ANTIDOTE: Unknown.
 FIRST AID: **Eyes**, flush with plenty of water. **Skin**, wash with plenty of soap and water. **Kumulus***: Ingestion, do NOT induce vomiting unless advised by a physician. Treat symptomatically.
 EMERGENCY TELEPHONE: 800-832-4357 (BASF). 800-424-9300 (CHEMTREC).

Sulfur 6 F* Fungicide (sulfur) — Discontinued 1994 by Cuproquim Corp.

Sulfur DF — see Sulfur.

Sulfur Dioxide

Identification

CODE NUMBERS: CAS 7446-09-5; SHA 077601.
 ADDITIONAL TRADE NAME: SO₂ Pad.
 DISCONTINUED NAME: SO₂ Generator Grape Preserver (Bactec Corp.).

Action/Use

ACTION: Fumigant, grape preserver and fungicide.
 USE: Kills the pathogen on contact and sterilizes the surface of berries. Cannot be used as an eradicant. Used commercially in California as chamber and storage fumigator.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Food and feed should be removed. Protect and remove metal, electrical equipment, and fabric materials.

Sulfuric Acid

Discontinued 1992 by Georgia-Pacific Corp.)

Identification

CODE NUMBERS: CAS 7664-93-9; SHA 078001.

Action/Use

ACTION: Herbicide, dessicant.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: The acid, either concentrated or diluted, attacks skin and clothing; hence the need for great care in handling.

Sulfuryl Fluoride — see Vikane*.

Sulgen* — see Dodine.

Sulmation* — see Malathion.

Sulphenone*

Discontinued by Stauffer Chemical Co.)

Identification

CODE NUMBERS: CAS 80-00-2; SHA 060501.

EXP. CODE NUMBER: R-242.

Chemistry

COMPOSITION: p-Chlorophenyl phenyl sulfone (CAS 8CI).

Action/Use

ACTION: Acaricide.

Sulphotox* — see Sulfur.

Sulprofos — see Bolstar*.

Sultricob* — see Copper Sulfate, Basic.

Sultricop* Fungicide (copper sulfate, basic) — Discontinued by Ingenieria.

Sultropen

Discontinued 1970 by Stauffer Chemical Co.)

Identification

COMMON NAMES: Sultropen (ISO-E, BSI); sultropène (ISO-F).

EXP. CODE NUMBERS: RD-7901; BTS-7901.

OTHER CODE NUMBERS: CAS 963-22-4; SHA 392300.

Chemistry

COMPOSITION: 2,4-Dinitrophenyl pentyl sulfone (IUPAC).

Action/Use

ACTION: Herbicide.

Sultropène — see Sultropen.

SULV Amine — see 2,4-D.

Sumagic* — see Uniconazole.

Sumi-8 — see Diniconazole.

Sumi-alpha*

BP: Sumitomo Chemical Co., Ltd.

Identification

COMMON NAME: Esfenvalerate (ISO, BSI).

EXP. CODE NUMBERS: S-1844, S-5602Ac.

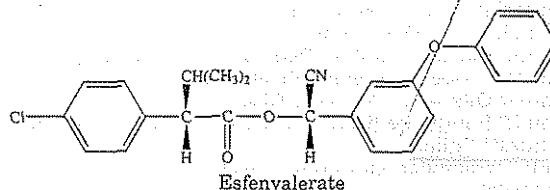
ADDITIONAL TRADE NAMES: Asana*, Hallmark*, Sumi-alfa*, Sumidan*.

Chemistry

COMPOSITION: (S)-α-Cyano-3-phenoxybenzyl (S)-2-(4-chlorophenyl)-3-methylbutyrate (IUPAC).

PROPERTIES: Molecular weight 419.9; Physical form at 23°C, viscous liquid or solid; Brown in color; Specific gravity at 26°C/4°C, 1.26;

Vapor pressure at 25°C, 5 × 10⁻⁷ mmHg. Soluble in acetone, chloroform, and xylene.



Action/Use

ACTION: Insecticide.

USE: Used on cotton, vegetables, fruits, cereals and wide range of other crops for control of Lepidoptera, Diptera, Orthoptera, Hemiptera and Coleoptera.

FORMULATIONS: Emulsifiable concentrate, flowable, ULV.

COMBINATIONS: Various combinations are under study.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

Safety Guidelines

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 325 mg/kg. Dermal LD₅₀ >5000 mg/kg.

PROTECTIVE CLOTHING: While handling, wear protective gloves and goggles or full face shield.

HANDLING AND STORAGE CAUTIONS: Avoid contact with mouth, eyes, and skin. Store in original containers away from foodstuffs and animal feed.

Sumiblend* — see Diethofencarb.

Sumicidin* — see Fenitrothion; Fenvalerate.

Sumico* — see Diethofencarb.

Sumicombi* — see Fenitrothion; Fenvalerate.

Sumidan* — see Sumi-alpha.

Sumidon* — see Phosphamidon.

Sumi-Eight* — see Diniconazole.

Sumifleece* — see Fenvalerate.

Sumifly* — see Fenvalerate.

Sumiherb*

BP: Sumitomo Chemical Co., Ltd.

Identification

COMMON NAME: Bromobutide (ISO draft, BSI).

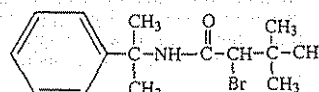
EXP. CODE NUMBERS: S-4347, S-47.

OTHER CODE NUMBER: CAS 74712-19-9.

Chemistry

COMPOSITION: 2-bromo-3,3-dimethyl-N-(1-methyl-1-phenylethyl)butyramide (IUPAC).

PROPERTIES: Tech, white-to-yellow crystalline solid. Melting point 180.1°C. Solubility variable in range of organic solvents.



Sumiherb*

Action/Use

ACTION: Herbicide.

USE: Used on rice in paddy field for control of weeds.

FORMULATIONS: As granules with other herbicides such as pyrazoxyfen or pyrazolate.

COMBINATIONS: Knock-wan* (bromobutide and pyrazoxyfen: 5% + 7%) Sario* (bromobutide and pyrazolate 5% + 7%). Having very broad spectrum to weeds and used on rice at early stage in paddy field.

Environmental Guidelines

HAZARDS: Fish: TLM 48, >10 ppm (carp).

SOLUBILITY: 3.54 ppm in water.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. Dermal LD₅₀ >5000 mg/kg.

PROTECTIVE CLOTHING: While handling, wear protective gloves and goggles or full face shield.

HANDLING AND STORAGE CAUTIONS: Avoid contact with mouth, eyes, and skin. Store in original containers away from foodstuffs and animal feed.

Sumilex* — see Procymidone.

Sumioxon*

Identification

COMMON NAME: Oxygen analog of Sumithion*.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Sumipower* — see Fenvalerate.
Sumisclax* — see Procymidone.
Sumithion* — see Fenitrothion.
Sumithrin* — See d-Phenothrin.
Sumitick* — see Fenvalerate.
Sumitol* (secbumeton) — Discontinued by Ciba-Geigy Ltd.
Sumitox* — see Fenvalerate; Malathion.
Summer Oils — see Petroleum Oils.
Summit* Fungicide (triadimenol) — Discontinued by Miles Inc.
Sunburst* Foliar

BP: Westbridge Agricultural Products

Chemistry

COMPOSITION: Humic acids, copper sulfate, ferrous sulfate, manganese sulfate, zinc sulfate, urea.

PROPERTIES: Brown liquid with pleasant smelling odor. Boiling point, 100°C. Specific gravity, 1.20.

Action/Use

ACTION: Specialty fertilizer.

Environmental Guidelines

SOLUBILITY: Approx. 98% in water.

Safety Guidelines

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber or neoprene gloves, coat, coveralls and apron.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRST AID: **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** drink large quantities of water or milk. Follow with milk of magnesia, beaten eggs or vegetable oil. Do NOT induce vomiting. Get medical aid.

Sunburst* Soil

BP: Westbridge Agricultural Products

Chemistry

COMPOSITION: Humic acids, copper sulfate, ferrous sulfate, manganese sulfate, zinc sulfate, urea.

PROPERTIES: Brown liquid with pleasant smelling odor. Boiling point, 100°C. Specific gravity, 1.18.

Action/Use

ACTION: Specialty fertilizer.

Environmental Guidelines

SOLUBILITY: Approx. 98% in water.

Safety Guidelines

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber or neoprene gloves, coat, coveralls and apron.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRST AID: **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** drink large quantities of water or milk. Follow with milk of magnesia, beaten eggs or vegetable oil. Do NOT induce vomiting. Get medical aid.

Suncide* — see Propoxur.

Suncrotophos* — see Monocrotophos.

Sundaphos* — see Methamidophos.

Sunfuran* — see Carbofuran.

Sunmerin* — see Cypermethrin.

Sunspray* — see Refined Petroleum Distillate.

Sunspray* Ultra-Fine Spray Oil — see Refined Petroleum Distillate.

Sunspray* Ultra-Fine Year-Round Pesticidal Oil — see Refined Petroleum Distillate.

Suntap* — see Cartap Hydrochloride.

Sunup* — see Glyphosate.

Sunvale* EC — see Fenvalerate.

Super Arsonate* — see MSMA.

Super Blazer* Herbicide (fluoroglycofen-ethyl) — Discontinued.

Super Crab-E-Rad* Herbicide (amine methanearsonate) — Discontinued by Vineland Chemical.

Super Crab-E-Rad A.M.A.* Herbicide (ammonium methanearsonate) — Discontinued by Vineland Chemical.

Super Crab-E-Rad-Calar* Herbicide (calcium acid methanearsonate) — Discontinued by Vineland Chemical.

Super Cu* — see Copper Sulfate, Basic.

Super D Weedone* Herbicide (2,4-D + 2,4,5-T) — Discontinued by Crystal Chemical.

Super Dal-E-Rad* Herbicide (amine methanearsonate) — Discontinued by Vineland Chemical.

Super Dal-E-Rad-Calar* Herbicide (calcium acid methanearsonate) — Discontinued by Vineland Chemical.

Super De-Sprout* — see Maleic Hydrazide.

Super Hex* — see Maleic Hydrazide.

Super Methar* (amine methanearsonates) — Discontinued by W.A. Cleary Chemical Corp.

Super Mixy* — see Zineb.

Super P* Plant Growth Regulator (maleic hydrazide) — Discontinued by Drexel Chemical Co.

Super Prodan* — see Prodan*.

Super Savol* Spreader/Penetrant — Discontinued 1993 by Uniroyal Chemical Co., Inc.

Super Sprout Stop* — see Maleic Hydrazide; Potassium Salt of Maleic Hydrazide; Maleic Hydrazide.

Super Sucker Stuff* — see Maleic Hydrazide; Potassium Salt of Maleic Hydrazide.

Super Suffix* — see Suffix BW*.

Super T* — see Trifluralin.

Super Tin* — see Triphenylin Hydroxide.

Super Trimec* — see 2,4-D; Dicamba; 2,4-DP; Trimec.

Super Vilex*

BP: Burlington Bio-Medical & Scientific Corp. (Super Vilex*)

Identification

COMMON NAME: Denatonium saccharide.

CODE NUMBERS: CAS 90823-38-4.

Chemistry

COMPOSITION: Benzyl-diethyl [(2,6-xylyl-carbamoyl)methyl] + ammonium saccharide.

PROPERTIES: White crystalline powder, molecular weight 507.626; melting point 176-182°C.

Action/Use

ACTION: Seed treatment preservative and denaturant.

USE: Protects seeds during storage and repels vertebrate pests.

Environmental Guidelines

SOLUBILITY: In water 3-7 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat) Oral LD₅₀ 1430 mg/kg.

PROTECTIVE CLOTHING: Wet filter mask, protective gloves and goggles. Local exhaust recommended.

HANDLING AND STORAGE CAUTIONS: Extremely bitter; avoid oral contact. Handle in fume hood or glove box to avoid taste. Avoid inhalation. Wash thoroughly after handling and launder clothing. Store in well sealed area.

SPILL CONTROL/CLEANUP: Flush spills with copious amounts of water. Wash area down thoroughly with water.

PRODUCT/WASTE DISPOSAL: Flush away with copious amounts of water.

Emergency Guidelines

FLASHPOINT: > 176-182°C.

FIRE EXTINGUISHING MEDIA: Water, foam, CO₂, or dry powder.

FIRST AID: **Eyes,** flush with water and obtain medical advice. **Skin,** flush with water and obtain medical advice. **Ingestion,** obtain medical advice.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Super Weedone* — see 2,4-D.

Super Wham* — see Propanil.

Super X Macclesfield* — see Bordeaux Mixture; Maneb; Zineb.

SuperCaid* — see Bromadiolone.

Superflor* — see Metaldehyde.

Superfoam* (foam marker) — Discontinued 1984 by Hopkins Agricultural Chemical Co.

Superior Oils

Developed at the New York Agricultural Experiment Station (Geneva) for summer orchard work. They have a high content of paraffinic hydrocarbons with relatively small amounts of aromatic and naphthenic constituents. They have high efficiency as insecticides and are less phytotoxic than aromatic or naphthenic oils.

See Petroleum Oils; Refined Petroleum Distillate.

Superior 70 Oil* — see Petroleum Oils.

Superman* — see Maneb.

Supernox* — see Propanil.

Superormone Concentre* Herbicide (2,4-D + MCPA) — Discontinued 1984 by Rhone-Poulenc.

Superselectyl* — see Dichlorprop; MCPA; MCPP.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

Super-Sul* Micronized Wettable Sulfur — see Sulfur.
Super-Sul* WDG — see Sulfur.
Superzol* — see Amitrole.
Supex* — see Glyphosate.
Supona* — see Chlorfenvinphos.
Sup'operats — see Bromadiolone.
Supracide* — see Methidathion.
Supracidin* — see Methidathion.
Supragil* — see Dispersants.
Suprathion* — see Methidathion.
Supreme Oil* — see Petroleum Oils.
Suprex* — see Kaolin.
Sup'r Flo* Diuron Herbicide — Discontinued by Rhone-Poulenc.
Sup'r Flo* Ferbam Fungicide — Discontinued by Rhone-Poulenc.
Suquin* — see Quinalphos.
Surcopur* — see Propanil.

Surecide*

(Discontinued 1984 by Sumitomo Chemical Co., Ltd.)

Identification

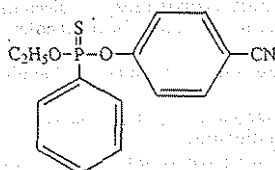
COMMON NAMES: Cyanofenphos (ISO-E, BSI); cyanophenphos (ISO-F); CYP (JMAF).

EXP. CODE NUMBER: S 4087.

OTHER CODE NUMBERS: CAS 13067-93-1; SHA 268200.

Chemistry

COMPOSITION: O-4-cyanophenyl O-ethyl phenylphosphonothioate (IUPAC).



Cyanofenphos

Action/Use

ACTION: Insecticide.

Environmental Guidelines

HAZARDS: Fish: TLM 48m, 1.35 ppm (carp).

Safety GuidelinesTOXICITY: (Mouse): Oral LD₅₀ 43.7 mg/kg. (Rat): 89 mg/kg. Dermal LD₅₀ >2000 mg/kg.**Sure-Fact***

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: 100% Alkyl Aryl Polyoxyethylene Ether and Esters.

Action/Use:

ACTION: Non-Ionic Surfactant.

USE: Designed for use as a spreader-activator in agricultural pesticide applications. Decreases the surface tension of spray droplets and allows for uniform distribution and coverage.

FORMULATION: Concentrated liquid.

Surefire*

BP: Concep, Inc.

Action/Use

ACTION: Controlled release dispensers containing synthetic sex pheromone and/or attractant with traps and Teflon* non-pesticide crawling insect barriers to monitor/trap/exclude specific pests.

USE: Product line available: Outdoor House Fly Trap, The Pantry Pest* Trap, Yellow Jacket Trap, Deluxe Yellow Jacket Trap, Jumbo Aphid/Whitefly Trap, Disposable Sticky Whitefly Trap, The Pit* Slug and Snail Trap, The Lady Bug Lure, Japanese Beetle Trap, Fruit Tree Pest Trap - Apple Maggot, Fruit Tree Pest Trap - Codling Moth, The Ultimate Roach Trap, The Fly Scoop* Indoor Fly Trap, The Blackhole* Rodent Trap, Gypsy Moth Trap, Smart Mouse Trap - Catch And Release, Pest Barrier Glue, Teflon* Crawling Insect Barrier Spray, Teflon* Crawling Insect Barrier Tape, Teflon* Gypsy Moth Tape.

Registration Notes

No EPA restrictions on use.

Safety Guidelines

TOXICITY: Nontoxic.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place.

Surf-Ac* 820

F: Drexel Chemical Co.

Chemistry

COMPOSITION: Alkyl and alkylaryl polyoxyethylene glycol.

PROPERTIES: Nonionic, biodegradable and inflammable.

Action/Use

ACTION: Surfactant.

USE: With herbicides, fungicides, insecticides and defoliant.

Emergency GuidelinesFIRE EXTINGUISHING MEDIA: Alcohol foam, CO₂, water spray.**Surf-Ac* 910** — see Wetting Agent.**Surface Active Agent**

A substance that reduces the interfacial tension of a system. Most pesticide adjuvants may be considered surface active agents. Also known as surfactants.

These materials can be classed as nonionic, anionic, cationic and amphoteric. Most emulsifying agents are of the nonionic type; they do not ionize. Wetting agents and detergents are primarily anionic. When ionized in solution, the water soluble portion is negatively charged. Cationic surfactants exhibit a net positive charge in solution and are not widely used in agricultural chemicals. Amphoterics have both anionic and cationic charges and are also seldom used in agricultural chemicals.

Factors involved in the selection of a surface active agent include the homogeneity of concentrate, storage stability of concentrate or powder, corrosion factors on storage or packaging of a concentrate, the ease of mixing in water, effect of water hardness on emulsion stability or dispersion, and use end cost of ingredients.

When dealing with high gallonage spray equipment using considerable agitation, a minimum amount of emulsifier is needed. However, residual surface sprays require greater amounts to reduce the run-off. Many terms designate particular surface activities. These are often related. Defined under these headings: Activator; Adjuvant; Defloculator; Detergent; Dispersant; Emulsifier; Foam Suppressant; Foaming Adjuvant; Spreader; Sticker; Wetting Agent.

Surfactant — see Surface Active Agent.**Surfactant PH***

BP: Brewer International Inc. (Surfactant PH*)

Chemistry

COMPOSITION: Alkylaryl polyethoxyethanol phosphates and organic phosphatic acids.

PROPERTIES: Green to blue-green color; boiling point, 212°F; specific gravity, 1.20; vapor pressure, 68°F; fresh scent.

Action/Use

ACTION: Buffering, conditioning agent.

Environmental Guidelines

SOLUBILITY: Miscible in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

PROTECTIVE CLOTHING: Face shield or goggles and gloves.

HANDLING AND STORAGE CAUTIONS: Wash thoroughly with soap and water before handling food or drink. Do not freeze.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Foam, carbon dioxide, water.

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing. **Inhalation**, remove to fresh air. **Ingestion**, do NOT induce vomiting. Drink large quantity of water.

EMERGENCY TELEPHONE: 800 255-3924 (Chem Tel).

Surfel* Crop Oil Surfactant — Discontinued 1994 by Rhone-Poulenc Surfactants & Specialties.**Surfix***

BP: Helena Chemical Co. (Surfix*)

Chemistry

COMPOSITION: Beta pinene polymer.

Action/Use

ACTION: Nonionic spreader-sticker adjuvant.

USE: With pesticides, nutritionals.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

Surflan*

BP: DowElanco (Surflan*)

Identification

COMMON NAME: Oryzalin (ISO, ANSI, BSI, WSSA).

EXP. CODE NUMBER: EL-119.

OTHER CODE NUMBERS: CAS 19044-88-3; SHA 104201.

ADDITIONAL TRADE NAME: Dirimal*.

DISCONTINUED NAMES: Rycelan*, Ryzelan*, Ryzelon*.

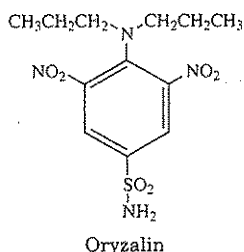
Chemistry

COMPOSITION: 3,5-Dinitro-N,N'-dipropylsulfanilamide (IUPAC).

PROPERTIES: Pure: yellow-orange crystalline solid, melting point 141-142°C. Vapor pressure is 1 x 10⁻⁶ mm Hg at 25°C.Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Surflan* A.S.: Bright orange opaque liquid with slight aromatic odor. Readily soluble in organic solvents such as acetone, ethanol, methanol and acetonitrile and only slightly soluble in benzene and xylene and insoluble in hexane.

**Action/Use**

ACTION: Selective preemergence surface-applied herbicide.

USE: For annual grasses, broadleaf weeds in bearing and nonbearing fruit trees, nut trees, vineyards, established bermudagrass turf, and established ornamentals.

FORMULATIONS: Aqueous suspension, dry flowable, wettable powder.

COMBINATION: XL* (+ benefin) (DowElanco); Rout* (+ oxyfluorfen) (Grace-Sierra Crop Protection).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 2.88 mg/l (bluegill). Bird: (Oral) >1000 mg/kg (hen).

SOLUBILITY: Water solubility at pH 7 is 2.5 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg.

PROTECTIVE CLOTHING: Chemical goggles, coveralls, long-sleeved shirt and impermeable gloves.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. Harmful if swallowed, inhaled, or absorbed through the skin. Avoid breathing vapors. Surflan* A.S. may cause skin sensitization reactions in certain individuals.

Emergency Guidelines

FLASHPOINT: No ignition up to 200°F.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting. Administer 6-8 tsp. activated charcoal and large quantity of water.

Surflex 786*

BP: Exacto Chemical Co. (Surflex 786*)

Chemistry

COMPOSITION: 90% Alkyl Aryl Polyoxyethylene Ether, Free Fatty Acids and Isopropanol.

Action/Use:

ACTION: Low Foam Non-Ionic Surfactant.

USE: Designed for use as a spreader-activator in agricultural pesticide applications. Decreases the surface tension of spray droplets and allows for uniform distribution and coverage.

FORMULATION: Concentrated liquid.

Surflex 927*

BP: Exacto Chemical Co. (Surflex 927*)

Chemistry

COMPOSITION: 100% Alkyl Aryl Polyoxyethylene Ether and Esters.

Action/Use:

ACTION: Non-Ionic Surfactant.

USE: Designed for use as a spreader-activator in agricultural pesticide applications. Decreases the surface tension of spray droplets and allows for uniform distribution and coverage.

FORMULATION: Concentrated liquid.

Surftex*

BP: Exacto Chemical Co. (Surftex*)

Chemistry

COMPOSITION: Polyquaternary amine.

Action/Use

ACTION: Percolation aid, seedling emergence aid, wetting agent.

USE: Sprayed over soil to inhibit soil crusting. Allows rapid water drainage by keeping soil loose and friable.

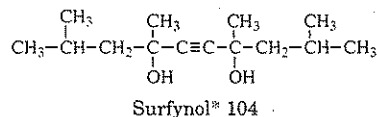
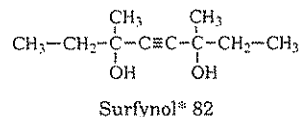
FORMULATION: Concentrated liquid.

Surfynol*

BP: Air Products & Chemicals, Inc.

Chemistry

PROPERTIES: Compatible in hard or soft water and with liquid fertilizers.

**Action/Use**

ACTION: A series of acetylenic glycols used in the formulation of wettable powders and flowable formulations as surface active agents; as adjuvants with postemergent herbicides.

USE: In wettable powders to provide multi-functional wetting, defoaming, and redispersibility. Free flowing powders (Surfynol* 104S, 82S) post blended with wettable powders provide anti-static action. In flowable formulations to improve suspendability, shelf life, bloom.

See Defoamer; Wetting Agent.

Surpass* — see Acetochlor.

Surpass* 100 — see Acetochlor; Atrazine.

Surpass* Herbicide (vernolate) — Discontinued by ZENECA Ag Products. Trade name now used for acetochlor.

SURPHAC*

BP: Unocal Petroleum Products & Chemicals Div.

Chemistry

COMPOSITION: Octyphenoxypolyethoxyethanol, monocarbamide dihydrogensulfate, adjuvant.

PROPERTIES: Transparent, blue-green solution. Strongly acidic. Corrosive

Action/Use

ACTION: Non-ionic, acidifying, wetting agent, penetrator.

USE: Enhances the penetration of leaf surface for many aquatic and terrestrial herbicides, defoliant and desiccants.

Reduces adverse effects that alkaline waters have on spray solution and provides additional wetting of sprayed foliage.

Environmental Guidelines

SOLUBILITY: Completely soluble in water.

Safety Guidelines

SIGNAL WORD: DANGER.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Corrosive to nylon and leather.

Emergency Guidelines

FLASHPOINT: >230°F.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting. Rinse mouth with water and dilute by drinking one glass milk or water.

Surya*

BP: Krishna Bio-Tech Pvt. Ltd. (Surya*)

Identification

COMMON NAMES: n-Triacontanol.

Action/Use

ACTION: Plant growth regulator.

Chemistry

MOLECULAR FORMULA: CH₃(CH₂)₂₈CH₂OH

PROPERTIES: Molecular weight 438.8, melting point 80-82°C.

Safety Guidelines

TOXICITY: Nontoxic.

Susceptible Species

A plant, animal, or microorganism that is affected by pesticides at the rates listed on the label.

Suspen-Der*

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: Poly resin.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Suspension aid, drift retardant.
USE: Retards the settling of wettable powders, dry flowables, granules and fertilizers. Retards spray drift and improves deposition.
FORMULATIONS: Concentrated liquid.
 See Drift Control Agents.

Suspending Agent — see Dispersant.

Suspending Aid

Surface-active agent used to prevent settling out of a pesticidal chemical, especially in water-based flowables.

Suspension

Particles of a solid or immiscible liquid dispersed in a liquid or gas but not dissolved in it. Ideally, suspended so as not to settle out.

Sustar*

Chemistry

COMPOSITION: 3-Trifluoromethylsulfonamido-p-acetotoluide.

Action/Use

ACTION: Plant growth regulator (sugarcane ripener).

Susvin* — see Monocrotophos.

Sutan*+* — see Butylate.

Sutazine* — see Atrazine; Butylate.

Sutene 35EC* — see Endosulfan.

Suzu* — see Triphenyltin Acetate.

Suzu H* — see Triphenyltin Hydroxide.

Swascofix*

Emulsifier series for use in formulation of insecticides.

Swat* Insecticide (phosphamidon) — Discontinued by Ciba-Geigy.

Swath Marker*

BP: Miller Chemical & Fertilizer Corp. (Swath Marker*)

Chemistry

COMPOSITION: Alkyl sulfate, ammonium salt, alkyl sulfonates, sodium salts, oxypropylene, oxyethylene.

PROPERTIES: Light amber liquid, bland odor.

Action/Use

ACTION: Marking agent.

FORMULATION: Liquid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Harmful if swallowed; avoid contact with eyes.

Emergency Guidelines

FIRST AID: Eyes and Skin, flush immediately with plenty of water. Inhalation, remove to fresh air and if victim is not breathing, give artificial respiration. Ingestion, contact a Physician immediately.

Swebate* — see Temephos.

Sweep* Herbicide (paraquat) — Discontinued by ICI Agrochemicals.

Sweep

(Discontinued by Nissan Chemical Industries, Ltd.)

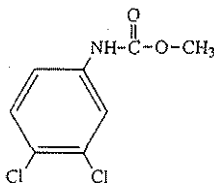
Identification

COMMON NAMES: Sweep (ANSI, WSSA); MCC (JMAF).

CODE NUMBERS: CAS 1918-18-9; SHA 084601.

Chemistry

COMPOSITION: Methyl 3,4-dichlorocarbanilate (IUPAC).



Sweep

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4197 mg/kg.

Swipe* — see Methamidophos.

SY-83 — see Propel*

Sylgard* 309 Silicone Surfactant

BP: Dow Corning Corp.

Identification

COMMON NAME: Silicone polyether.

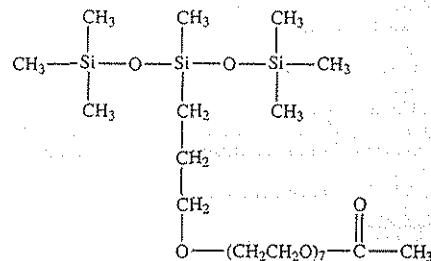
EXP. CODE NUMBER: Q2-5309 (Dow Corning).

CODE NUMBERS: CAS 125997-17-3.

Chemistry

COMPOSITION: 2-(3-Hydroxypropyl)-Heptamethyltrisiloxane, Ethoxylated, Acetate.

PROPERTIES: Clear, amber-colored liquid. Viscosity: 30 cSt. Surface tension (0.01% in water) = 21 dynes/cm.



Sylgard* 309

Action/Use

ACTION: Nonionic surfactant.

USE: Enhances the activity of pesticides and water soluble herbicides by promoting rapid spreading and uptake into plant tissues.

FORMULATIONS: Liquid.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Dispersible in water.

Safety Guidelines

PROTECTIVE CLOTHING: Chemical resistant gloves, suitable dust/mist type respirator.

HANDLING AND STORAGE CAUTIONS: Do not contaminate water.

Emergency Guidelines

FLASHPOINT: >212°F/100°C.

FIRE EXTINGUISHING MEDIA: Water, water fog, CO₂, dry chemical, foam.

EMERGENCY TELEPHONE: 517-496-5900 (Dow Corning).

Syllit* Fungicide (dodine) — Discontinued by Rhone-Poulenc.

Syloid* — see Silicates (Synthetic Dry).

Symphonie* — see Moncut*.

Symthrin* — see Neo-Pynamin*.

Synchrony* STS*

BP: Du Pont Agricultural Products (Synchrony* STS*)

Chemistry

COMPOSITION: Chlorimuron-ethyl + thifensulfuron-methyl.

FAMILY: Sulfonylurea.

Action/Use

ACTION: Postemergent herbicide.

USE: For use only on soybeans designated as STS* in the variety name. These varieties contain a proprietary trait that enhances the soybean's natural tolerance to Du Pont soybean sulfonylurea herbicides.

FORMULATIONS: Water dispersible granule.

Registration Notes

U.S.: For use only in certain states.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

PROTECTIVE CLOTHING: Long-sleeved shirt and long pants, water-proof gloves, shoes plus socks.

HANDLING AND STORAGE CAUTIONS: Store product in original container only. Do not contaminate water, other pesticides, fertilizer, food or feed in storage.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-441-3637 (Du Pont).

See STS Soybean Varieties.

Synergist

A material which exhibits synergism, the joint action of different agents so that the total effect is greater than the sum of the independent effects. The efficiency of one or more components of a mixture is greatly heightened or potentiated by a synergistic component. (Example: Pesticide X kills 40% of an insect population, Pesticide Y kills 20%. When applied together, X and Y kill 95%). The newer developments in this field have stemmed from the efforts to increase the activity or extend the supply of pyrethrum during the scarcity in World War II.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Before the war, in 1938, N-isobutylhendecenamide was developed for use with pyrethrum. The value of sesame oil was discovered about the same time and its effectiveness was found to be due to the presence of sesamin. Synthesis of this material led to the production of related compounds such as piperonyl butoxide.

Synerol* — see Pyrethrum.

Synklor* Insecticide (chloridane) — Discontinued by Tamogen.

Synperonic NX — see Agral 90*.

Synpren-Fish — see Rotenone.

Synthetic Pyrethroids — see Pyrethrin.

Synthex 301*

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: 65% Alkyl aryl polyethoxy phosphate ester.

Action/Use:

ACTION: Compatibility agent.

USE: Adjusts the pH, acidifying the solution and is designed to emulsify and disperse liquid fertilizers and emulsifiable pesticides in a spray solution.

FORMULATION: Concentrated liquid.

Synthex 866*

BP: Exacto Chemical Co.

Chemistry

COMPOSITION: 80% Phosphatidylcholine and methylacetic acid.

Action/Use:

ACTION: Buffering Agent.

USE: Adjusts the pH of alkaline water in a spray solution and reduces hydrolysis of pesticides which decompose rapidly under high pH.

FORMULATION: Concentrated liquid.

Synthrin* — see Resmethrin.

System*

F: Helena Chemical Co. (System*)

Identification

ADDITIONAL TRADE NAME: Kodiak A-T*.

Chemistry

COMPOSITION: PCNB + metalaxyl + *Bacillus subtilis*.

PROPERTIES: Gray powder. Non-corrosive.

Action/Use:

ACTION: Combination biological and chemical fungicide seed treatment.

USE: For use on barley, beans, corn, cotton, peanuts, peas, rice, and soybeans.

Environmental Guidelines

SOLUBILITY: Not miscible in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

Systemic Fungicides

Fungicides that are systemic in action, i.e., are translocated to other parts of the plant than those originally hit.

1. Oxathiins: carboxin and oxycarboxin. Used as seed treatments for cereal crops.
2. Benzimidazoles: benomyl, carbendazim, thiabendazole, and thiophanate. Used for the control of a wide range of diseases of fruits, nuts, vegetables, field crops, turf, and ornamentals.
3. Pyrimidines: ethirimol, bupirimate, dimethirimol.

Systemic Pesticide

Pesticide that is translocated to other parts of a plant or animal than those to which the material is applied.

Systemox* Insecticide/Acaricide (demeton) — Discontinued 1987 by Bayer AG.

Systemschutz D* — see Butocarboxim.

Sythane*

BP: Rohm and Haas Co. (Eagle*, Nova*, Rally*, Sythane*)

Identification

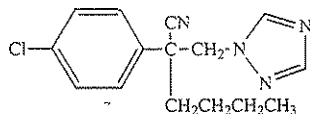
COMMON NAME: Myclobutanil (ISO draft, ANSI, BSI).

EXP. CODE NUMBER: RH-3866.

OTHER CODE NUMBERS: CAS 88671-89-0; SHA 128857.

Chemistry

COMPOSITION: α -butyl- α -(4-chlorophenyl)-1H-1,2,4-triazole-1-propanenitrile (CAS).



Myclobutanil

PROPERTIES: Light yellow solid, melting point 63-68°C. Boiling point 202-208°C. Vapor pressure 1.6×10^{-6} torr at 25°C. Stable under

normal storage conditions. Soluble in common organic solvents such as ketones, esters, alcohols, aromatic hydrocarbons, etc. Insoluble in aliphatic hydrocarbon solvents.

Action/Use

ACTION: Systemic protectant and curative fungicide effective against many fungi classified as Ascomycetes, Deuteromycetes (Fungi Imperfecti) and Basidiomycetes. The fungicide's primary mode of action is the inhibition of ergosterol biosynthesis.

USE: Tree fruit and vines.

FORMULATIONS: Emulsifiable concentrate and wettable powder.

Environmental Guidelines

SOLUBILITY: Water, 142 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: DANGER (20E). WARNING (tech). CAUTION (40W).

TOXICITY CLASS: I (20E). II (tech). III (40W).

TOXICITY: (Rat): Oral LD₅₀ 1600 mg/kg (male); 2290 mg/kg (female).

(Rabbit): Dermal LD₅₀ >5000 mg/kg. (Rat): Inhalation LC₅₀ >5 mg/l.

PROTECTIVE CLOTHING: Wear long trousers, long sleeved shirts, impervious gloves and splash goggles during all methods of mixing, loading, applying or otherwise handling this experimental compound.

HANDLING AND STORAGE CAUTIONS: Store away from excessive heat, sources of ignition and reactive materials. Do not store near feed or foodstuffs. Do not swallow, get in eyes or on skin or breathe spray mist. Wash thoroughly after handling and before eating or smoking. Do not contaminate streams, lakes and ponds, feed or food.

Emergency Guidelines

FLASHPOINT: Tech, 40 WP: 415°F/213°C (COC); 2 EC: 106°F/41°C.

FIRST AID: In all instances, get prompt medical aid. **Eyes**, flush with plenty of water for at least 15 minutes. **Skin**, wash area thoroughly with soap and water. Remove contaminated clothing, wash before re-using. **Inhalation**, remove to fresh air. If not breathing, give artificial respiration. **EC: Ingestion**, depending on extent, careful gastric lavage may be indicated because of presence of petroleum hydrocarbons.

Other formulations: **Ingestion**, if conscious, give 2 glasses of water.

Systox*

(Discontinued 1989 by Mobay Corp.)

Identification

COMMON NAMES: Demeton, Demeton-O + demeton-S (ISO), mercaptofos (USSR).

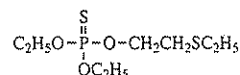
EXP. CODE NUMBERS: Bay 10756, E 1059.

OTHER CODE NUMBERS: CAS 8065-48-3; SHA 057601.

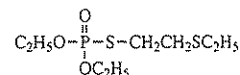
DISCONTINUED NAME: Systemox* (Bayer AG).

Chemistry

COMPOSITION: Mixture of O,O-diethyl O-[2-(ethylthio)ethyl] phosphorothioate and O,O-diethyl S-[2-(ethylthio)ethyl] phosphorothioate.



Demeton I (thiono isomer)



Demeton II (thiolo isomer)

Action/Use

ACTION: Systemic insecticide-acaricide.

Environmental Guidelines

HAZARDS: Fish: Moderately toxic. Bee: Toxic.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ 2.5-6 mg/kg. Dermal LD₅₀ 8.2-14 mg/kg.

Emergency Guidelines

ANTIDOTE: Administer atropine sulfate in large therapeutic doses. Repeat as necessary to the point of tolerance. 2-PAM is antidotal and may be administered in conjunction with atropine.

Sytam* — see Schradan.

Sytemp* Insecticide (toxaphene + parathion + methyl parathion) — Discontinued by Ring Around Products, Inc.

2,4,5-T

Identification

COMMON NAME: 2,4,5-T (ISO, BSI, WSSA, JMAF).

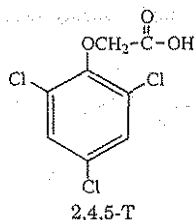
CODE NUMBERS: CAS 93-76-5; SHA 082001.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

DISCONTINUED NAMES: Tributon* (Bayer AG); Tormona* (Celamerck); T-Nox* (Crystal Chemical Inter-America); Reddon*, Verton* 2T (Dow); Transamine* (+ 2,4-D) (Inter-Ag Corp.); Kaislantuhoh* (+ dalapon + 2,4-D) (Kemira Oy); Fruitone A*, Spontox* (Rhône-Poulenc); Brush Killer*, Ded-Weed* (+ 2,4-D + dalapon + MCPA + silvex) (TH Agricultural & Nutrition); Brushtox* (Union Carbide Australia); Esterone*; Brush-Rhap* (+ 2,4-D), Veon* 245 (Vertac); Farmco Fence Rider*; Forron*; Inverton 245*; Line Rider*; Super D Weedone* (+ 2,4-D); Trinoxol*.

Chemistry

COMPOSITION: 2,4,5-Trichlorophenoxy-acetic acid.
PROPERTIES: Salts (amines) are insoluble in petroleum oils; esters are formulated to be emulsifiable in water and soluble in most oils.



Action/Use

ACTION: Herbicide.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

SOLUBILITY: Salts (amines) are soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech a.i. (Rat): Oral LD₅₀ 500 mg/kg.

Tabamex* — see Butralin.

Table Salt — see Sodium Chloride.

Tachigaren*

BP: Sankyo Co., Ltd. (Tachigaren*)

Identification

COMMON NAMES: Hymexazol (ISO, BSD); hydroxy isoxazole (JMAF).

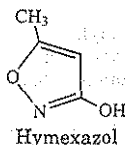
EXP. CODE NUMBERS: F 319 (Sankyo Co., Ltd.); SF-6505.

OTHER CODE NUMBER: CAS 10004-44-1.

Chemistry

COMPOSITION: 3-Hydroxy-5-methylisoxazole; 5-methyl isoxazol-3-ol.

PROPERTIES: Colorless crystals, melting point 86-87° C. Vapor pressure 1 × 10⁻³ mm/Hg (25° C). Readily soluble in most organic solvents.



Action/Use

ACTION: Systemic soil fungicide.

USE: As a soil drench, soil incorporation, or seed pelleting and dressing for damping off caused by Fusarium, Aphanomyces, Pythium, Corticium, etc. Agent to improve root growing and cold resistance of crop seedling.

FORMULATIONS: Liquid, dust, wettable powder for seed pelleting and dressing.

Registration Notes

U.S.: Not registered.

OUTSIDE U.S.: For sugar beet as seed treater. In Japan for paddy rice, cucumber, watermelon, sugar beet, ornamentals, and forest tree seedlings.

Environmental Guidelines

HAZARDS: Fish: TLM 165 ppm (48h) (carp).

SOLUBILITY: Soluble in water 8.5% w/v at 25° C (48h).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4678 mg/kg (male); 3909 mg/kg (female). Dermal LD₅₀ >10,000 mg/kg. (Mouse): Oral 2148 mg/kg (male); 1968 mg/kg (female).

Tackle* Herbicide (acifluorfen-sodium) — Discontinued by Rhône-Poulenc.

Tafethion* — see Ethion.

Tafgor* — see Dimethoate.

Tahmabon* Insecticide/Acaricide (methamidophos) — Discontinued by Equitable Trading Co., Ltd.

Taifun* — see Joker*.

Tairel* — see Galben*.

Tairel* F Fungicide (benalaxyl + folpet) — Discontinued by Agrimont S.p.A.

Tairel* M Fungicide (benalaxyl + mancozeb) — Discontinued 1989 by Agrimont S.p.A.

Tairel* R — see Copper Oxochloride; Galben*.

Tairel* Z Fungicide (benalaxyl + zineb) — Discontinued 1989 by Agrimont S.p.A.

Tako* Carrier (kaolin) — Discontinued by Thomas Alabama Kaolin Co.

Taktic* — see Amitraz.

Talan* — see Dinobuton.

Talbot* Insecticide (lead arsenate) — Discontinued 1987 by Mechema Chemicals, Ltd.

Talc

Identification

CODE NUMBER: CAS 14807-96-6.

Chemistry

COMPOSITION: Hydrus magnesium silicate: Mg₃(SiO₃)₂(OH)₂.

Action/Use

USE: Inert carrier and diluent in pesticides. When the ultra fine grinds are used (Mistron grades), they contribute to large surface areas and are non-reactive with sensitive toxicants and can be used in wettable powders.

Safety Guidelines

SIGNAL WORD: Nontoxic.

Talcord* — see Permethrin.

Talent* — see Asulam; Paraquat.

Tallow Amine Ethoxylate — see Hyspray*.

Taloberg* — see Chlorothalonil.

Talon* — see Brodifacoum.

Talstar* — see Bifenthrin.

Tam* — see Methamidophos.

Tamanox* — see Methamidophos.

Tamaron* — see Methamidophos.

Tamaron Combi* — see Alsystin*; Methamidophos.

Tamaron* EP — see Methamidophos; Parathion.

Tame* — see Fenpropathrin.

Tamex* — see Butralin.

Tamol*

BP: BASF India Ltd. (Tamol*)

Chemistry

PROPERTIES: Pale colored powder. Sodium salts of alkyl naphthalene sulphonic acids and aromatic sulphonic acid condensation products.

Action/Use

ACTION: Surfactant.

USE: For the formulation of wettable powders for crop protection. As a wetting and dispersing agent.

FORMULATIONS: Powder, solution.

Environmental Guidelines

SOLUBILITY: Readily water soluble.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: The storage stability of water dispersible powders can be effectively maintained.

See Dispersant.

Tanalith* — see Wolman Salts*; Fluor Chrome Arsenate Phenol.

Tanazon* Fungicide (zineb) — Discontinued 1989 by Agrimont S.p.A.

Tandem* — see Tridiphane.

Tandex* Herbicide (karbutilate) — Discontinued 1987 by FMC Corp.

Tanex* — see Phenmedipham.

Tanglefoot Bird Repellent*

BP: The Tanglefoot Co.

Chemistry

COMPOSITION: Mixture of several grades of polybutenes with stabilizers.

PROPERTIES: Clear, sticky, odorless, bright viscous gel.

Action/Use

ACTION: Bird repellent.

USE: Discourages pigeons, English sparrows and starlings from roosting areas. Apply to window sills, roof lines, gutter edges and other roosting places.

FORMULATIONS: Squeeze tubes, caulking cartridges, aerosols, tubs, pails.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

PROTECTIVE CLOTHING: Gloves for handling.

HANDLING AND STORAGE CAUTIONS: Keep closed and upright when not in use. Keep out of reach of children, pets.

Emergency Guidelines

EMERGENCY TELEPHONE: 616-459-4139 (Tanglefoot Co.).

Tangle-Trap Insect Trap Coating*

BP: The Tanglefoot Co.

Chemistry

COMPOSITION: Mixture of several grades of polybutenes, stabilizers.

PROPERTIES: All weather, clear, odorless, bright viscous gel. Adheres to virtually any surface.

Action/Use

ACTION: Insect Trapping Adhesive.

USE: Adhesive coating for sticky insect traps used in population detection and monitoring. Effective in trapping small flying insects such as whiteflies, aphids, carrot rust flies, fungus gnats, leafminer flies, thrips, apple maggot flies.

FORMULATIONS: Paste, brushable and aerosol.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

PROTECTIVE CLOTHING: Gloves when handling.

HANDLING AND STORAGE CAUTIONS: Keep closed and upright when not in use. Keep out of reach of children, pets.

Emergency Guidelines

EMERGENCY TELEPHONE: 616-459-4139 (Tanglefoot Co.).

Tangle-Trap* Traps — see Sticky Trapping Systems.**Tango*** — see Calixin*; Opus*.**Tank-Aid***

BP: Cornbelt Chemical Co.

Chemistry

COMPOSITION: Proprietary blend.

Action/Use

ACTION: Tank cleaner for sprayers and tanks.

Cleans, prevents corrosion, removes rust, disperses acids.

USE: Hand sprayers to flotation rigs.

Safety Guidelines

PROTECTIVE CLOTHING: Gloves, goggles.

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. Avoid skin, eye contact. Avoid mist conditions or strong alkalies. Read label.

Emergency GuidelinesFIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion**, induce vomiting.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Tank Kleen*

F: Kalo, Inc. (Tank Kleen*)

Chemistry

COMPOSITION: Complex phosphates, chelating agents, potassium silicate, nonionic surfactant.

PROPERTIES: Clear green liquid with light spearmint odor.

Action/Use

ACTION: Sprayer tank and equipment cleaner.

USE: Cleaning, scouring and washing compound for metal, fiberglass and plastic spray system.

FORMULATIONS: Liquid.

Environmental Guidelines

SOLUBILITY: Complete in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Human: Very low level.

PROTECTIVE CLOTHING: Safety glasses, impervious gloves.

HANDLING AND STORAGE CAUTIONS: Avoid prolonged skin contact, direct eye contact may cause eye irritation or burns. Store at room temperature, away from strong acids.

Emergency GuidelinesFIRST AID: **Eyes**, flush immediately with plenty of water. Get medical aid. **Skin**, flush with water. **Ingestion**, drink two large glasses of water. Get medical aid. **Inhalation**, remove to fresh air.**Tank Mix**

A tank mix is a mixture of two or more pesticides in the spray tank at the time of application. A tank mix should be used with caution until assured of the compatibility of the ingredients. The application of soluble compounds as solutions can present some problems when used in

a tank mixture. When used alone as a spray there is no settling out of the chemical in the tank, but when mixed with other compounds the fact that the pesticide is soluble in water increases the chances of an undesirable chemical reaction taking place in the spray tank.

See Adjuvant, Serial Application.

Tanone* Insecticide (phenthoate) — Discontinued 1989 by Agrimont S.p.A.**Tantizon***

(Discontinued by Bayer AG)

Identification

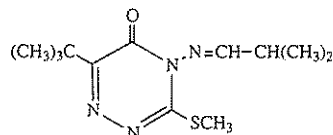
COMMON NAMES: Isomethiozin (ISO-E, BSI); isométhiozine (ISO-F).

EXP. CODE NUMBER: BAY-DIC 1577.

OTHER CODE NUMBER: CAS 67052-04-7.

Chemistry

COMPOSITION: 6-tert-butyl-4-isobutylideneamino-3-methylthio-1,2,4-triazin-5 (4H)-one.



Isomethiozin

Action/Use

ACTION: Herbicide.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg. Dermal LD₅₀ >1000 mg/kg.**Tanzen* Herbicide (karbutilate + simazine)** — Discontinued 1986 by Ciba-Geigy.**Taperon*** — see Methamidophos.**Tar Distillates**

Products of fractional distillation of tars. They are named according to the boiling range at which each type of distillate, or tar oil, is produced. Coal tar is the leading crude tar distilled but many other tars are available commercially, i.e., wood tar, lignite tar, shale tar. See Tar Oils.

Tar Oils

Tar oils include anthracene, creosote, and naphtha. Tar oils for spray purposes are refined by redistillation of tar distillates to remove the lower and higher fractions, and by removal of most of the content of tar acids (phenols, etc.). Tar oils were used formerly as dormant sprays to kill scale insects and aphid eggs. They have been largely replaced.

Targa* — see Quizalofop-ethyl.**Targa D+*** — see Quizalofop-P-ethyl.**Targa Super*** — see Quizalofop-P-ethyl.**Target**

The plants, animals, structures, areas, or pests to be treated with a pesticide application.

Target* (in U.K.) — see Asulam; Dalapon.**Target* Herbicide (in Canada) (MCPA + MCPP + dicamba)** —

Discontinued 1987 by Ciba-Geigy Ltd.

Target* MSMA 6.6 — see MSMA.**Target* MSMA 6 Plus** — see MSMA.**Target*-NL**

(Discontinued 1990 by Agway, Inc.)

Chemistry

COMPOSITION: A.i.: Blend of adjuvants, solubilizers, polymers, stabilizers, dispersants, and preservatives added.

Action/Use

ACTION: Multi-purpose spray adjuvant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

Tartan*

(Discontinued by Agrimont S.p.A)

Identification

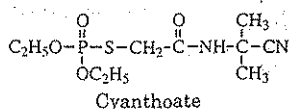
COMMON NAME: Cyanthoate (ISO, BSI, ESA).

CODE NUMBER: CAS 3734-95-0.

Chemistry

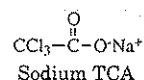
COMPOSITION: S-[N-(1-cyano-1-methylethyl)carbamoylmethyl] O,O-diethyl phosphorothioate (IUPAC).

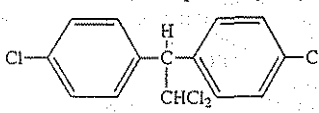
Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.



Action/Use
ACTION: Acaricide, insecticide.
Safety Guidelines
SIGNAL WORD: DANGER.
TOXICITY CLASS: I.
TOXICITY: (Rat): Oral LD₅₀ 3.5-5.3 mg/kg.
Tartan* Herbicide — see Asulam; Diuron.
Tartar Emetic
BP: Sanachem (Pty) Ltd. (Brennotox*, Santox*, Tartox*, Thriptox*)

Identification
CODE NUMBERS: CAS 28300-74-5; SHA 006201.
Chemistry
COMPOSITIONS: Potassium antimonyl tartrate, antimony potassium tartrate.
Action/Use
ACTION: Insecticide.
USE: Spray on gladiolus and citrus for thrip control. Ant baits; a.i. in liquid baits for moths, wasps and yellow jackets.
Safety Guidelines
SIGNAL WORD: CAUTION. Tartar emetic is a stomach poison.
TOXICITY CLASS: III.
Tartox* — see Tartar Emetic.
Tarzol* — see Fenazaflor.
Taterpex* — see Chlorpropham.
Tato* — see Bendiocarb.
Tattoo* insecticide (bendiocarb) — Discontinued by FBC Ltd.
Tavron G*
Chemistry
COMPOSITION: (2,2,2-Trichloroethyl) styrene.
Taxylone* — see Methyl Parathion; Phosalone.
Taylor* Antifoams
BP: Taylor Chemical Co., Inc. (Taylor* Antifoams)
Chemistry
COMPOSITION: Dimethylpolysiloxane.
FAMILY: Silicone.
PROPERTIES: Milky liquid, non-corrosive.
Action/Use
ACTION: Defoaming/antifoam agents.
Safety Guidelines
TOXICITY: Non-toxic.
Tayssato* Fungicide (MEMC) — Discontinued 1985 by Kemira Oy.
4-(2,4,5-TB)
Identification
COMMON NAME: 2,4,5-TB (ISO, BSI, WSSA).
CODE NUMBERS: CAS 93-80-1; SHA 681800.
Chemistry
COMPOSITION: 4-(2,4,5-Trichlorophenoxy)butyric acid.
Action/Use
ACTION: Herbicide.
2,3,6-TBA — see Trichlorobenzoic Acid.
TBCS-53* — see Copper Sulfate, Basic.
TBTO* — see Butinox*.
TBZ — see Thiabendazole.
TBZ* — see Thiabendazole.
TC-90 Copper Fungicide* — Discontinued by Cities Service Co.
TCA
BP: HELM AG
Identification
COMMON NAMES: TCA (ISO, BSI, WSSA); TCA-sodium (USA, JMAF); trichloroacétate de sodium (France).
CODE NUMBERS: CAS 76-03-9 (TCA); CAS 650-51-1 (TCA-sodium); SHA 081002.
DISCONTINUED NAMES: Konesta* (Akzo Chemicals B.V.); Dow* Sodium TCA Inhibited, Dow* Sodium TCA Solution (Dow Chemical); NaTA* (Hoechst AG); Revenge* (+ dalapon sodium salt + dalapon magnesium salt) (Hopkins Agricultural Chemical Co.); Varitox* (Rhone-Poulenc).
Chemistry
COMPOSITION: Sodium salt of trichloroacetic acid.
PROPERTIES: Soluble in alcohol and ether.



Action/Use
ACTION: Herbicide.
Environmental Guidelines
HAZARDS: Fish: Nontoxic. Bee: Nontoxic.
SOLUBILITY: Soluble in water.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 5000 mg/kg (male); 5060 mg/kg (female).
TCA-Sodium — see TCA.
TCB — see Trichlorobenzene.
TCBA — see Trichlorobenzoic Acid.
TCBC — see Trichlorobenzyl Chloride.
TCMTB
BP: Buckman Laboratories, Inc. (Busan* 30A)
Identification
CODE NUMBER: CAS 21564-17-0.
DISCONTINUED NAMES: Protector 3L* (Agway); Busan 72A* (Buckman Laboratories, Inc.); Nusan* 30 (Wilbur-Ellis Co).
Chemistry
COMPOSITION: 2-(Thiocyanomethylthio)benzothiazole (TCMTB).
Action/Use
ACTION: Fungicide.
USE: Contact fungicide for barley, cotton, corn, oats, rice, sorghum, sugarbeets, safflower and wheat. Dust formulations based on TCMTB for seed treatment of cereals, corn, cotton, legumes, rice, sorghum, sugar beets.
FORMULATIONS: Emulsifiable liquid (30% TCMTB).
Safety Guidelines
SIGNAL WORD: WARNING.
TOXICITY CLASS: II.
TCNA
Chemistry
COMPOSITION: 2,3,5,6-Tetrachloro-4-nitroanisole.
Action/Use
ACTION: Acaricide.
TCNB — see Fusarex*.
TCNS 53* — see Copper Sulfate, Basic.
TCTP — see Penphene*.
TDE
(Discontinued by Rohm and Haas Co.)
Identification
COMMON NAME: TDE (ISO, BSI, ESA).
CODE NUMBERS: CAS 72-54-8; SHA 029101.
ADDITIONAL TRADE NAMES: DDD, Rhothane* (Rohm and Haas).
Chemistry
COMPOSITION: 1,1-Dichloro-2,2-bis(p-chlorophenyl)ethane (CAS 8CI).


TDE

Action/Use
ACTION: Insecticide.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 3400 mg/kg.
T-DET*
BP: Harcros Chemical, Inc.
Action/Use
USE: As emulsifier, foaming adjuvant, spreader, sticker, and wetting agent.
Team*
BP: DowElanco
Chemistry
COMPOSITION: Trifluralin + benefin.
PROPERTIES: Light yellow free-flowing granule with slight aromatic odor.
Action/Use
ACTION: Herbicide.
FORMULATIONS: Granular.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Environmental Guidelines

SOLUBILITY: Not soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): LD₅₀ 500 mg/kg.

PROTECTIVE CLOTHING: Eye protection, impermeable gloves, long-sleeved shirt and long pants.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency GuidelinesFIRE EXTINGUISHING MEDIA: CO₂ or dry chemical.FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting, administer 6-8 tsp. activated charcoal and large quantity of water.

n-TDF — see Hercon* Disrupt.

Tebuconazole — see Folicur*.

Tebufenozide — see Mimic*.

Tebujan* Fungicide (dodine + fenarimol) — Discontinued 1993 by Rhone-Poulenc.

Tebupirimphos

BP: Miles Inc.

COMMON NAME: Tebupirimphos (proposed).

TRIVIAL NAME: Phostebupirim (abandoned).

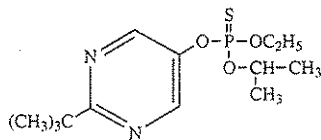
EXP. CODE NUMBER: Bay MAT 7484 (Miles Inc.).

OTHER CODE NUMBER: CAS 96182-53-5.

Chemistry

COMPOSITION: O-[2-(1,1-Dimethylethyl)-5-pyrimidinyl]O-ethyl O-(1-methylethyl) phosphorothioate (CAS).

FAMILY: Organophosphorus pesticide.

PROPERTIES: Amber to brown liquid. Vapor pressure 5 × 10⁻⁶ hPa at 20°C. Subject to hydrolysis under alkaline conditions. Boiling point 152°C. Soluble in alcohol, ketones and toluene.

Tebupirimphos

Action/Use

ACTION: Insecticide.

USE: Control of soil-dwelling insect pests in corn.

FORMULATIONS: Granules.

COMBINATIONS: Aztec* (+ cyfluthrin) (Miles Inc.).

Registration Notes

U.S.: Applications not yet registered by EPA.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ (96 h) 2.25 mg/l (rainbow trout). Bird: LD₅₀ 20.3 mg/kg b.w. (bobwhite quail).

SOLUBILITY: Water (20°C) 5.5 ppm.

Safety Guidelines

SIGNAL WORD: DANGER—POISON (tech); WARNING (form.).

TOXICITY CLASS: I (tech); II (form.).

TOXICITY: Tech (Rat): Oral LD₅₀ 1.8 - 3.6 mg/kg b.w.; Dermal LD₅₀ 9.4 - 31 mg/kg b.w.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

ANTIDOTE: Administer atropine sulfate in large therapeutic doses. Repeat as necessary to point of tolerance. 2-PAM is also antidotal and may be administered in conjunction with atropine.

EMERGENCY TELEPHONE: 816-242-2582 (Miles Inc.).

Tebusan — see Tebuthiuron.

Tebuthiuron

BP: DowElanco (Spike*)

Sanachem (Pty) Ltd. (Tebusan*)

Identification

COMMON NAME: Tebuthiuron (ISO, ANSI, BSI, WSSA).

EXP. CODE NUMBER: EL-103.

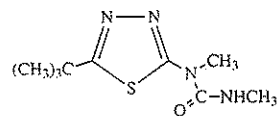
OTHER CODE NUMBERS: CAS 34014-18-1; SHA 105501.

DISCONTINUED NAMES: Brush Bullet*, Graslan*, Perflan* (Elanco Products Co.).

Chemistry

COMPOSITION: N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea (CAS).

PROPERTIES: Gray to dark brown pellet with faint musty odor. Melting range 161.5-164°C.



Tebuthiuron

Action/Use

ACTION: Herbicide.

USE: Noncropland areas, rangelands, rights-of-way and industrial sites.

FORMULATIONS: Pellets, wettable powder.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ 144 mg/l (rainbow trout); 112 mg/l (bluegill).

SOLUBILITY: Dry flowable and wettable powder disperse in water. Pellets not soluble, but disintegrate in water. Granules not soluble.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 644 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, impermeable gloves, waterproof boots, long-sleeved shirt and long pants.

HANDLING AND STORAGE CAUTIONS: See formulation labels. Keep away from children. Do not re-use empty container.

Emergency GuidelinesFIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting. Administer 6-8 tsp. activated charcoal and large quantity of water.**Technical Material**

The pesticide chemical in pure form (usually 95-100% a.i.) as it is manufactured by a chemical company prior to being formulated into wettable powders, dusts, emulsifiable concentrates, granules, etc.

Tech TMTD — see Thiram.

Teciotalam — see Shirahagen-S*.

Teciotalame — see Shirahagen-S*.

Tecnar* — see *Bacillus thuringiensis* var. *israelensis*.

Tecnazene — see Fusarex*.

Tecoglif* — see Glyphosate.

Tecoram**Identification**

CODE NUMBERS: CAS 5836-23-7; SHA 436200.

Chemistry

COMPOSITION: Ethylene-1,2-bis(thiocarbamoyl-dimethyl-thiocarbamoyl)disulfide).

Action/Use

ACTION: Fungicide.

Tecozeb* — see Mancozeb.

Tecozi* — see Carbendazim.

Tecto* — see Thiabendazole.

Tectoquinone**Chemistry**

COMPOSITION: 2-Methyl anthraquinone.

Action/Use

ACTION: Insecticide; wood treatment.

See Anthraquinone.

Tedion — see Tetradifon.

Tedion V-18* — see Tetradifon.

Teel Oil — see Sesame Oil.

Teer* — see Butachlor.

Teflubenzuron

BP: American Cyanamid Co. (Nomolt*)

Identification

COMMON NAME: Teflubenzuron (ISO draft except Netherlands, BSI).

EXP. CODE NUMBER: CME 134.

OTHER CODE NUMBER: CAS 83121-18-0.

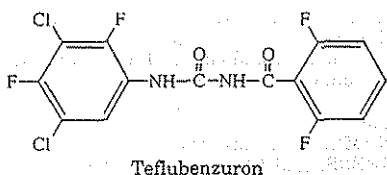
ADDITIONAL TRADE NAMES: Dart*, Diaract*.

Chemistry

COMPOSITION: 1-(3,5-dichloro-2,4-difluorophenyl)-3-(2,6-difluorobenzoyl)urea (IUPAC).

PROPERTIES: White to yellowish crystalline solid, melting point 223-225°C.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.



Action/Use
ACTION: Insect growth regulator, interfering with chitin synthesis and molting process.

USE: Controls a wide range of lepidopterous and coleopterous larvae in fruit, citrus, cotton, potato, vegetables, soybean, forestry and ornamentals as well as fly and mosquito larvae and pear psylla.

FORMULATIONS: Emulsifiable concentrate, suspension concentrate.

COMBINATION: Dartone* (+ phosalone) (Rhône-Poulenc).

Registration Notes

U.S.: Not registered.

Environmental Guidelines

SOLUBILITY: Almost insoluble in water (20 ppb).

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rat): Dermal LD₅₀ >2000 mg/kg.

Tefluthrin — see Force*.

Tegopren* 5840 — see Break-Thru*.

Tegopren* 5878 — see Break-Thru*.

Tekkam* — see 1-Naphthaleneacetic Acid.

Tekwalsa* — see Methyl Parathion.

Telar* — see Chlorsulfuron.

Tell* — see Beacon*.

Telodrin*

(Discontinued 1967 by Shell Chemical Co.)

Identification

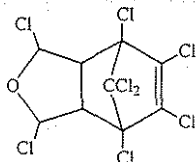
COMMON NAMES: Isobenzan (ISO, BSD); telodrin (JMAF).

EXP. CODE NUMBER: SD 4402 (Shell Chemical Co.).

OTHER CODE NUMBERS: CAS 297-78-9; SHA 058501; OMS 206 (WHO); ENT-25545.

Chemistry

COMPOSITION: 1,3,4,5,6,7,8,8-octachloro-1,3,3a,4,7,7a-hexahydro-4,7-methanoisobenzofuran (IUPAC and CAS 8 and 9CI).



Action/Use

ACTION: Insecticide.

Telodrin* — see Telodrin.

Telone* — see Dichloropropene.

Telone* C — see Chloropicrin.

Telvar* Herbicide (monuron) — Discontinued by Du Pont Agricultural Products.

TEM — see Tetramine.

Temeguard* — see Temephos.

Temephos

BP: American Cyanamid Co. (Abate*, Abathion*, Ecopro*,

Lypor*, Nimitex*, Swebate*)

Cyanamid India Ltd. (Abate*)

Gharda Chemicals Ltd. (Temeguard*)

Sanex Inc. (Tempo*, Tiempo*)

Identification

COMMON NAME: Temephos (ISO, ANSI, BSI, ESA).

EXP. CODE NUMBER: AC 52160.

OTHER CODE NUMBERS: CAS 3383-96-8; SHA 059001; OMS-786 (WHO); ENT 27165.

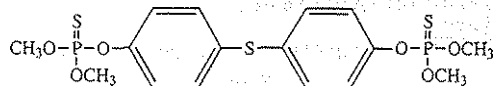
ADDITIONAL TRADE NAMES: Acibate* 50EC (Agro Chemicals Industries Ltd.).

DISCONTINUED NAMES: Biothion* (American Cyanamid).

Chemistry

COMPOSITION: O,O'-thiodi-4,1-phenylene O,O,O'-tetramethyl phosphorothioate (CA).

PROPERTIES: Technical (>90% pure): Amber viscous liquid; decomposes at 120-125°C. Soluble in acetonitrile, carbon tetrachloride, diethyl ether, ethylene dichloride, lower alkyl ketones, and toluene. Essentially insoluble in hexane, methylcyclohexane.



Action/Use

ACTION: Larvicide.

USE: Mosquito and midge larvicide.

FORMULATIONS: Emulsifiable concentrate, granules, capsules.

Registration Notes

OUTSIDE U.S.: Cyclops control.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 31.8 mg/l (rainbow trout).

SOLUBILITY: Soluble in water (1ppm).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Oral LD₅₀ 4204 mg/kg (male); 10,000 (female). (Rabbit): Dermal LD₅₀ 2000 mg/kg (male); 2378 (female).

Abate* (Rat): Inhalation (4 h) LC₅₀ (mg/6) >4.79 (maximum concentration obtainable by analytical determination).

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Stable at 25°C for at least 2 years.

Emergency Guidelines

ANTIDOTE: Atropine.

Temik* — see Aldicarb.

Tempo* H — see Baythroid*.

Tempo* Insecticide — see Baythroid*.

Tempo* Larvicide — see Temephos.

Temporary Tolerance

A tolerance established on an agricultural commodity by EPA to permit a pesticide manufacturer or his agent time, usually one year, to collect additional residue data to support a petition for a permanent tolerance. In essence, an experimental tolerance.

Temus — see Bromadiolone.

Tenax* — see Phorate.

Tenere* — see Fenbuconazole; Fenpropidin.

Tenn-Cop*

BP: Boliden Intertrade, Inc. (Tenn-Cop*)

Identification

DISCONTINUED NAME: Citcop*.

Chemistry

COMPOSITION: Copper salts of fatty and rosin acids.

PROPERTIES: Low viscosity liquid. Non-corrosive to normal materials used in constructing spray equipment.

Action/Use

ACTION: Fungicide.

USE: For citrus diseases, as well as bacterial and fungus diseases on tomatoes, peppers, grapes, beans, lettuce, onions, peanuts, and other fruit, vegetable, and field crops.

FORMULATIONS: Emulsifiable liquid.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Forms a stable emulsion in water following initial agitation.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Oral LD₅₀ = 10-20 g/kg body wt. Exempt from a residue tolerance. No time limit before harvest.

HANDLING AND STORAGE CAUTIONS: Do not use or store near fire, open flame.

Emergency Guidelines

FLASHPOINT: Combustible.

FIRST AID: Get medical aid. Ingestion, do NOT induce vomiting.

See Copper Resinate.

Tenor* — Discontinued 1994 by Schering AG.

Tenoran*

(Discontinued by Ciba-Geigy Ltd.)

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Identification

COMMON NAMES: Chloroxuron (ANSI, BSI, ISO, WSSA), chloroxifenidim (USSR).

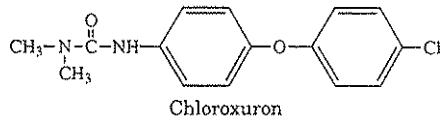
EXP. CODE NUMBER: C-1983.

OTHER CODE NUMBERS: CAS 1982-47-4; SHA 025401.

DISCONTINUED NAME: Norex*.

Chemistry

COMPOSITION: 3-[p-(p-chlorophenoxy) phenyl]-1,1-di-methylurea.

**Action/Use**

ACTION: Selective herbicide.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 3700 mg/kg. (Rabbit): Dermal LD₅₀ >10,000 mg/kg; non-irritating to eye.

Tenorax* 50W (Rat): Oral LD₅₀ 5370 mg/kg.

Tenox* IBP-2

(Discontinued by Eastman Chemical Company).

Identification

CODE NUMBERS: CAS 79-31-2; SHA 101502.

Chemistry

COMPOSITION: Isobutyric acid + propionic acid.

Action/Use

ACTION: Fungicide; grain preservative.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Tenox* P

BP: Eastman Chemical Company

Identification

CHEMICAL NAME: Propionic acid.

CODE NUMBERS: CAS 79-09-4.

Chemistry

PROPERTIES: Colorless, with pungent odor. Boiling point, 138°C (280°F); melting point, -21°C (-6°F).

Action/Use

ACTION: Grain preservative.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

PROTECTIVE CLOTHING: Wear safety glasses with side shields, goggles or a full-face respirator and a face shield. Impermeable gloves should be worn. An impermeable apron or smock and boots should be worn to minimize skin contact. A safety shower, an eye bath, and washing facilities should be available. Wash thoroughly after handling.

HANDLING AND STORAGE CAUTIONS: Keep away from heat and flame. Since emptied packages retain product residue, follow label warnings even after package is emptied.

SPILL CONTROL/CLEANUP: Eliminate all ignition sources. Small spills may be collected with absorbent materials. For large spills, use water spray to dilute spill to a noncombustible mixture. Prevent runoff from entering drains, sewers, or streams. Neutralize spill and/or washings with soda ash or lime.

PRODUCT/WASTE DISPOSAL: Incineration. Observe all federal, state, and local laws concerning health and environment.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water spray, dry chemical, carbon dioxide (CO₂), alcohol foam.

FIRST AID: **Eyes**, immediately flush with plenty of water for at least 15 minutes. Call a physician. **Skin**, immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash contaminated clothing before reuse. **Inhalation**, remove from exposure, treat symptomatically, and get medical attention if symptoms persist.

Tepa**Identification**

OTHER NAMES: Aphoxide, APO.

Chemistry

COMPOSITION: Tris (1-aziridinyl) phosphine oxide.

Action/Use

ACTION: Insect chemosterilant.

Tephrosia

Genus of subtropical plants from which rotenone is obtained, largely in Old World areas. *Tephrosia virginiana*, native to the southeastern U.S. from Texas to Maryland and to Minnesota in the Midwest. Contains small quantities of rotenone.

TEPP**Identification**

COMMON NAME: TEPP (BSI, ISO).

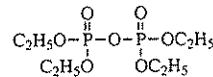
CODE NUMBERS: CAS 107-49-3; SHA 079601.

ADDITIONAL TRADE NAME: Tetron*.

DISCONTINUED NAMES: Kilmite 40* (Miller Chemical & Fertilizer Corp.), Vapoton* (Chevron Chemical Co.).

Chemistry

COMPOSITION: Tetraethyl diphosphate or tetraethyl pyrophosphate or ethyl pyrophosphate..



TEPP

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Oral LD₅₀ 1.2-2.0 mg/kg. Very toxic to warm-blooded animals. Absorbed quickly through the skin. Vapors highly toxic.

See HETP.

Teratogen

A teratogen is a chemical compound, exposure to which is liable to produce malformations, monstrosities, or serious deviations from the normal type. Such a compound is teratogenic.

Terbacil

BP: Du Pont Agricultural Products (Sinbar*)

Identification

COMMON NAME: Terbacil (ANSI, BSI, ISO, WSSA).

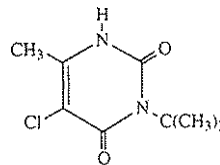
CODE NUMBERS: CAS 5902-51-2; SHA 012701.

DISCONTINUED NAME: Geonter* (Chemol Trading Ltd. Co.)

Chemistry

COMPOSITION: 3-tert-Butyl-5-chloro-6-methyluracil.

PROPERTIES: White crystals, melting point 175-177°C. Moderately soluble in organic solvents such as dimethylformamide (33.7g/100g), cyclohexanone (22g/100g), xylene (6.5 g/100g).



Terbacil

Action/Use

ACTION: Selective herbicide.

USE: Controls many annual and some perennial weeds in certain crops such as sugarcane, alfalfa, apples, peaches, blueberries, strawberries, citrus, pecans and mint.

FORMULATIONS: Wettable powder.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Nontoxic.

SOLUBILITY: Water solubility 710 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 <7500 mg/kg.

PROTECTIVE CLOTHING: Use good sanitary practices.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place. May irritate eyes, nose, throat, and skin. Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing. Keep out of lakes, streams, or ponds. Do not contaminate water by cleaning of equipment or disposal of wastes.

Emergency Guidelines

EMERGENCY TELEPHONE: 1-800-441-3637 (Du Pont).

Terbalin* — see Trifluralin; Terbutryn.

Terborox — see Terbufos.

Terbucarb — see Azak*.

Terbucarbe — see Azak*.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Terbuconazole — see Tebuconazole.

Terbufos

BP: American Cyanamid Co. (Contraven*, Counter*, Counter* CR*)
Hubei Sanonda Co., Ltd.
Pilarquim Corp. (Pilarfox*)
Rotam Group (Terborox*)

Identification

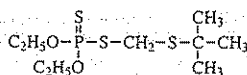
COMMON NAME: Terbufos (BSI, ANSI).
CODE NUMBERS: CAS 13071-79-9; SHA 105001.

Chemistry

COMPOSITION: S-[[[(1,1-Dimethylethyl) thio]methyl] O,O-di-ethyl phosphorodithioate.

FAMILY: Organophosphate.

PROPERTIES: Clear, slightly brown liquid, melting point -15°C. Hydrolyzes under alkaline conditions. Stable for at least two years at room temperature. Soluble in acetone, aromatic hydrocarbons, chlorinated hydrocarbons, alcohols.



Terbufos

Action/Use

ACTION: Systemic insecticide, nematocide.

USE: For corn rootworm, other soil insects, nematodes, infesting corn. Sugar beet maggots in sugar beets. Greenbug on grain sorghum.

FORMULATIONS: Granular.

Registration Notes

U.S.: Some or all applications of Contraven*, Counter*, and Counter*

CR* may be classified as RUP.

OUTSIDE U.S.: Includes control of soil insects, nematodes infesting

vegetables and other field, plantation crops.

Environmental Guidelines

SOLUBILITY: In water approx. 15 ppm.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): 4.5 mg/kg (male); 9.0 mg/kg (female). (Mouse): 2.5 mg/kg (male); 9.2 mg/kg (female). (Rabbit): Dermal 1.1 mg/kg (24 hr./single contact).

Counter* 15G (Rabbit): Dermal LD₅₀ approx. 29-34 mg/kg (paste 24 hr./continuous). 15 G Dry granules (Rat): Dermal LD₅₀ 900-1425 mg/kg (24 hr./continuous).

PROTECTIVE CLOTHING: Coveralls over long-sleeved shirt and long pants, chemical-resistant gloves; socks and chemical-resistant footwears, protective eyewear. Chemical-resistant headgear for overhead exposure. Chemical-resistant apron when cleaning equipment, mixing, or loading. A respirator with either an organic vapor-removing cartridge with a prefilter approved for pesticides, or a canister approved for pesticides. Discard, do not reuse, clothing and other absorbent materials that have been heavily contaminated with product.

HANDLING AND STORAGE CAUTIONS: May be fatal if swallowed, inhaled or absorbed through the skin. Rapidly absorbed through skin. Repeated inhalation, or skin contact may without symptoms progressively increase susceptibility to poisoning. Do not breathe dust, do not contaminate food or feed products. Keep out of reach of domestic animals. Not for use or storage in or around the home.

Emergency Guidelines

ANTIDOTE: Atropine.

FIRST AID: Get medical aid. Eyes, immediately flush with plenty of water. Skin, immediately remove contaminated clothing, wash skin thoroughly with soap and water. Inhalation, remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration (preferably mouth-to-mouth). Ingestion, if conscious, drink 1-2 glasses water, induce vomiting until vomit is clear.

EMERGENCY TELEPHONE: 201-835-3100 (American Cyanamid).

Terbumeton

BP: Ciba-Geigy Ltd. (Caragard*)
Probelte, S.A. (Athado Summer*, Athado Winter*, Athado L*)
Sanachem (Pty) Ltd.

Identification

COMMON NAME: Terbumeton (ISO, BSI).

EXP. CODE NUMBER: GS 14259.

OTHER CODE NUMBER: CAS 33693-04-8.

Chemistry

COMPOSITION: 2-(tert-butylamino)-4-(ethylamino)-6-methoxy-s-triazine (CAS 8CI).

FAMILY: Triazine herbicide.

PROPERTIES: White solid, melting point 123-124°C. Soluble in organic solvents.

Action/Use

ACTION: Herbicide.

USE: Postemergence weed control in citrus, apple orchards, vineyards, forestry. Many annual, perennial species of both grasses, broadleaf weeds.

FORMULATIONS: Wettable powder.

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 21 mg/l (96 h) (goldfish). Bee: Mixed products nontoxic. Bird: Nontoxic.

SOIL PARTICLE ADSORPTION: Remains largely in top soil.

SOLUBILITY: In water at room temperature, 130 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III (Caragard*).

TOXICITY: Tech: (Rat): Oral LD₅₀ 433-657 mg/kg. Dermal >3170 mg/kg.

Caragard*: (Rat): Oral LD₅₀ 482-651 mg/kg. Dermal >3100 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FLASHPOINT: >170°C.

FIRST AID: Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water and induce vomiting. Get medical aid.

Terbuthylazine

BP: Ciba-Geigy Ltd. (Gardoprim*)
Makhteshim-Agan (Tyllanex*)
OXON Italia S.p.A.
Probelte, S.A.
Sanachem (Pty) Ltd.

Identification

COMMON NAME: Terbuthylazine (ISO, ANSI, BSI, WSSA).

EXP. CODE NUMBER: GS 13529.

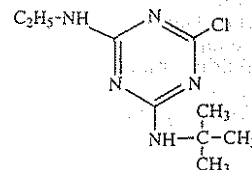
OTHER CODE NUMBERS: CAS 5915-41-3; SHA 080814.

ADDITIONAL TRADE NAME: Primato* M.

Chemistry

COMPOSITION: 2-(tert-butylamino)-4-chloro-6-(ethylamino)-s-triazine (CAS 8CI).

PROPERTIES: White solid, melting point 177-179°C. Solubility in isopropanol about 1%; in dimethylformamide about 10%.



Terbuthylazine

Action/Use

ACTION: Herbicide.

USE: Controls a wide range of weeds in corn, pome fruit, grapes, in afforestation areas and noncrop situations.

FORMULATIONS: WP, FW.

COMBINATIONS: Amigan* (+ ametryn), Bromoterb* and Bromotrilt* (+ bromoxynil) (Makhteshim-Agan).

Registration Notes

U.S.: Not marketed.

Environmental Guidelines

SOLUBILITY: In water at 20°C, 5 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 2000-2160 mg/kg. (Rabbit): Dermal LD₅₀ >3000 mg/kg.

Terbutol (terbucarb) — See Azak*.

Terbutrazole — see Tebuconazole.

Terbutrex* — see Terbutryn.

Terbutrex Combi* — see Simazine; Terbutryn.

Terbutryn

BP: Makhteshim-Agan (Terbutrex*)
Sanachem (Pty) Ltd.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Identification

COMMON NAMES: Terbutryn (ISO-E, ANSI, BSI, WSSA); terbutryne (ISO-F).

EXP. CODE NUMBER: GS 14260.

OTHER CODE NUMBERS: CAS 886-50-0; SHA 080813.

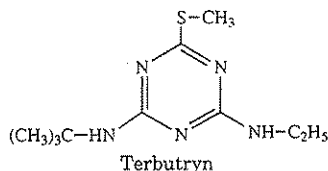
ADDITIONAL TRADE NAME: Prebane* (U.K.).

DISCONTINUED NAMES: Plantonit* (Chemol Trading Ltd. Co.); Igran*, Short-stop* (both Ciba-Geigy Ltd.).

Chemistry

COMPOSITION: 2-(tert-butylamino)-4-(ethylamino)-6-(methylthio)-s-triazine (CAS 886-50-0).

PROPERTIES: White powder, melting point 104-105°C. Readily soluble in organic solvents.

**Action/Use**

ACTION: Selective herbicide.

USE: Preemergence and preplant incorporated on grain sorghum; preemergence and postemergence on fallow land.

FORMULATIONS: Wettable powder, flowable, liquid.

COMBINATIONS: Dakar* (+ bromacil + diuron) (Aragones Agros, S.A.); Senate* (+ trietazine) (Hoechst Schering AgrEvo GmbH); Terbalin* (+ trifluralin), Terbutrex Combi* (+ simazine) (Makhteshim-Agan); Premium* (+ neburon) (Rhône-Poulenc); Igrater* 50WP (+ metobromuron).

Environmental Guidelines

HAZARDS: Fish: Moderately toxic to warmwater fish; highly toxic to coldwater fish. Bee: Practically nontoxic. Bird: Practically nontoxic to upland gamebirds.

SOIL PARTICLE ADSORPTION: Readily adsorbed in soils with high organic or clay content.

SOLUBILITY: Solubility in water 25 ppm at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 2500 mg/kg. Dermal >2000 mg/kg.

Terbutryne — see Terbutryn.

Tercyl* — see Carbaryl.

Tergitol* Emulsifiers — Discontinued by Union Carbide Corp.

Termex* — see Chlordane.

Termidan* — see Chlordane.

Termide* — see Chlordane.

Termi-Ded* insecticide (chlordane) — Discontinued by Rigo Co.

Terminate* — see Quinalphos.

Terminater* — see Deltamethrin.

Terminator* — see Sincocin*.

Termiseal* — see Chlordane.

Tern* — see Fenpropidin.

Terpal* — see Ethephon; Mepiquat Chloride.

Terpal* C — see Chlormequat Chloride; Ethephon.

Terpene Polychlorinates — see Strobane*.

Terpenic Polymer — see Pinene II*.

Terraclor* — see PCNB.

Terraclor Super X20-5* Fungicide (etridiazole + PCNB) — Discontinued 1993 by Gustafson Inc.

Terra-Coat L-205N* Fungicide (etridiazole + PCNB) — Discontinued 1993 by Gustafson Inc.

Terracur*

(Discontinued by Bayer AG)

Identification

TRIVIAL NAME: Thiadiazinthon.

CODE NUMBER: CAS 3655-88-7.

Chemistry

COMPOSITION: Tetrahydro-5-methyl-6-thioxo-2H-1,3,5-thiadiazin-3-ylacetic acid (IUPAC).

Action/Use

ACTION: Nematicide, fungicide, herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1000 mg/kg.

Terracur P* — see Dasanit*.

TerraFlo* Fungicide (etridiazole) — Discontinued by Uniroyal Chemical Co., Inc.

Terrafuran* — see Carbofuran.

Terraguard* Fungicide — see Triflumizole.

Terraguard* Insecticide — see Chlorpyrifos.

Terraklene* — see Paraquat; Simazine.

Terramitsin — see Terramycin*.

Terramycin*

Identification

COMMON NAMES: Oxytetracycline, terramitsin (USSR).

CODE NUMBERS: CAS 79-57-2; SHA 006308.

ADDITIONAL TRADE NAME: Biostat* PA.

Action/Use

ACTION: Preservative (antibiotic).

USE: Formerly for poultry to be cooked.

Terraneb* SP

BP: Kincaid Enterprises, Inc. (Chloroneb 65W, Terraneb* SP)

Identification

COMMON NAMES: Chloroneb (ISO-E, ANSI, BSI); chloronébe (ISO-F).

CODE NUMBERS: CAS 2675-77-6; SHA 027301.

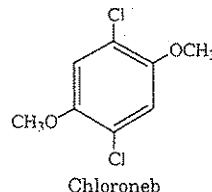
ADDITIONAL TRADE NAMES: N-Flow D (Wilbur-Ellis Co.).

DISCONTINUED NAMES: Demosan* (Du Pont); Flo-Pro* D (Cargill); Tersan* SP.

Chemistry

COMPOSITION: 1,4-Dichloro-2,5-dimethoxybenzene (IUPAC and CAS).

PROPERTIES: White crystals, melting point 133-135°C. Solubility: 11.8% in acetone, 8.9% in xylene, 13.3% in methylene chloride.

**Action/Use**

ACTION: Fungicide.

USE: Supplemental seed treatment, or infurrow soil treatment at planting time, for systemic control of seedling diseases of beans, cotton, soybeans. Supplemental seed treatment for sugar beets; turfgrass to control snow mold (Typhula), Pythium blight, brown patch, Sclerotium blight.

FORMULATIONS: Flowable concentrate, wettable powders.

COMBINATIONS: Nu-Flow AD and Nu-Gro Delta Coat AD (+ metalaxyl), Nu-Flow ND (+ TCMTB) (Wilbur-Ellis Co.).

Environmental Guidelines

SOLUBILITY: In water, 8 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. 75WP (Rabbit): Dermal LD₅₀ >5000 mg/kg. Not an eye irritant by EPA standards.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin or clothing. Wash hands and face thoroughly with soap and water after use and before eating or smoking. Store in a cool, dry place.

Emergency Guidelines

FIRST AID: Eyes, flush immediately with running water. Get medical aid if irritation persists.

Terra-Seal* Carrier (Fuller's Earth) — Discontinued by Mid-Florida Mining Co.

Terra-Sytam* — see Dimefox.

Terrazan* — see PCNB.

Terrazole* — see Captan; Etridiazole.

Terr-O-Cide*

(Discontinued by Great Lakes Chemical Corp.)

Action/Use

ACTION: Nematicide, insecticide.

Registration Notes

U.S.: Trade name reserved for reuse by Great Lakes Chemical Corp.

Terr-O-Cide* II — see Methyl Bromide.

Terr-O-Gas*

BP: Great Lakes Chemical Corp. (Brom-O-Gas*, Brom-O-Sol*, Terr-O-Gas*)

Chemistry

COMPOSITION: Methyl bromide + chloropicrin.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Nematicide, soil insecticide/fungicide/fumigant/herbicide.

FORMULATIONS: Various.

Registration Notes

U.S.: All applications classified RUP.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

PROTECTIVE CLOTHING: Wear all necessary protective equipment including goggles or full face shield when handling. Do NOT wear gloves.

HANDLING AND STORAGE CAUTIONS: Store cylinders upright, secured to rack or wall to prevent tipping, in locked, dry, cool, well ventilated area. Do not contaminate water, food or feed by storage. Do not use cylinders for any other purpose; only the registrant or his designee is authorized to refill containers.

Emergency Guidelines

FLASHPOINT: Nonflammable in concentrated form.

FIRST AID: **Eyes**, flush with water for at least 15 minutes. **Skin**, remove clothing, shoes, jewelry and any other items. Wash thoroughly with soap and water. **Inhalation**, remove to fresh air. Keep warm. If conscious, rinse mouth out with water.**Terr-O-Gel[®] Soil Fumigant (methyl bromide + chloropicrin)**

— Discontinued by Great Lakes Chemical Corp.

Tersan[®] 75 (thiram) — Discontinued.**Tersan[®] 1991** — see Benomyl.**Tersan[®] SP** — Discontinued.**Terset[®]** — see Bromoxynil; Ioxynil; Isoproturon; Mecoprop.**Tetraamminecopper Sulfate** — see Copac[®] E.**Tetrachlorure de Carbone** — see Carbon Tetrachloride.**Tetrachloroethylene****Identification**

CODE NUMBERS: CAS 127-18-4; SHA 078501.

OTHER NAME: Perchloroethylene.

Registration Notes

U.S.: No longer registered in mixtures with grain protectants, certain liquid grain fumigants.

Tetrachloronitrobenzene — see Fusarex[®].**Tetrachloronitroethane** — see GASPA Fumigant.**Tetrachlorophenol**

— Discontinued by Dow Chemical Co.)

Identification

CODE NUMBERS: CAS 25167-83-3; SHA 063004.

ADDITIONAL TRADE NAME: Dovicide[®] 6.**Chemistry**

COMPOSITION: 2,3,4,6-Tetrachlorophenol.

Action/Use

ACTION: Wood preservative.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Guinea Pig): Oral LD₅₀ 250 mg/kg.**Tetrachlorothiophene** — see Penphene[®].**Tetrachlorvinphos**BP: Fermenta Animal Health Co. (Rabon[®], Debantic[®]).**Identification**

COMMON NAMES: Tetrachlorvinphos (ISO, BSI); stirofos (ESA);

CVMP (Japan).

EXP. CODE NUMBER: SD 8447 (Shell Chemical Co.).

OTHER CODE NUMBERS: CAS 22248-79-9; CAS 961-11-5 (for

mixed E/Z isomers); SHA 08370; OMS 595 (WHO); ENT-25841.

ADDITIONAL TRADE NAMES: Appex[®], Dust M[®], Gardicide[®], Gardona[®]

(American Cyanamid Co.).

DISCONTINUED TRADE NAME: Stirofos[®] (Fermenta Animal

Health Co.)

Chemistry

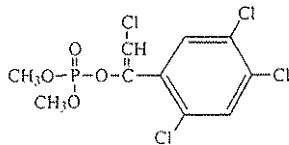
COMPOSITION: (Z)-2-chloro-1-(2,4,5-trichlorophenyl)vinyl dimethyl

phosphate (IUPAC).

FAMILY: Organophosphate.

PROPERTIES: Off-white crystalline solid. Melting point 94-97°C.

Limited solubility in most aromatic hydrocarbons.



Tetrachlorvinphos

Action/Use

ACTION: Insecticide.

USE: Contact and stomach poison for houseflies, chicken mites on livestock and their premises; larvicide for animal feed.

FORMULATIONS: Emulsifiable concentrate, wettable powder, granular, oral larvicide, dust.

Registration NotesOUTSIDE U.S.: Debantic[®] (Fermenta).**Environmental Guidelines**

HAZARDS: Fish: Toxic. Bee: Toxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >2,000 mg/kg. (Rabbit): Dermal LD₅₀ >2500 mg/kg.**Emergency Guidelines**

ANTIDOTE: Atropine or atropine plus 2-PAM.

TetraconazoleBP: ISAGRO S.p.A. (Domark[®], Eminent[®], Arpege[®], Lospel[®])**Identification**

COMMON NAMES: Tetraconazole (BSI, draft E-ISO).

EXP. CODE NUMBER: M 14360.

Chemistry

CHEMICAL NAME: (IUPAC): (±)-2-(2,4-dichlorophenyl)-3-(1H-1,2,4-triazol-1-yl)propyl 1,1,2,2-tetrafluoroethyl ether.

FAMILY: Triazoles

PROPERTIES: Viscous, colorless oil. Vapour pressure: 1.6 mPa

(20°C). Solubility (20°C): 150 mg/l water; miscible with acetone, dichloromethane, methanol. Kow: 3400 (23°C). Stable in water to sunlight; to hydrolysis pH5 and pH9. Slightly corrosive to copper.

Action/Use

ACTION: Systemic fungicide.

USE: Foliar spray in cereals, sugar beet, grapes, pome fruits and vegetables; also as seed treatment. Effective against *Erysiphales*, *Puccinia* spp., *Uromyces* spp., *Cercospora beticola* and *Venturia* spp.

FORMULATIONS: Emulsifiable concentrate, oil-in-water emulsion, liquid for seed treatment.

COMBINATIONS: Eminent[®] Star (+ chlorothalonil) (ISAGRO).**Environmental Guidelines**

SOLUBILITY: Low in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY: (Rat) Oral LD₅₀ 1250 mg/kg (male); Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Wear appropriate protective clothing and equipment.

HANDLING AND STORAGE CAUTIONS: Biological activity remains practically unvaried for 2 years under environmental conditions provided product stored in unopened, undamaged original containers in shaded, well-aired places. Do not contaminate water, food or feed by storage or disposal. Do not re-use container.

PRODUCT/WASTE DISPOSAL: Dispose of empty container by procedures recommended by federal, state or local authorities. Open dumping is prohibited. Recommended product temperature should not exceed 30-40°C. Stack containers to permit a free circulation of air at bottom and inside of piles.

Emergency Guidelines

FLASHPOINT: 69°C.

FIRST AID: **Ingestion**: induce vomiting. **Eyes**: flush with plenty of water. **Skin**: wash thoroughly with soap and plenty of water.**Tetradifon**BP: Ciech-Agrochemia (Pol-Akaritox[®])Solvay Duphar B.V. (Tedion V-18[®])**Identification**

COMMON NAMES: Tedion (former exception in Turkey, USSR), tetradifon (ISO, ANSI, BSI, JMAF, ESA).

EXP. CODE NUMBER: Nia 5488 (FMC Corp.); CN 29309090 (Ciech-Agrochemia).

OTHER CODE NUMBERS: CAS 116-29-0; SHA 079202; ENT 23737.

ADDITIONAL TRADE NAMES: Acimite[®] (Agro Chemicals Industries Ltd.); Aracnol K[®] (Diachem S.P.A.); Rotetra[®] (Rotam Group).DISCONTINUED NAMES: Badilin Blumenspray[®] (+ dodine + fenitrothion) (BASF AG).**Chemistry**

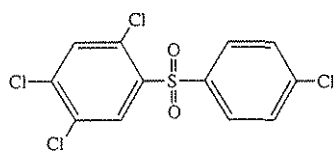
COMPOSITION: (IUPAC): 4-chlorophenyl 2,4,5-trichlorophenyl sulfone; 2,4,4',5-tetrachlorodiphenyl sulfone. (CAS): 1,2,4-trichloro-5-[(4-chlorophenyl)sulfonyl]benzene.

PROPERTIES: Tech melting point 144°C-147°C. Resistant to hydrolysis by acid or alkali. Soluble in acetone and alcohol; more soluble in aromatic hydrocarbons, chloroform and dioxan.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.



Tetradifon

Action/Use

ACTION: Acaricide.

USE: Larvicidal and ovicidal activity on spider mites. Used on many species of fruits (including citrus and nuts), vegetables, cotton, hops, tea, and ornamentals.

FORMULATIONS: Emulsifiable concentrate, wettable powder, smoke generators.

COMBINATIONS: Plidion* (+ cyhexatin) (Chemia S.p.A.); Omite* TD (+ propargite) (Uniroyal Chemical Co., Inc.); Vapcothion* (+ dicofol) (VAPCO).

Registration Notes

OUTSIDE U.S.: Pol-Akaritox* in Spain, Hungary, Jordan, Iran, Poland, Thailand CIS.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ >10 mg/l (3 h) (carp). Bee: Nontoxic. Bird: Low.

SOLUBILITY: In water 0.08 mg/l at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg. (Rabbit): Dermal LD₅₀ >10,000 mg/kg.Pol-Akaritox* (tech): (Rat): Oral LD₅₀ >14,700 mg/kg.

PROTECTIVE CLOTHING: Minimum safe handling recommendations.

Emergency Guidelines

FLASHPOINT: Combustible.

Tetraethyl Pyrophosphate — see TEPP.

Tetrafluron — see Tomilon*.

Tetraiodoethylene**Identification**

CODE NUMBERS: CAS 513-92-8; SHA 046908.

Action/Use

ACTION: Fungicide.

USE: Postharvest to prevent decay in cantaloupes.

Tetralate*

BP: Roussel Uclaf Corp.

Chemistry

COMPOSITION: Tetramethrin + resmethrin.

Action/Use

ACTION: Insecticide.

USE: For use in aerosols and space and contact insecticides.

FORMULATIONS: Aerosols, emulsifiable concentrates, oil soluble, stable emulsions.

Tetram*

(Discontinued 1968 by Imperial Chemical Industries, Ltd.)

Identification

COMMON NAME: Amiton.

CODE NUMBERS: CAS 3734-97-2; SHA 057301.

ADDITIONAL TRADE NAME: Citram*.

Action/Use

ACTION: Acaricide, insecticide.

TetramethrinBP: Atabay Agrochemicals & Veterinary Products Inc.
Chinoin Pharmaceutical & Chemical Works Co. Ltd.
Endura S.p.A. (Tech)
Lucky Ltd.
Sumitomo Chemical Co., Ltd. (Neo-Pynamin*)**Identification**

COMMON NAMES: Tetramethrin (ISO-E, ANSI, BSI); phthalthrin (JMAF); tetramethrine (ISO-F).

EXP. CODE NUMBER: FMC 9260 (FMC Corp.); SP 1103 (Sumitomo Chemical).

OTHER CODE NUMBERS: CAS 7696-12-0; SHA 069003; OMS-1011 (WHO).

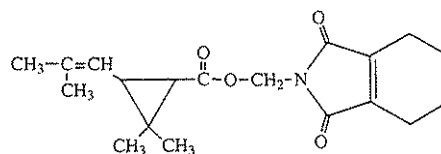
ADDITIONAL TRADE NAMES: Multicide* (Roussel Uclaf Corp.).

Chemistry

COMPOSITION: 3,4,5,6-tetrahydrophthalimidomethyl chrysanthemate or 3,4,5,6-tetrahydrophthalimidomethyl (LRS)-cis,trans-chrysanthemate (IUPAC).

PROPERTIES: White crystalline solid, with a slight pyrethrum-like odor. Specific gravity 1.108 at 20/20°C; melting point 60-80°C. Highly

soluble in aromatic hydrocarbons, sparingly soluble with aliphatic hydrocarbons.



Tetramethrin

Action/Use

ACTION: Insecticide.

USE: Synthetic pyrethroid compound developed in Japan. Water-based pressurized sprays for flying insects, garden pests. Control of stored product pests is promising.

FORMULATIONS: Aerosol, oil liquid, emulsifiable concentrate.

COMBINATIONS: Duracide* 15 (+ piperonyl butoxide) (Endura S.p.A.); Tetralate* (+ resmethrin) (Roussel Uclaf Corp.); Phinco-T22* (+ permethrin + piperonyl butoxide) (VAPCO).

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Toxic.

SOLUBILITY: Insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Ordinary good manufacturing practices and sanitation. Ventilate well. Store in closed drum in a cool, dry place.

See Pyrethroids.

d-Tetramethrin — see Neo-Pynamin Forte*.

Tetramethrine — see Tetramethrin.

Tetramine**Identification**

OTHER NAME: TEM.

Chemistry

COMPOSITION: Tetramethylene disulfotetramine.

Action/Use

ACTION: Rodenticide.

Safety Guidelines

TOXICITY: Reported more toxic than strychnine.

Tetranactin

BP: Chugai Pharmaceutical Co., Ltd.

Identification

COMMON NAME: Tetranactin.

ChemistryCOMPOSITION: 5,14,23,32-tetraethyl-2,11,20,29-tetramethyl-4,13,22,31,37,38,39,40-Octa oxapentacyclo [32.2.1.1¹⁰.1^{16,19}.1^{25,28}] tetranactane-3,12,20,30-tetraone.PROPERTIES: Colorless prism, vapor pressure 1-5 × 10⁻⁴. Readily soluble in chloroform, dimethylsulfoxide, dichloromethane, benzene, toluene, ethyl acetate and acetone; soluble in methanol, ethanol, and n-hexane.**Action/Use**

ACTION: Antibiotic miticide.

USE: Concentrations of <10 ppm are lethal to adult (carmine, two-spotted, kanzawa, European red) spidermites in greenhouses.

Environmental Guidelines

SOLUBILITY: Insoluble in water.

See Polynactins Complex.

Tetrasul — see Animert* V 101*.

Tetron* — see TEPP.

Tetroxone* M Herbicide (bromoxynil + ioxynil + dichlorprop + MCPA) — Discontinued 1984 by ICI Agrochemicals.

Thallium Sulfate**Identification**

COMMON NAME: Thallium sulfate.

CODE NUMBERS: CAS 7446-18-6; SHA 080001.

Action/Use

ACTION: Rodenticide.

USE: For rats, moles, and house mice.

FORMULATIONS: Paste, grain.

Registration Notes

U.S.: Labelling must indicate for use by government agencies only.

Sale in some localities is prohibited.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

TOXICITY: (Rat, brown): Oral LD₅₀ 16 mg/kg.
HANDLING AND STORAGE CAUTIONS: Thallium compounds are dangerous, slow-acting cumulative poisons.

Thanite*

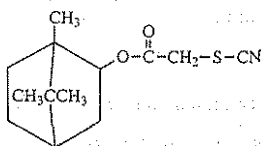
(Discontinued by McLaughlin Gormley King Co.)

Identification

CODE NUMBERS: CAS 115-31-1; SHA 047101.

Chemistry

COMPOSITION: Isobornyl thiocyanacetate, other related terpenes.



Isobornyl Thiocyanacetate

Action/Use

ACTION: Contact insecticide; knockdown agent.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1603 mg/kg. (Guinea Pig): LD₅₀ 551 mg/kg. Primary irritant on human skin in higher concentrations; safe at lower dilutions.

Themanitar* — see Methamidophos.

Thermal Aerosol Fog

An aerosol fog is produced by blowing hot air past a hydraulic sprayer nozzle emitting an oil-base spray. The air passes at high velocity through a combustion chamber heated to between 800° and 1200°F. The oil solution, delivered into the hot-air blast a short distance inside the muzzle of the equipment, emerges as a dense insecticide fog. See Steam Aerosol Fog.

Thiabendazole

BP: Merck & Co., Inc. (Arbortect*, Mertect*, Storite*, TBZ*, Tecto*, Thiabendazole*)

Identification

COMMON NAME: Thiabendazole (ISO, BSI, JMAF, BAN).

TRIVIAL NAME: TBZ.

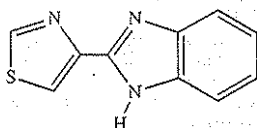
CODE NUMBERS: CAS 148-79-8; SHA 060101.

ADDITIONAL TRADE NAMES: Brogdex* 594-F, 597-F, 598-F (Brogdex Co.); Decco 20S* (ELF Atochem Agri B.V.); Gustafson LSP* (Gustafson Inc.); RPH* (Rothwell Plant Health Ltd.).

DISCONTINUED NAMES: Bioguard*, Tobaz* (Merck & Co., Inc.).

Chemistry

COMPOSITION: 2-(4'-Thiazolyl)-benzimidazole.



Thiabendazole

Action/Use

ACTION: Systemic fungicide; anthelmintic (TBZ*, Thiabendazole*).

USE: As fungicide, controls green mold, blue mold, and stem end rot of citrus fruits; to control Fusarium basal rot and Penicillium blue mold on ornamental bulbs and corms; to control crown rot on bananas; to control blue mold rot, bull's eye rot and gray mold on apples and pears; to control black rot, scurf and foot rot of sweet potatoes; to control Fusarium (dry rot) in potato storage. Also as a preservative for reconstituted tobacco.

FORMULATIONS: Wettable powder, flowable, dust.

COMBINATIONS: Apl-Luster*, Apl-Luster* T (ELF Atochem Agri B.V.); Freshgard* (+ imazalil) (FMC, Food Processing Systems Div.); Captan T (+ captan), Rival* (+ captan + PCNB), RTU* Flowable (+ thiram), Vitavax*-Extra (+ carboxin + imazalil) (Gustafson); Crown* (+ carboxin) (Uniroyal Chemical Co., Inc.); Agrosol* (+ captan + molybdenum), Agrosol* Flowable (+ captan), Agrosol* Pour-On and Agrosol* Plus (+ thiram + molybdenum), Agrosol* T (+ thiram), Granox* Plus (+ maneb) (Wilbur-Ellis); Ferrax* (+ flutriafol + ethirimol + imazalil), Vincit* (+ flutriafol + imazalil) (ZENECA Agrochemicals).

Environmental Guidelines

HAZARDS: Fish: Slightly toxic. Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3100 mg/kg.

Thiadiazine — see Milneb.

Thiadiazinthon — see Terracur*.

Thiameturon-methyl — see Pinnacle*.

Thianosan* — see Dithiocarbamates; Thiram.

Thiazafluron — see Erbotan*.

Thiazfluron — see Erbotan*.

Thibenzole* — see Thiabendazole.

Thickener/Suspending Agents

Used to prevent settling out and hard packing of pesticide chemicals in water systems.

Thidiazuron — see Dropp*; Ginstar*.

Thifensulfuron Methyl — see Pinnacle*.

Thifor* — see Endosulfan.

ThiLor* — see Thiram.

Thimar* (thiram) — Discontinued.

Thimenox* Insecticide (phorate) — Discontinued by Crystal

Chemical Inter-America.

Thimer* (thiram + PMA) — Discontinued by W.A. Cleary Chemical Corp.

Thimerosal*

BP: Burlington Bio-Medical & Scientific Corp. (Thimerosal*)

Identification

CODE NUMBERS: CAS 54-64-8; SHA 078901.

ADDITIONAL TRADE NAMES: Elcide*, Merthiolate*.

Chemistry

COMPOSITION: Sodium ethylmercury thiosalicylate.

Action/Use

ACTION: Fungicide.

USE: For cotton seed treatment.

Emergency Guidelines

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Thimet* — see Phorate.

Thimul* — see Endosulfan.

Thin-It* — see Naphthaleneacetamide.

Thin 'n Stop-Drop* — see 1-Naphthaleneacetic Acid.

Thiobel* — see Cartap Hydrochloride.

Thiobencarb — see Saturn*.

Thiobencarbe — see Saturn*.

Thiocarboxime

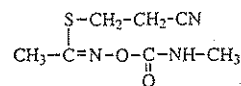
Identification

COMMON NAME: Thiocarboxime (ISO, BSI)

CODE NUMBER: CAS 25171-63-5.

Chemistry

COMPOSITION: 3-[1-(methylcarbamoyloxyimino)ethylthio] propionitrile (IUPAC).



Thiocarboxime

Action/Use

ACTION: Insecticide.

Thiocron* Extra Insecticide (amidithion + fenitrothion) — Discontinued by Ciba-Geigy Ltd.

Thiocron* Insecticide (amidithion) — Discontinued by Ciba-Geigy Ltd.

Thiocure* M

(Discontinued by Rohm and Haas Co.)

Chemistry

COMPOSITION: Methyl-4(O-furfurylidene aminophenyl)3 thioallophanate.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Toxic. May be irritating to the skin, eyes, and nose.

Thiocyclam — see Thiocyclam Hydrogen Oxalate.

Thiocyclam Hydrogen Oxalate

BP: Sandoz Agro Ltd. (Evisect*, Evisekt*)

Identification

COMMON NAMES: Thiocyclam hydrogen oxalate, thiocyclam (ISO, BSI, JMAF).

EXP. CODE NUMBER: SAN 155 I.

OTHER CODE NUMBERS: CAS: 31895-21-3 (thiocyclam), 31895-22-4 (thiocyclam hydrogen oxalate).

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

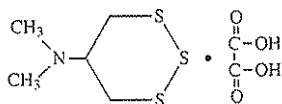
Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Chemistry

COMPOSITION: N,N-dimethyl-1,2,3-trithian-5-amine hydrogen oxalate. Free base N,N-dimethyl-1,2,3-trithian-5-amine.

FAMILY: Nereistoxin, tritiane.

PROPERTIES: Colorless, odorless crystalline solid melting with decomposition at 125-128°C. Half life at 25°C in buffered aqueous solutions (40ppm) approx. 183 days at pH5, 6 days at pH9 and pH7. Very sensitive to light. Solubility in acetone, ethanol, <1%. Practically insoluble in chloroform, toluol, hexan.



Thiocyclam Hydrogen Oxalate

Action/Use

ACTION: Selective stomach insecticide with contact action for lepidopterous and coleopterous pests; some dipterous and thysanopterous pests. Capable of acropetal translocation.

USE: On potato for Colorado potato beetle; rape for coleopterous and lepidopterous pest complexes, irrigated rice for stemborers, etc., maize for corn borer and tanymecus, sugarbeet for sugarbeet weevil and other coleopterous pests, sugarcane for sugarcane stemborer, fruit trees for lepidopterous leafminer and other lepidopterous pests, and vegetables for leafminer, and various lepidopterous, coleopterous pests.

FORMULATIONS: Soluble powder, granular.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 1.01 mg/l (96 h) (carp); 0.04 mg/l; (96 h) (rainbow trout). Bee: Moderately toxic.

SOLUBILITY: Solubility in water 8.4% (23°C).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 399 mg/kg (male), 370 mg/kg (female); Dermal 1000 mg/kg (male), 880 (female). In 2-year feeding trial, NOEL was 100 ppm.

HANDLING AND STORAGE CAUTIONS: Stable at room temperature. Store in original container in locked area, away from children, food, feed.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water, foam, carbon dioxide, dry chemical.

FIRST AID: In all cases, get medical aid.

Thiodan* — see Endosulfan.

Thiodemeton — see Disulfoton.

Thiodicarb — see Larvin*.

Thiofanox**Identification**

COMMON NAMES: Thiofanox (ISO, ANSI, BSI, ESA); thiofanocarb (So. Africa).

EXP. CODE NUMBER: DS-15647 (Diamond Shamrock).

OTHER CODE NUMBERS: CAS 39196-18-4; SHA 109201.

ADDITIONAL TRADE NAMES: Benelux* (Diamond Shamrock); Dacamax* (Rhône-Poulenc).

Chemistry

COMPOSITION: 3,3-dimethyl-1-(methylthio)-2-butanone O-[(methylamino)carbonyl]oxime (CAS 9CI).

Action/Use

ACTION: Systemic soil insecticide.

USE: For control of susceptible aphids, mites, thrips, plant bugs, leafhoppers, and beetles for 5-10 weeks and up to a full season depending on crop and pest.

FORMULATIONS: Granules.

Registration Notes

U.S.: Not registered. Crops under investigation include cotton, potato, sugar beet, peanut, soybeans, some cereals, sugarcane, and rape seed. OUTSIDE U.S.: Aphidic for sugar beets in Belgium, Denmark, France, Germany, Greece, Netherlands, Spain, and U.K.; for potatoes in Spain and U.K.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 130 mg/l (96 h) (rainbow trout). Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

Emergency Guidelines

ANTIDOTE: Atropine sulfate; do NOT use 2-PAM (pralidoxime chloride).

Thiofor* — see Endosulfan.

Thiohempa**Chemistry**

COMPOSITION: Hexamethylphosphorothioic triamide; sulfur analog of hempa.

Action/Use

ACTION: Insect chemosterilant.

Registration Notes

U.S.: EUP.

Thioknock* — see Thiram.

Thiolux* — see Sulfur.

Thiometon

BP: Sandoz Agro Ltd. (Ekatim*)

Identification

COMMON NAMES: Thiometon (ISO, BSI, JMAF), dithiométon (ISO-F); M-81 (USSR).

CODE NUMBERS: CAS 640-15-3; SHA 456300.

ADDITIONAL TRADE NAMES: Thiotox* (All India Medical Corp.).

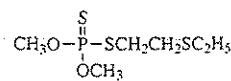
DISCONTINUED NAME: Luxistelm* (Sandoz Ltd.).

Chemistry

COMPOSITION: S-[2-(ethylthio)ethyl] O,O-dimethyl phosphorodithioate (CAS 8 and 9 CI).

FAMILY: Organophosphorus.

PROPERTIES: Colorless oil with a characteristic odor, boiling at 110°C at 0.1 mm Hg, vapor pressure 23 mPa at 20°C, d₂₀²⁰ 1.209, n_D²⁰ 1.5515. Slightly soluble in light petroleum; soluble in most organic solvents. Unstable in pure form; stable in non-polar solvents. Easily hydrolyzed in aqueous solution at 25°C, 50% loss in 25 days at pH 3, 27 days at pH 6 and 17 days at pH 9.



Thiometon

Action/Use

ACTION: Systemic insecticide.

USE: For aphids, psyllids, woolly aphids, sawflies, jassids, thrips, and mites (not organophosphoric-resistant).

FORMULATIONS: Emulsifiable concentrate, ULV.

COMBINATIONS: Ethimeton* 4 (+ diazinon), Mavrik* B (+ tau-fluvalinate), Serk* (+ endosulfan), Tombel* (+ quinalphos) (all Sandoz Agro Ltd.).

Environmental Guidelines

HAZARDS: Bee: Toxic.

SOLUBILITY: In water 200 mg/liter (25°C).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 120-130 mg/kg; Dermal LD₅₀ >1000 mg/kg; In 2-year feeding trials NOEL 2.5 mg/kg diet.

HANDLING AND STORAGE CAUTIONS: Store in original container in a locked area away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Atropine with PAM or obidoxime chloride.

FIRST AID: In all cases, get medical aid.

Thionate* — see Endosulfan.

Thionazin — see Zinophos*.

Thionazine — see Zinophos*.

Thioneb* — see Metiram-Complex.

Thionex — see Endosulfan.

Thionic* — see Dithiocarbamates; Ziram.

Thionyl* — see Methyl-Parathion.

Thiophal* — see Folpet.

Thiophan* — see Thiophanate-Methyl.

Thiophanate**Identification**

COMMON NAMES: Thiophanate (ISO, BSI, JMAF, BAN), thiophanate-éthyl (ISO-F).

EXP. CODE NUMBER: NF 35 (Nippon Soda).

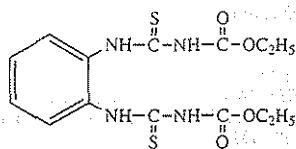
OTHER CODE NUMBERS: CAS 23564-06-9; SHA 103401; EINEC 2457412.

DISCONTINUED NAMES: 3336-F*, Cercobin* (W.A. Cleary Chemical Corp.); Spectro*, Topsin* (Nippon Soda Co., Ltd.).

Chemistry

COMPOSITION: Diethyl 4,4'-(o-phenylene)bis(3-thioallophanate) (IUPAC); diethyl [1,2-phenylenebis(iminiocarbonothioyl)] bis(carbamate) (CAS 9CI).

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.



Thiophanate

Action/Use

ACTION: Systemic fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY (Rat): Oral LD₅₀ >15,000 mg/kg.

Thiophanate-ethyl — see Thiophanate.

Thiophanate-methyl

- BP: W.A. Cleary Chemical Corp. (3336*)
- ELF Atochem North America (Topsin® M)
- Fulon Chemical Industrial Co., Ltd. (Topmegen*)
- Grace-Sierra Crop Protection Co. (Domain® FL, Fungo 50*)
- HELM AG
- Jin Hung Fine Chemicals Co., Ltd. (Thiophan*)
- Kuo Ching Chemical Co., Ltd.
- Nippon Soda Co., Ltd. (Topsin® M)
- Sundat (S) Pte. Ltd.

Identification

COMMON NAME: Thiophanate-methyl (ISO, ANSI, BSI, JMAF).

EXP. CODE NUMBER: NF 44.

OTHER CODE NUMBERS: CAS 23564-05-8; SHA 102001; EINECS 2457407.

ADDITIONAL TRADE NAMES: TSM* (Agsin Pte. Ltd.); Cercobin M* (W.A. Cleary); Tops* 5, Tops* 2.5D*, Tops* MZ (Gustafson Inc.); Miltodthane* (Rhône-Poulenc); Enovit Methyl, Frumidor*, Sipcplant*, Sipcasan*, Sipcavit* (all S.I.P.C.A.M.); Sigma*.

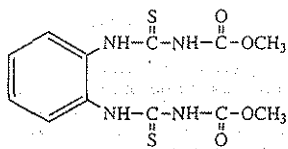
DISCONTINUED NAMES: Chipco* Spot Kleen* (Rhône-Poulenc); Ditek* (Sandoz Crop Protection Corp.).

Chemistry

COMPOSITION: Dimethyl [(1,2-phenylene)bis-(iminocarbonothioyl)] dis(carbamate); or dimethyl 4,4'-o-phenylenebis[3-thioallophanate] (IUPAC).

FAMILY: Carbamates.

PROPERTIES: Unique thioallophanate structure; colorless crystalline solid; melting point 168°C with decomposition.



Thiophanate-methyl

Action/Use

ACTION: Systemic fungicide.

USE: Broad spectrum of plant disease control in vegetables, fruit, turf, soybeans, peanuts, almonds, celery. Topsin® M ULV for aerial application on banana, wheat, rice, sugar beet.

FORMULATIONS: Wettable powder, paste, flowable, granules, dust, ULV.

COMBINATIONS: Compass® SC (+ iprodione); Labilite® (+ maneb), Homai® (+ thiram), Mugibon® (+ mancozeb) (Nippon Soda Ltd.); Decco® Salt No. 22 (+ DCNA).

Registration Notes

U.S.: Topsin-M® voluntarily cancelled for sugarcane and all postharvest uses. Tops-M2® state registration in Idaho.

Environmental Guidelines

HAZARDS: Fish: Slightly toxic (sunfish, rainbow trout); Highly toxic (catfish); Bird: Very low toxicity.

SOLUBILITY: Sparingly soluble in most organic solvents; slightly in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY (Rat): Oral LD₅₀ 7500 mg/kg. Inhalation LC₅₀ 1.7 mg/l (4h) and 10.2 mg/l (1h).

PROTECTIVE CLOTHING: Rubber gloves, respirator, rubber boots, long-sleeved shirt/jacket and long pants.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place,

away from feed and foodstuffs. Avoid contact with mouth, eyes, and skin. Keep out of reach of children.

Emergency Guidelines

ANTIDOTE: Thiophanate; atropine sulfate.

Thiophanates

A group of systemic fungicides including thiophanate (NF 35), thiophanate-methyl (NF 44), and Topsin®.

Thiophos® Insecticide (parathion) — Discontinued 1989 by American Cyanamid Co.

Thioquinox — see Eradex®.

Thiosulfan® Insecticide/Acaricide (endosulfan) — Discontinued by Hooker Chemical Corp.

Thiotopp — see Bladafum®.

Thiotex* — see Thiram.

Thiotox* — see Thiometon.

Thiovit* — see Sulfur.

Thipel* — see Thiram.

Thi-Protect-L® Fungicide (thiram) — Discontinued by North American Plant Breeders.

Thiram

- BP: Burlington Bio-Medical & Scientific Corp.
- W.A. Cleary Chemical Corp. (Spotrete®)
- ELF Atochem Agri B.V. (Tripomol®)
- General Quimicas S.A. (Tiurante®)
- Grupo Bioquimico Mexicano S.A. de C.V. (Metacid® TS)
- HELM AG
- Hubei Sanonda Co., Ltd.
- India Pesticides Ltd.
- UCB Chemicals (Agrochemicals Headquarters)
- (Tech TMTD, Thianosan®, Thiram Granuflo®, Thiram 75 WDG®, Thiram 80 WDG®)
- UCB Chemicals Corp. (Tech TMTD, Thianosan®, ThiLor®, Thipel®, Thiram Granuflo®, Thiram 65®, Thiram 75 WDG®)

Identification

COMMON NAMES: Thiram (ISO-E, BSI); thirame (ISO-F); TMTD (USSR); thiuram (JMAF).

CODE NUMBERS: CAS 137-26-8; SHA 079801; ENT-987; EINECS 205-286-2.

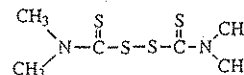
ADDITIONAL TRADE NAMES: Pomarsol Forte® (Bayer AG); TMTD 50 Borches® (Diachem S.P.A.); Thiram-30 (Gustafson Inc.); AAtack®, Aules®, Chipco® Thiram 75® and Rhodiasan Express® (Rhône-Poulenc); Fernide®, Fernasan®, Nomersan® (ZENECA Agrochemicals); Thioknock®, Thiotex®, Thirasan®, Thiuramin®, Tirampa®, TMTD, Trametan®, Tuads®.

DISCONTINUED NAMES: Triquintam® (+ PCNB) (Atochem Agri B.V.); Polyram® Ultra (BASF AG); Bromosan-F® (+ thiophanate), Cad-Trete® (+ cadmium chloride hydrate), Thimer® (+ PMA) (W.A. Cleary); Arasan®, Thylate® (Du Pont); Double-Noctin® II, Double-Noctin® L, Stand-Up Plus®, Triple-Noctin® II (Gustafson Inc.); Carbina® TZ (+ zineb), Fernasan®, Mercuram® (+ phenylmercury-dimethyldithiocarbamate + malachite green), Serinal® T (+ chlozolinate) (ISAGRO); Moly-Co-Thi® (+ molybdenum) (Kalo, Inc.); Thi-Protect-L® (North American Plant Breeders); Tersan® 75; Thimar®; Thiram 75®; Thiramad® (Sierra Crop Protection Co.); Vancide® TM (Vanderbilt).

Chemistry

COMPOSITION: Bis(dimethylthiocarbamoyl) disulfide; or tetramethylthiuram disulfide (IUPAC).

PROPERTIES: Crystalline. Slightly soluble in carbon disulfide; soluble in chloroform.



Thiram

Action/Use

ACTION: Fungicide, seed protectant, animal repellent, rubber curing accelerator.

USE: As seed protectant, reduces losses from seed decay, damping off and seedling blights caused by many seed-borne and soil-borne organisms. As fungicide, for certain fungus diseases of apples, peaches, strawberries, onions, celery, and tomatoes. For large brown patch snowmold and dollar spot on fine turfs. As repellent, protects fruit trees, shrubs, ornamentals, and nursery stock from rabbit, rodent and deer depredation. For use as seed protectant crop fungicide, turf fungicides, and repellent (Gustafson 42-S, Thipel®).

FORMULATIONS: Dust, flowable, wettable powder, water dispersible granules, and water suspension. Thiram tech is a fine, free flowing powder (98% a.i.), 30% flowable. Thiram 50WP (Gustafson Inc.).

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

UCB Thiram Tech. Micropearls* (96.5%). Water dispersible granules: Thiram 75, 80, Thiram Granuflo*, Thianosan* (UCB).

COMBINATIONS: Ronilan* T Combi and Silbos* DF (+ vinclozolin) (BASF AG); Oftanol* T (+ isofenphos), Raxil* T (+ tebuconazole) (Bayer AG); Southland Pearson Moly-Stand* (+ molybdenum) (Drexel Chemical); Moly-T* (+ molybdenum), Pro-Gro* (+ carboxin), RTU*-Baytan*-Thiram* (+ triadimenol), RTU* Flowable (+ thiabendazole), Thiram 42-S, Triple Noctin* L (+ molybdenum + inoculant), Vitavax*-Thiram-Lindane (+ carboxin + lindane), RTU*-Vitavax*-Thiram and Vitavax* 200 (+ carboxin), Yield Shield* (+ cobalt + iron + molybdenum) (Gustafson Inc.); Homai* (+ thiophanate-methyl) (Nippon Soda Co.); Vitavax*-200 (+ carboxin) (Proficol El Carmen S.A.); Dirac Express* (+ iprodione) (Rhône-Poulenc); Protector D* and Protector L* (+ molybdenum), Vitavax T-L* (+ carboxin) (Trace Chemicals, Inc.); ThiLor* (+ Lorsban*) (UCB Chemicals Corp.); Agrosol* Pour-On and Agrosol* Plus (+ thiabendazole + molybdenum), Agrosol* T (+ thiabendazole) (Wilbur-Ellis).

Registration Notes

OUTSIDE U.S.: TMTD 50 Borches*, Tiurante*, Metacid* TS, Oftanol* T, Raxil* T.

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic.

SOLUBILITY: Slightly soluble (30 ppm) in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 1000 mg/kg. Dermal LD₅₀ >5000 mg/kg.

PROTECTIVE CLOTHING: Protective clothing, rubber gloves and mask with filter when handling the tech ai.

HANDLING AND STORAGE CAUTIONS: Use with adequate ventilation, avoid breathing dust. Avoid contact with eyes, skin or clothing, wash thoroughly after handling. Contact may cause allergic reaction. Avoid alcohol before and after use.

SPILL CONTROL/CLEANUP: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

Emergency Guidelines

FIRST AID: Spotrete* F: Get medical aid. **Eyes, Skin**, wash immediately with plenty of water. **Ingestion**, induce vomiting as soon as possible. EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Thiram 65* — see Thiram.

Thiram 75* (thiram) — discontinued.

Thiram 75 WDG* — see Thiram.

Thiram 80 WDG* — see Thiram.

Thiram Granuflo* — see Thiram.

Thiram-30 Fungicide* — see Thiram*.

Thiramad* Fungicide/Repellent (thiram) — Discontinued 1992 by Sierra Crop Protection Co.

Thirame — see Thiram.

Thirasan* — see Thiram.

Thistrol* — see MCPB.

Thiuram — see Thiram.

Thiuram M* Fungicide (mercuric mercurous chloride) — Discontinued by Vineland Chemical.

Thiuramin* — see Thiram.

Thiuron* Herbicide (methiuron) — Discontinued by Bayer AG.

Thixotropic

Having the property of certain colloidal gels of coagulating (becoming stiff and jelly-like) when at rest, but becoming fluid when agitated or otherwise subjected to stress.

Three Elephant* Herbicide/Larvicide (borax) — Discontinued by Kerr-McGee.

Threshold Limit Value (TLV)

The airborne concentration of a material at which it is felt that nearly every healthy worker may be exposed for an eight-hour period, daily, for a working lifetime without adverse effects (American Conference of Government Industrial Hygienists).

See Short Term Exposure Level.

Thriptox* — see Tartar Emetic.

Thuricide* — see *Bacillus thuringiensis* var. *kurstaki*.

Thylate* Fungicide (thiram) — Discontinued by Du Pont Agricultural Products.

Thylpar M-50* — see Methyl Parathion.

Thynon* Fungicide (dithianon) — Discontinued by Shell Agrar GmbH & Co. KG.

TI-78 — see Bancol*.

TIA 230 — see Voltage*.

Tiazin* Fungicide (zineb) — Discontinued 1989 by Agrimont S.p.A.

Tiazon* — see Dazomet.

TIBA

Identification

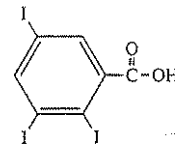
TRIVIAL NAME: TIBA.

CODE NUMBERS: CAS 88-82-4; SHA 009104.

DISCONTINUED NAMES: Floraltone* (+ gibberellic acid) (Rhône-Poulenc); Regim-8* (IMC).

Chemistry

COMPOSITION: 2,3,5-Triiodobenzoic acid compound (as dimethylamine salt).



Action/Use

ACTION: Plant growth regulator.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech. (Rat): Oral LD₅₀ 813 mg/kg. Dermal LD₅₀ >10,200 mg/kg.

Tiempo* — see Temephos.

Tiesene* — see Zineb.

Tigrex* — see Diflufenican; MCPA.

Tilcarex* Fungicide (PCNB) — Discontinued 1989 by Bayer AG.

Tillam*

BP: ZENECA Ag Products

Identification

COMMON NAME: Pebulate (ISO, BSI, JMAF, WSSA).

EXP. CODE NUMBER: R-2061 (Stauffer Chemical Co.).

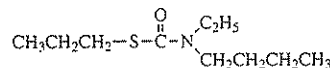
OTHER CODE NUMBERS: CAS 1114-71-2; SHA 041408.

OTHER NAME: PEBC.

Chemistry

COMPOSITION: S-Propyl butyl(ethyl)thiocarbamate (IUPAC).

PROPERTIES: Tech: Amber liquid.



Action/Use

ACTION: Preplant selective herbicide.

USE: Controls both grassy and broadleaf weeds. Used for selective weed control in sugar beets, tobacco, and tomatoes.

FORMULATIONS: Emulsifiable concentrate, granules.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 7.4 mg/l (96 h) (rainbow trout). Bee: Very slightly toxic.

SOLUBILITY: Tech in water 60 ppm at 58°F.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 921-1900 mg/kg. (Rabbit): Dermal LD₅₀ >4640 mg/kg.

PROTECTIVE CLOTHING: Chemical safety glasses or goggles and impervious gloves, footwear, long-sleeved clothing, wide brimmed hat. HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated area away from flammable materials, children, food and feed.

Emergency Guidelines

FLASHPOINT: Tech: 256°F, 124°C (Tag OC).

Tillantox* — see Ceredon*.

Tiller (tillering) — see Growth Stages for Cereal Crops.

Tiller* — see 2,4-D; Fenoxaprop-P-ethyl; MCPA.

Tillex*

Chemistry

COMPOSITION: Ethoxyethylmercury hydroxide.

Action/Use

ACTION: Fungicide (seed dressing).

Tillox* — see Galtak*.

Tilt* — see Propiconazole.

Tilt* C — see Carbendazim; Propiconazole.

Tilt* CT — see Chlorothalonil; Propiconazole.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Tilt* Excel — see Carbendazim; Chlorothalonil; Propiconazole.
Tilt* MBC 45WP — see Carbendazim; Propiconazole.
Tilt* SP — see Carbendazim; Chlorothalonil; Propiconazole.
Tilt Top* — see Fenpropimorph; Propiconazole.
Tilt Turbo* — see Calixin*; Propiconazole.
Timet — see Phorate.
Tinestan* Fungicide (triphenyltin acetate) — Discontinued by Nihon Nohyaku Co., Ltd.
Tinmate* — see Triphenyltin Chloride.
Tinox* Miticide (methyl-demeton-methyl) — Discontinued by Chemiekombinat Bitterfeld VEB.

Tin-San*
 (Discontinued by Pfister Chemical)
Chemistry
 COMPOSITION: Tributyltin chloride complex.
Action/Use
 ACTION: Fungicide (preservative).
Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: IV.
 TOXICITY: Dermal LD₅₀ 10,000 mg/kg.

Tiocarbazil — see Drepamon*.
Tiolen* — see Sulfur.
Tiovel* Insecticide (endosulfan) — Discontinued by Velsicol Chemical Corp.
TipNip*
 (Discontinued 1984 by Armak Co.)
Action/Use
 ACTION: Growth regulator.
Safety Guidelines
 TOXICITY CLASS: IV.
 TOXICITY: (Rat): Oral LD₅₀ 15.8 g/kg. (Rabbit): Dermal >8 g/kg. Slightly toxic.

Tipoff*
 (Discontinued by Midox Ltd.)
Chemistry
 COMPOSITION: 1-naphthylacetic acid.
Action/Use
 ACTION: Growth regulator/herbicide.
Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: III.
 TOXICITY: Oral LD₅₀ 1000 mg/kg.

Tiptor* — see Cyproconazole; Prochloraz.
Tirampa* — see Thiram.
Tirpate*
 (Discontinued by 3M Co.)
Identification
 CODE NUMBERS: CAS 26419-73-8; SHA 364300.
Chemistry
 COMPOSITION: 2,4-Dimethyl-1,3-dithiolane-2-carboxaldehyde O-(methylcarbamoyl)oxime (IUPAC).
Action/Use
 ACTION: Nematicide.

Tirurante* — see Thiram.
TLC
 Acronym for thin layer chromatography.
TLM
 Acronym for tolerance level median. See Tolerance.
TMP* Adjuvant (Bivert*) — Discontinued 1992 by Wilbur-Ellis Co.
TLV
 Acronym for Threshold Limit Value. See Threshold Limit Value.
TMTC — see Thiram.
TMTD — see Thiram.
TMTD 50 Borches* — see Thiram.
TMTDS — see Thiram.
T-MULZ*

BP: Harcros Chemical, Inc.
Action/Use
 USE: As emulsifier, spreader, sticker, and wetting agent.
TNCS 53* — see Copper Sulfate, Basic.
T-Nox* Herbicide (2,4,5-T) — Discontinued by Crystal Chemical Inter-America.

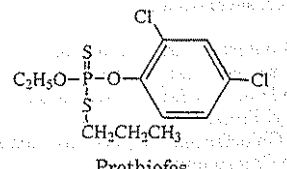
Tobacco
 Probably the first use of tobacco as an insecticide occurred in 1690 when French fruit growers applied a tobacco wash to pear trees for control of the lacebug. In 1763 both tobacco water and powder were

recommended for aphids and red spider in England and by 1800 it was in common use as an insecticide in that country. Its properties as a fumigant were first recommended in 1773 when tobacco was placed in a heated iron pipe and the resulting smoke was blown onto the infested plants. By 1825 the use of tobacco smoke as an indoor fumigant was quite common and in 1851 a fumigator in which tobacco was burned was developed. Tobacco decoction was recommended in England for the control of wooly aphid in 1829 and extracts were tested after thirty years had passed. The use of concentrated extracts is considered to date from 1882 in England and from 1885 in the U.S. The first standardized extract was placed on the U.S. market in 1892 and shortly after the start of the twentieth century progress was reported on the use of nicotine alone.

Tobacco Transplant Solution* — see Lindane.
Tobaz* Anthelmintic/Fungicide (thiabendazole) — Discontinued by Merck & Co., Inc.
TOK* — see Nitrofen.
Tokuthion*
 BP: Miles Inc. (Tokuthion*)

Identification
 COMMON NAME: Prothiofos (ISO, BSI, JMAF).
 EXP. CODE NUMBER: BAY NTN 8629 (Miles Inc.).
 OTHER CODE NUMBERS: CAS 34643-46-4 (prothiofos); SHA 128858; EINECS 252-125-7.

Chemistry
 COMPOSITION: O-(2,4-dichlorophenyl) O-ethyl S-propyl phosphorodithioate (CAS).
 FAMILY: Organophosphorus pesticide.
 PROPERTIES: Colorless liquid boiling at 125-128°C at 0.1 mmHg. Vapor pressure <10⁻⁴ mbar at 20°C; d₄²⁰ = 1.3. Readily soluble in n-hexane, dichloromethane, 2-propanol, toluene.



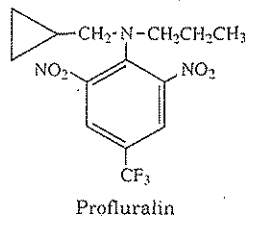
Action/Use
 ACTION: Insecticide.
 USE: For leaf-eating caterpillars, Pseudococcus, cutworms, thrips, aphids; public health pests (flies, mosquitoes).
 FORMULATIONS: Dust, emulsifiable concentrate, wettable powder.

Registration Notes
 U.S.: Not registered.
Environmental Guidelines
 HAZARDS: Fish: LC₅₀ (96h) 0.7 mg/l (rainbow trout).
 SOLUBILITY: Nearly insoluble in water.

Safety Guidelines
 SIGNAL WORD: CAUTION.
 TOXICITY CLASS: III.
 TOXICITY: (Rat): Oral LD₅₀ approx. 1500 mg/kg. Dermal LD₅₀ >5000 mg/kg.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in locked area, away from children, food, feed.
Emergency Guidelines
 ANTIDOTE: Atropine sulfate in large therapeutic doses. 2-PAM may be administered in conjunction with atropine.
 FIRST AID: Get medical aid. Eyes, flush with water for at least 15 minutes. Skin, wash immediately with soap and water. Ingestion, give water and induce vomiting.
 EMERGENCY TELEPHONE: 816-242-2582 (Miles Inc.).

Tolan* — see Quizalofop-ethyl.
Tolban*
 (Discontinued by Ciba-Geigy Corp.)



Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Tolclofos-Methyl

PESTICIDE DICTIONARY

Identification

COMMON NAMES: Profluralin (ISO-E, ANSL, BSI, WSSA); profluraline (ISO-F).

EXP. CODE NUMBER: CGA 10832 (Ciba-Geigy Corp.).

OTHER CODE NUMBERS: CAS 26399-36-0; SHA 106601.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech (Rat): Oral LD₅₀ 1808 mg/kg. Inhalation LC₅₀ >3.97 mg/l (4 hr.). (Rabbit): Dermal LD₅₀ >10,000 mg/kg. Non-irritating to eyes, skin.

Tolban* 4E: (Rat): Oral LD₅₀ 2200 mg/kg; inhalation LC₅₀ (4 hr.) >3.0 mg/l. (Rabbit): Dermal LD₅₀ >10,000 mg/kg. Moderate eye, minimal skin irritation.

Tolclofos-Methyl — see Rizolex.

Tolerance

The tolerance for a pesticide is:

(1) under the "Miller Pesticide Residue Amendment," to the Federal Food, Drug, and Cosmetic Act, the minute trace permitted by the Food and Drug Administration to be present in or on raw agricultural commodities, or

(2) under the "Food Additives Amendment" the trace permitted in or on processed or semi-processed food or feed products. Certain highly poisonous pesticides have had a zero tolerance; others are sufficiently low in hazard in usual practice as to be exempt from tolerance requirements. See Crop Tolerance.

Tolerant

The property of some plants, animals, and microorganisms to withstand a certain degree of injury by pesticides. Also, the property of living organisms to withstand stress or adversity such as disease, insect attack, dry weather, severe cold, etc.

See Resistance.

Tolkan* — see Dinoterb Salts; Isoproturon.

Tolkan* Fox* — see Bifenox; Isoproturon.

Tolkan S* — see Dinoterb Salts; Isoproturon.

Toll* — see Methyl Parathion.

Tolpiran* — see Chlorfenson; Polynactins Complex.

Tolurane* — see Chlorotoluron.

Tolurex* — see Chlorotoluron.

Toluron* — see Chlorotoluron.

Tolyfluamid — see Euparen M*.

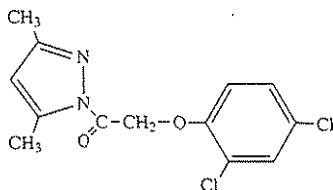
Tolyfluamide — see Euparen M*.

Tomacon*

(Discontinued by Takeda Chemical Industries, Ltd.)

Chemistry

COMPOSITION: 1-(2,4-dichlorophenoxyacetyl)-3,5-dimethyl-pyrazole.



Active Ingredient of Tomacon*

Action/Use

ACTION: Plant growth regulator.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Mouse): Oral LD₅₀ 1130 mg/kg.

Tomadorane* — see Marks 4-CPA*.

Tomahawk* — see Atrazine; Butylate.

Tomarin — see Fumarin*.

Tomaset*

BP: Makhteshim-Agan (Tomaset*) (Israel)

Identification

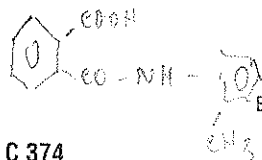
COMMON NAME: N-m-t.

DISCONTINUED NAME: Duraset* (Uniroyal Chemical Co., Inc.).

Chemistry

COMPOSITION: N-meta-Tolylphthalamic acid.

PROPERTIES: Solubility in acetone, 13g/100ml at 25°C.



Action/Use

ACTION: Plant growth regulator.

USE: Increases fruit set in tomatoes, lima beans, cherries, prunes.

FORMULATIONS: Wettable powder.

Environmental Guidelines

SOLUBILITY: Solubility in water, 0.1 g/100ml.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 5230 mg/kg.

Tomato Fix* Plant Growth Regulator (4-CPA) — Discontinued 1992 by Amvac Chemical Corp.

Tomato Hold* Plant Growth Regulator (4-CPA) — Discontinued 1991 by Amvac Chemical Corp.

Tomato Worm Attack* (Bacillus thuringiensis var. kurstaki) — Discontinued 1993 by Ranger Corp.

Tomatotone* — see 4-CPA.

Tombel* — see Quinalphos; Thiometon.

Tomcat* — see Diphacinone.

Tomcato* — see Glyphosate.

Tomilon*

(Discontinued by Hoechst AG).

Identification

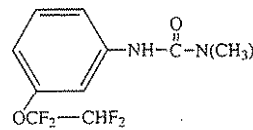
COMMON NAME: Tetrafluron (ISO, BSI).

EXP. CODE NUMBER: Hoe 2991.

OTHER CODE NUMBERS: CAS 27954-37-6; SHA 382400.

Chemistry

COMPOSITION: N,N-dimethyl-N'-[3-(1,1,2,2-tetrafluoroethoxy)-phenyl]urea (CAS).



Tetrafluron

Action/Use

ACTION: Selective herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1265 mg/kg (male); 1430 mg/kg (female).

Dermal >2000 mg/kg.

Tomorin* Rodenticide (coumachlor) — Discontinued 1984 by

Ciba-Geigy Ltd.

Top Cop* Tri-Basic

BP: Stoller, Inc.

Identification

COMMON NAMES: Tribasic copper sulfate, basic copper sulfate, fixed copper.

CODE NUMBER: CAS 1332-14-5 (tribasic copper sulfate).

Chemistry

FAMILY: Sulfate.

PROPERTIES: Blue, viscous liquid.

Action/Use

ACTION: Fungicide, Bactericide.

Environmental Guidelines

SOLUBILITY: Miscible, not soluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat) Oral LD₅₀ 300 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves,

waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-

ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water, CO₂, dry chemicals. Wear

self-contained breathing apparatus.

Toxic fumes may be generated at elevated temperatures.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of

water. Skin, wash thoroughly with soap and water. Remove contain-

ated clothing and shoes. Inhalation, remove to fresh air. Ingestion,

give large quantities of milk or water and induce vomiting.

Top Cop* with Sulfur

BP: Stoller, Inc.

Chemistry

COMPOSITION: Tribasic copper sulfate + sulfur.

FAMILY: Sulfate.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

PROPERTIES: Greenish-yellow, viscous liquid. Sulfur odor.

Action/Use

ACTION: Fungicide, Bactericide.

USE: Controls powdery and downy mildew, spinachleaf rust, leaf spot, black rot, brown rot, shot hole, *Anthraco*, *Cercospora* fruit spot, scab, *Sigatoka*, melanose, scab, fruit rot, bunch rot, rice blast, leaf spot, narrow brown leaf spot, stem rot, leaf smut, brown bordered leaf and sheath spot, sheath blight, pod and stem blight, white rust, in a variety of field, vegetable, fruit, vine, and nut crops.

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Insoluble. Miscible in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat) Oral LD₅₀ 300 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water, CO₂, or dry chemicals.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** give large amounts of milk or water and induce vomiting.

Top Crop* Flowable Bactericide/Fungicide

BP: Fertilizer Corp. of America

Chemistry

COMPOSITION: Tribasic copper sulfate and sulfur.

FAMILY: Sulfate.

PROPERTIES: Greenish yellow flowable liquid with slight sulfur odor.

Water insoluble, corrosive to mild steel, specific gravity 1.38 at 20°C.

Action/Use

ACTION: Contact fungicide and bactericide.

USE: Controls powdery and downy mildew, spinachleaf rust, leaf spot, black rot, brown rot, shot hole, *Anthraco*, *Cercospora* fruit and leaf spot, scab, *Sigatoka*, melanose scab, fruit rot, bunch rot, rice blast, narrow brown leaf spot, stem rot, leaf smut, brown bordered leaf and sheath spot, sheath blight, pod and stem blight, white rust, in a variety of field, vegetable, fruit, vine, and nut crops.

Registration Notes

Registered by E.P.A. with no residue tolerance required as active ingredients generally considered safe.

Environmental Guidelines

HAZARDS: Fish: Toxic.

DEGRADATION AND METABOLISM: Bacterial decomposition to sulfates which are assimilated by the plants as plant nutrients.

SOLUBILITY: Insoluble. Miscible in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat) Oral LD₅₀ 5790 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FLASHPOINT: Non flammable.

FIRE EXTINGUISHING MEDIA: Water, CO₂, or dry chemicals.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** give large amounts of milk or water and induce vomiting.

Topical Application

Treatment of a localized surface site such as a single leaf blade, petiole, or growing point.

Topane* (sodium ortho phenylphenate) — Discontinued by Dow Chemical Co.

Topas* — see Penconazole.

Topicide*

(Discontinued by Gulf Oil Chemical Co.)

Identification

COMMON NAME: Benzadox (ANSI, BSI, WSSA).

CODE NUMBERS: CAS 5251-93-4; SHA 275400.

Chemistry

COMPOSITION: Ammonium (benzamidoxy) acetate.

Action/Use

ACTION: Selective herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 5600 mg/kg.

Topiclor 20* Insecticide (chlordan) — Discontinued.

Topitox* — see Chlorophacinone.

Topmegen* — see Thiophanate-methyl.

Tops* 5 — see Thiophanate-methyl.

Tops* 2.5D — see Thiophanate-methyl.

Tops* MZ — see Thiophanate-methyl.

Topsin* Fungicide (thiophanate) — Discontinued 1989 by Nippon Soda Co., Ltd.

Topsin* M — see Thiophanate-methyl.

Topsite* Insecticide (imazapyr + diuron) — Discontinued 1994 by American Cyanamid Co.

Torak*

BP: Hoechst Schering AgrEvo GmbH (Torak*)

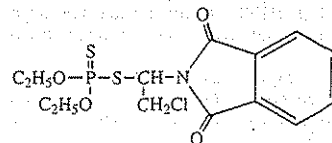
Identification

COMMON NAMES: Dialifor (ANSI, ESA); dialifos (ISO-E, BSI); dialiphos (ISO-F).

CODE NUMBERS: CAS 10311-84-9; SHA 102501; ENT-27320.

Chemistry

COMPOSITION: S-2-Chloro-1-phthalimidoethyl O,O-diethyl phosphorodithioate.



Dialifos

Action/Use

ACTION: Insecticide-acaricide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ 43-53 mg/kg. 4EC: 62 mg/kg.

Torbidan*

Chemistry

COMPOSITION: Toxaphene + methyl parathion.

Action/Use

ACTION: Insecticide.

USE: For rice.

FORMULATIONS: Emulsifiable concentrate.

Registration Notes:

OUTSIDE U.S.: In Philippines for rice.

Torch* (bromoxynil) — Discontinued.

Tordon* — see Picloram.

Tordon* 101 Mixture — see 2,4-D; Picloram.

Tordon* K — see Picloram.

Tordon* RTU — see Picloram.

Tormona* Herbicide (2,4,5-T) — Discontinued 1984 by Celamerck.

Tornado* — see Fluazifop-P-butyl; Fomesafen.

Torpedo* Insecticide (permethrin) — Discontinued by ZENECA Professional Products.

Torque* — see Fenbutatin-oxide.

Torus* — see Fenoxycarb.

Total* — see Paraquat.

Totacol* — see Diuron; Paraquat.

Totaiene* — see Trichlorfon.

Totazina* — see Simazine.

Toterbane 50F* — see Diuron.

Totril* — see Ioxynil.

Touchdown*

BP: ZENECA Agrochemicals

Identification

COMMON NAME: Glyphosate-trimesium (ISO draft, BSI).

TRIVIAL NAME: Sulfosate.

EXP. CODE NUMBERS: ICIA-0224, SC-0224.

OTHER CODE NUMBERS: CAS 81591-31-3; SHA 128501.

Chemistry

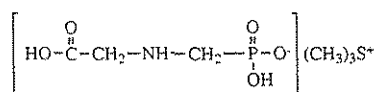
COMPOSITION: N-phosphonomethylglycine trimethylsulfonium salt.

PROPERTIES: Vapor pressure 3 x 10 Torr (25°C). Specific gravity 1.23 (20°C/20°C). Clear, straw to brown color. Density (20°C) 1.23 - 1.25 g/ml. Viscosity 26.6 centistokes (5°C).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.



Glyphosate-trimesium

Action/Use

ACTION: Nonselective postemergence systemic herbicide.

USE: Controls broad range of annual and perennial grass and broad-leaf weeds, and certain woody perennials. Foliar-applied and translocated, may be applied as a broadcast, band, wiper/wick treatment or a spot treatment when weeds are actively growing. A nonionic surfactant must be used.

FORMULATIONS: Water soluble liquid.

Environmental Guidelines

HAZARDS: Bird: Slightly toxic. Fish: Practically non-toxic. Bee: Slightly toxic.

SOIL PARTICLE ADSORPTION: Rapidly degraded in soil within days of application, depending on soil type and environmental conditions.

SOLUBILITY: In water, 430 g/100 ml (25° C).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat) Oral LD₅₀ 750 mg/kg. (Rabbit) Dermal LD₅₀ >200 mg/kg. (Rat) Inhalation LC₅₀ >5.18 mg/l. Mild skin and eye irritation.

PROTECTIVE CLOTHING: Avoid contact with skin, eyes or clothing. When handling the concentrate, wear rubber gloves. Avoid breathing spray mist.

HANDLING AND STORAGE CAUTIONS: Do not store in galvanized steel or unlined steel containers. Do not contaminate water, food, feed, containers. Do not contaminate water, food, feed, fertilizer, or seeds by storage or disposal.

Emergency Guidelines

FLASHPOINT: >105°C.

FIRE EXTINGUISHING MEDIA: Water fog, alcohol foam, CO₂, dry chemical halogenated agents.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink several glasses of water and induce vomiting.

EMERGENCY TELEPHONE: 0622-812511 (ZENECA Agrochemicals).

Tough* — see Pyridate.

Tournoi* — see Fenpropidin; Fenpropimorph; Propiconazole.

Toxakil* — see Toxaphene.

Toxaphene**Identification**

COMMON NAMES: Campechlor (ISO-E, BSI); camphéchloré (ISO-F); toxaphene (USA); polychlorcamphene (USSR).

CODE NUMBERS: CAS 8001-35-2; SHA 080501.

DISCONTINUED NAMES: Camphoclor*, Camphofene Huileux*, Mottox*, Phenacide*, Phenatox*, Strobane T-90* (Agro-Quimicas de Guatemala); Heliotox* (+ DDT) (BFC Chemical); Sytemp* (+ methyl parathion + parathion) (Ring Around Products); Toxakil* (FMC Corp.); Toxon* 63 (Riverside).

Chemistry

COMPOSITION: Chlorinated camphene (content of combined chlorine, 67-69%).

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: DANGER (methyl parathion combinations); WARNING.

TOXICITY CLASS: I (methyl parathion combinations); II.

TOXICITY: (Rat) Oral LD₅₀ 69 mg/kg.

Strobane T-90 (Rat) Oral LD₅₀ 90-120 mg/kg (male); 45-60 mg/kg (female).

Toxer* — see Paraquat.

Tox-Hid* — see Cov-R-Tox*, Warfarin.

Toxicant

A poisonous substance such as the active ingredient in pesticide formulations that can injure or kill plants, animals, or microorganisms.

Toxicity

Defined as the "quality, state, or degree of being ... poisonous." Acute toxicity results from a severe case of poisoning due to a single dose or exposure to a chemical (LD₅₀). Chronic toxicity is caused by repeated small doses over a considerable period, resulting in accumulation of

the chemical in the body, or its effects are additive, bringing on illness or sometimes death. Dermal toxicity is a measure of the amount of a poison that can be absorbed through the skin of an animal to produce toxic symptoms.

Measurements of toxicity are usually compared at the fifty (50) percent level.

See LD₅₀; Hazard.

Toxicity (Human)

The AAPCO has adopted these regulatory principles relating to the determination of highly toxic materials:

"Highly Toxic: An economic poison which, when it falls within any of the following categories when tested on laboratory animals (mice, rats and rabbits), is highly toxic to man within the meaning of these principles:

- "Oral toxicity: Those which produce death in half or more than half the animals of any species at a dosage of 50 milligrams at a single dose, or less, per kilogram of body weight when administered orally to 10 or more such animals of each species.
- "Toxicity on inhalation: Those which produce death in half or more than half of the animals of any species at a dosage of 200 parts or less by volume of the gas or vapor per million parts by volume of air when administered by continuous inhalation for one hour or less to ten or more animals of each species, provided such concentration is likely to be encountered by man when the economic poison is used in any reasonably foreseeable manner.
- "Toxicity by skin absorption: Those which produce death in half or more than half of the animals (rabbits only) tested at a dosage of 200 milligrams or less per kilogram of body weight when administered by continuous contact with the bare skin for 24 hours or less to 10 or more animals. Provided, however, that an enforcement official may exempt any economic poison which meets the above standard but which is not in fact highly toxic to man, from these principles with respect to economic poisons highly toxic to man, and may after hearing designate as highly toxic to man any economic poison which experience has shown to be so in fact."

Hazard Indicators	"Danger" I	"Warning" II	"Caution" III	"Caution" IV
Oral LD ₅₀	up to and including 50 mg/kg	from 50 thru 500 mg/kg	from 500 thru 5000 mg/kg	greater than 5000 mg/kg
Inhalation LD ₅₀	up to and including .2 mg/liter	from .2 thru 2 mg/liter	from 2.0 thru 20 mg/liter	greater than 20 mg/liter
Dermal LD ₅₀	up to and including 200 mg/kg	from 200 thru 2000 mg/kg	from 2000 thru 20,000 mg/kg	greater than 20,000 mg/kg
Eye Effects	Corrosive corneal opacity not reversible within 7 days	Corneal opacity reversible within 7 days; irritation persisting for 7 days	No corneal opacity; irritation reversible within 7 days	No irritation
Skin Effects	Corrosive	Severe irritation at 72 hours	Moderate irritation at 72 hours	Mild or slight irritation at 72 hours

Table of toxicity categories by hazard indicator

TOXICITY CATEGORIES

EPA has published regulations for use of human hazard signal words on pesticide labels:

Signal words assigned by levels of toxicity

A. Toxicity Category I

All pesticide products meeting the criteria of Toxicity Category I shall bear on the front panel the signal word "**Danger**." In addition, if the product was assigned to Toxicity Category I on the basis of its oral, inhalation, or dermal toxicity (as distinct from skin and eye local effects), the word "**Poison**" shall appear in red on a background of distinctly contrasting color and the skull and crossbones shall appear in immediate proximity to the word "Poison."

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

- B. Toxicity Category II
All pesticide products meeting the criteria of Toxicity Category II shall bear on the front panel the signal word "Warning."
- C. Toxicity Category III
All pesticide products meeting the criteria of Toxicity Category III shall bear on the front panel the signal word "Caution."
- D. Toxicity Category IV
All pesticide products meeting the criteria of Toxicity Category IV shall bear on the front panel the signal word "Caution."
- E. Use of signal words
Use of signal word(s) associated with a higher Toxicity Category is not permitted except when the Agency determines that such labeling is necessary to prevent unreasonable adverse effects.

Toximul*

BP: Stepan Co.

Action/Use

ACTION: A series of emulsifiers for use in pesticide formulation. Toximul* are proprietary blends of anionic and nonionic surface active agents. They are considered to be inert ingredients when used in pesticide formulations.

Toxogonin

Chemistry

COMPOSITION: Bis (4-hydroxyiminomethylpyridinium-1-methyl) ether dichloride; bis (isonicotinaldoxime 1-methyl) ether dichloride.

Action/Use

ACTION: Antidote for poisoning with alkyl phosphates.

Toxon* 63 Insecticide (toxaphene) — Discontinued by Riverside.

Tox-R* Insecticide (rotenone + diatomaceous earth) — Discontinued 1993 by Uniroyal Chemical Co., Inc.

2,4,5-TP* Herbicide (silvex) — Discontinued by Nissan Chemical Industries, Ltd.

TPTA — see Triphenyltin Acetate.

TPTH — see Triphenyltin Hydroxide.

TPTOH — see Triphenyltin Hydroxide.

Trac* 50 FL — see Atrazine.

Trademark

A trade name is a trade-marked name. Defined as "A word, letter, device, or symbol, used in connection with merchandise and pointing distinctly to the origin or ownership of the article to which it is applied." See Brand, Proprietary.

Trakephon* — see Buminafos.

Tra-Kill Tracheal Mite Killer*

(Discontinued 1993 by Ecogen Inc.)

Chemistry

COMPOSITION: 1-Menthol; 2-isopropyl-5-methylcyclohexanol.

Action/Use

ACTION: Selective insecticide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3180-3300 mg/kg.

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** drink one or two glasses of water.

Tralex* — see Tralomethrin.

Tralkoxydim — see Grasp*.

Tralkoxydime — see Grasp*.

Tralomethrin

BP: AgrEvo USA Co. (Scout X-TRA*)

Roussel Uclaf Corp. (SAGA*, Tralex*)

Identification

COMMON NAMES: Tralomethrin (ISO-E draft, ANSI, BSI); tralométhrine (ISO-F).

CODE NUMBERS: CAS 66841-25-6; SHA 121501; OMS 3048 (WHO).

Chemistry

COMPOSITION: (1R,3S)3[(1' RS)(1',2',2',2'-tetrabromoethyl)-2,2-dimethylcyclopropanecarboxylic acid (S)-α-cyano-3-phenoxybenzyl ester.

PROPERTIES: Yellow orange resinoid. Stability: No alteration after 6 mo. at 50°C. Specific gravity: 0.901 at 20°C; pH 6.6. Boiling point: 138-148°C (280-298°F). Soluble in most organic solvents.

Action/Use

ACTION: New generation pyrethroid insecticide.

FORMULATIONS: Emulsifiable concentrate.

Registration Notes

U.S.: Scout X-TRA* RUP for cotton and soybeans.

Environmental Guidelines

HAZARDS: Scout X-TRA*: Fish: Extremely toxic. Bee: Highly toxic.

SOLUBILITY: Substantially insoluble in water.

Safety Guidelines

SIGNAL WORD: DANGER (Scout X-TRA*).

TOXICITY CLASS: I (Scout X-TRA*).

TOXICITY: Scout X-TRA*: (Rat): Oral LD₅₀ 1250 mg/kg (male); 1070 mg/kg (female). Inhalation LC₅₀ 2700 mg/m³ (male); 3900 mg/m³ (female). Slight-moderate skin or irritation. (Rabbit); Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Goggles or face shield when handling.

HANDLING AND STORAGE CAUTIONS: Avoid contact with the eyes, skin and clothing. Avoid contact or inhalation of the spray mist. Wash thoroughly after using and change clothing.

Emergency Guidelines

FIRST AID: Scout X-TRA*: Get medical aid. **Eyes,** immediately flush with plenty of water for at least 15 minutes. **Skin,** wash affected area with lanolin based soaps as soon as possible to alleviate irritation which may appear upon extended contact with the mist. **Ingestion,** do NOT induce vomiting.

EMERGENCY TELEPHONE: 302-892-3000 (AgrEvo USA Co.).

Tralométhrine — see Tralomethrin.

Tramat* — see Ethofumesate.

Tramat* Combi — see Ethofumesate; Lenacil.

Trametam* — see Thiram.

Tranid*

(Discontinued by Rhone-Poulenc)

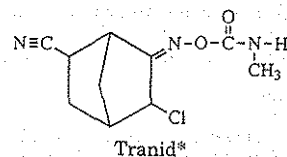
Identification

EXP. CODE NUMBER: UC 2047A (Union Carbide Corp.).

OTHER CODE NUMBER: CAS 15271-41-7.

Chemistry

COMPOSITION: exo-3-Chloro-endo-6-cyano-2-norbornanone O-(methylcarbamoyl)oxime.



Action/Use

ACTION: Acaricide.

Trans-Aid* Herbicide (ammonium thiocyanate) — Discontinued by Union Carbide Corp.

Transamine*

(Discontinued by Inter-Ag Corp.)

Chemistry

COMPOSITION: Oil-soluble amine formulations of 2,4-D + 2,4,5-T.

Action/Use

ACTION: Selective herbicide (hormone type).

Safety Guidelines

SIGNAL WORD: WARNING, CAUTION (varies with formulation).

TOXICITY CLASS: II, III (varies with formulation).

TOXICITY: Various formulations (Rats/Guinea Pigs/Rabbits): Oral LD₅₀ 300-1200 mg/kg of body weight.

Transfilm*

BP: PBI/Gordon Corp.

Identification

ADDITIONAL TRADE NAME: Pinethylene*.

DISCONTINUED NAME: Exhalt* 4-10.

Action/Use

ACTION: Anti-transpirant.

USE: To prevent winter damage on evergreens. Also as a spray or dip for all-season transplant of deciduous and evergreen trees and ornamentals.

Transgenic

This term is used in reference to the introduction of a gene from one organism to another when those two organisms are not normally sexually compatible, e.g., inserting a gene from a *Bacillus thuringiensis* bacterium into a cotton plant.

Translocation

Distribution of a pesticide chemical from the point of absorption (plant leaves or stems, sometimes roots) to other leaves, buds, and root tips. Translocation occurs also in animals treated with certain pesticides. See Systemic Pesticide.

Transplantone*

(Discontinued 1984 by Rhone-Poulenc)

Chemistry

COMPOSITION: Naphthaleneacetamide + naphthaleneacetic acid.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Plant growth regulator.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Transline* — see Clopyralid.

Trans-Vert* Herbicide (MSMA) — Discontinued by Union Carbide Corp.

Trapex*

Identification

COMMON NAMES: Methyl isothiocyanate (ISO-E, BSI, JMAF); isothiocyanate de méthyle (ISO-F).

CODE NUMBERS: CAS 556-61-6; SHA 068103.

DISCONTINUED NAME: Nemarate* (+ DCIP) (SDS Biotech K.K.).

Chemistry

COMPOSITION: Methyl isothiocyanate.

Action/Use

ACTION: Soil fumigant.

Safety Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic.

Trapping Systems

Any of a number of systems designed to attract targeted insects for monitoring. Various formulations for specific insect pests, usually pheromone-based and nontoxic. A few examples are: Biocattura*, Biocontrol* (Biochem S.R.L); Traptest* (ISAGRO).

See Pheromone; Sticky Trapping Materials.

Traptest*

BP: ISAGRO (Traptest*)

Identification

DISCONTINUED NAME: Scaletrap* (ISAGRO).

Action/Use

ACTION: Insect trapping system.

USE: The number of insects captured gives information which, if correctly interpreted, is essential to achieve a rational integrated pest control.

FORMULATIONS: Sticky trap for monitoring of lepidopterous insect adults in various crops.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Avoid contamination among pheromone dispensers targeted on different species to assure their selectivity. Store in cool place or refrigerate. Destroy used stick bottoms, replaced dispensers to avoid undesired attraction sources. See Trapping Systems.

Trebon*

BP: Mitsui Toatsu Chemicals, Inc.

Identification

COMMON NAME: Etofenprox (ISO draft, BSI, INN); ethofenprox (prior to 1988).

EXP. CODE NUMBER: MTI-500.

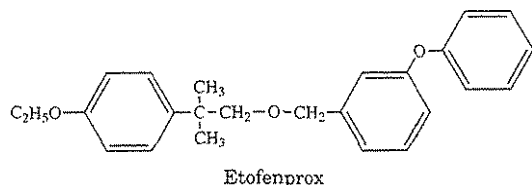
OTHER CODE NUMBERS: CAS 80844-07-1; OMS 3002 (WHO).

OTHER NAMES: Ethofenprox, Lenatop*, Vectron*.

Chemistry

COMPOSITION: 2-(4-ethoxyphenyl)-2-methylpropyl 3-phenoxybenzyl ether.

PROPERTIES: White crystalline solid. Melting point 36.4-38.0. Soluble in common organic solvents.



Action/Use

ACTION: Insecticide.

USE: For planthoppers, leafhoppers, weevils, aphids, armyworms, cutworms, bollworms, leafminers, whiteflies, thrips, bugs on rice, orchard fruits, vegetables, cereals, and tea. For flies, mosquitoes, cockroaches, etc.

FORMULATIONS: EC, EW, dust, G, oil, ULV, WP.

COMBINATIONS: Compatible with wide range of insecticides, fungicides.

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: Fish: TLM (48 hr.) 5.0 ppm (carp); Bird: LD₅₀ >2000 mg/kg (mallard duck). Low toxicity to earthworms.

SOLUBILITY: Barely soluble in water.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >42,880 mg/kg. Dermal >2140 mg/kg.

Trecit* — see 1-Naphthaleneacetic Acid.

Tree Tanglefoot Pest Barrier*

BP: The Tanglefoot Co.

Chemistry

COMPOSITION: Natural gum resins, castor oil, vegetable waxes.

PROPERTIES: Carmel brown, extremely viscous, tacky gel.

Action/Use

ACTION: Sticky insect barrier.

USE: For all weather control of destructive climbing insects, cutworms, and foliar feeding larvae common to deciduous, tropical fruit crops, ornamentals, shade trees, and vines.

FORMULATIONS: Paste, available in caulking cartridges, pails, tubs, tubes.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

PROTECTIVE CLOTHING: Gloves for handling.

HANDLING AND STORAGE CAUTIONS: Keep container closed and upright when not in use. Keep out or reach of children, pets.

Emergency Guidelines

EMERGENCY TELEPHONE: 616-459-4139 (Tanglefoot Co.).

Trefanocide* Herbicide (trifluralin) — Discontinued by Elanco

Products Co.

Trefter* — see Trifluralin.

Treficon* Herbicide (trifluralin) — Discontinued by Elanco Products Co.

Treflan* — see Trifluralin.

Trefmid* Herbicide (diphenamid + trifluralin) — Discontinued

by Elanco Products Co.

Tre-Hold* — see 1-Naphthaleneacetic Acid.

Trenox* — see Bentazone; Compete*; Dichlorprop-P.

Tretox 480* — see Trifluralin.

Trex-San*

F: Grace-Sierra Crop Protection Co.

Chemistry

COMPOSITION: 2,4-D dimethylamine (30.21%), MCPP dimethylamine (16.22%), dicamba dimethylamine (4.05%), dimethylamine salts of related compounds (0.05%), inerts (49.52%).

Action/Use

ACTION: Herbicide.

USE: Postemergence control of most common broadleaf weeds in fine turf.

FORMULATIONS: Liquid concentrate.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 1060 mg/kg.

Trex-San* Bent

F: Grace-Sierra Crop Protection Co.

Chemistry

COMPOSITION: 2,4-D dimethylamine (6.6%), MCPP dimethylamine (19.9%), dicamba dimethylamine (2.6%), inerts (70.9%).

Action/Use

ACTION: Herbicide.

USE: Postemergence control of many common broadleaf weeds in fine turf. Same components as regular Trex-San*, but formulated differently to give maximum weed control with an especially large extra safety factor on fine sensitive bent grasses at low heights-of-cut, such as on golf course greens, tees and fairways.

FORMULATIONS: Liquid concentrate.

Triacetane* F198 — see Triphenyltin Acetate.

n-Triacontanol — see Surya*.

Triadimefon — see Bayleton*.

Triadimefone — see Bayleton*.

Triadimeno! — see Baytan*.

Triagran* — see Bentazone; Dichlorprop; MCPA.

Tri-allate — see Far-Go*.

Triallate — see Far-Go*.

Triamine* — see 2,4-D; Dichlorprop; Mecoprop.

Triamine* II — see Dichlorprop; MCPA; Mecoprop.

Triamiphos — see Wepsyn 155*.

Triangle* — see Copper Sulfate.

Triaram* — see Atram.

Triarimol* — Discontinued by Dow Chemical.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

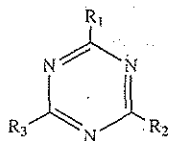
Triasulfuron — see Amber*.

Triasyn* — see Dyrene*.

Triazine — see Dyrene*.

Triazine Herbicides

These materials include atrazine, Lambast*, prometone, prometryne, propazine, simazine, etc., based on a symmetrical triazine structure, where R₁, R₂, and R₃ are a variety of attached radicals.



Symmetrical Triazine

Triazophos — see Hostathion*.

Triazotion — see Azinphos-Ethyl.

Tribac* — see Trichlorobenzoic Acid.

Tribactur* Insecticide (*Bacillus thuringiensis* var. *kurstaki*) —

Discontinued 1991 by Atochem Agri B.V.

Tri-ban* Rodenticide (pindone) — Discontinued.

Tri-Basic* — see Copper Sulfate, Basic

Tribasic Copper Sulfate — see Cuproxat*; Top Cop* Tri-Basic; Top

Prop* Flowable Bactericide/Fungicide.

Tribenuron-methyl — see Express*.

Tribetol* Herbicide (endothall + propham) — Discontinued by

Atochem Agri B.V.

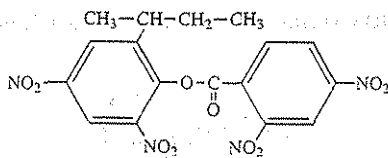
Tribonate

(Discontinued by Atochem Agri B.V.)

Chemistry

COMPOSITION: 2,4-Dinitrophenyl 2-8(sec-butyl)-4,6-dinitrophenyl

carbonate.



Tribonate

Action/Use

ACTION: Postcontact herbicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 108 mg/kg.

Tribufate — see DEF 6*.

Tribufos — see DEF 6*.

Tribunil*

BP: Bayer AG (Tribunil*)

Identification

COMMON NAMES: Methabenzthiazuron (ISO, BSI); methibenzuron

(WSSA).

EXP. CODE NUMBERS: Bay 74283, S 25128.

OTHER CODE NUMBERS: CAS 18691-97-9 (methabenzthiazuron);

SHA 281300; EINECS 242-505-0.

DISCONTINUED NAMES: Exa* (+ triasulfuron), Tribunil-Combi* (+

dichlorprop) (Bayer AG).

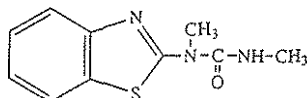
Chemistry

COMPOSITION: N-2-benzothiazolyl-N,N'-dimethylurea.

FAMILY: Substituted urea.

PROPERTIES: Colorless crystals. Melting point 119-121°C. Vapor

pressure 5.9 µPa at 20°C.



Active Ingredient of Tribunil*

Action/Use

ACTION: Herbicide.

USE: Broad-spectrum activity for control of broadleaved weeds and grasses in cereals, peas, broad beans, garlic and onions. Combinations with other compounds are used in vineyards and orchards.

FORMULATIONS: Wettable powder.

COMBINATIONS: Trilixon (+ chlorsulfuron + methabenzthiazuron), Ustinex* (+ amitrole + MCPA) (Bayer AG); Glean T* (+ chlorsulfuron) (Du Pont); Glytex* (+ isoxaben); Mesox* (+ isoxaben).

Registration Notes

U.S.: Not marketed.

OUTSIDE U.S.: Not marketed in Canada.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 15.9 mg/l (96 h) (rainbow trout). Bee: Nontoxic.

SOLUBILITY: In water: 0.059 g/l at 20°C.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Tech (Rat): Oral LD₅₀ >5000 mg/kg b.w.; Dermal >5000 mg/kg b.w.

Tribunil-Combi* Herbicide (dichlorprop + methabenzthiazuron) — Discontinued 1994 by Bayer AG.

Tribute* — see Fenvalerate.

Tributon* — see 2,4-D.

Tributon* Herbicide (2,4,5-T) — Discontinued by Bayer AG.

Tributyl Chlorobenzyphosphonium — see Phosfon*.

Tributyltin

Chemistry

FAMILY: Organotinols.

Action/Use

ACTION: Pesticide (biocide, antifoulant, disinfectant).

Registration Notes

U.S.: Twenty TBT compounds registered as pesticidal active ingredients (a.i.).

Tributyltin Complex — see Tin-San*.

Tricamba — see Banvel T*.

Tricarbamix* — see Ziram.

Tricarbamix* Z Fungicide (ziram) — Discontinued by Pennwalt Holland B.V.

Tricarbasul* Fungicide (zinc + manganese + sulfur) — Discontinued by Atochem Agri B.V.

Tricarnam* — see Carbaryl.

Tricel* — see Chlorpyrifos.

Trichlamide — see Hataclean*.

Trichlorfon* Acaricide (ovex) — Discontinued by Pennwalt Holland B.V.

Trichlorfon

BP: AgrEvo USA Co. (Proxol*)

Atabay Agrochemicals & Veterinary Products Inc.

Bayer AG (Dipterex*)

Cequisa (Cekufon*)

Defensa Indústria de Defensivos Agrícolas S.A.

Denka International B.V.

Hubei Sanonda Co., Ltd.

Jin Hung Fine Chemicals Co., Ltd. (Dep*)

Miles Inc. (Dipterex*, Dylox*)

Quimica Lucava, S.A. de C.V. (Lucavex*)

Sanachem (Pty) Ltd.

Identification

COMMON NAMES: Trichlorfon (ISO, BSI); trichlorophon (former

BSI); dipterex (former exception Turkey); chlorophos (USSR).

CODE NUMBERS: CAS 52-68-6; OMS 800 (WHO); ENT-19763; EI-

NECS 200-149-3.

ADDITIONAL TRADE NAMES: Trichlorotox* (Agsin Pta. Ltd.); To-

talene* (Diachem S.P.A.); Higalfon* (Hightex S.A.); Pronto* (PBI/Gor-

don); Rochlor* (Rotam Group); Bovinox*, Equino-Aid*, Leivasom*,

Trinex*.

DISCONTINUED NAMES: Neguvon*, Tugon* (Bayer AG); Ditrifon*

(Chemol Trading Ltd. Co.); Danex* (Makhteshim-Agan); Briten*,

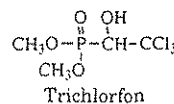
Ciclosom* (Quimica Estrella).

Chemistry

COMPOSITION: Dimethyl (2,2,2-trichloro-1-hydroxyethyl)phospho-

nate (CAS).

FAMILY: Organophosphate.
PROPERTIES: White crystalline solid. Melting point 75-84°C. Vapor pressure 0.21 mPa at 20°C. Readily soluble in dichloromethane, 2-propanol. Soluble in toluene. Nearly insoluble in n-hexane. Dylox* is compatible with chlorinated and phosphate insecticides; incompatible with alkaline materials such as lime and lime sulfur and with summer oils and dormant oils.



Trichlorfon

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator
Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Insecticide.

USE: For many different pest species in banana, cereals, chickpea, citrus, coffee, corn, cotton, fruit trees, grapes, Indian corn, oleiferous palm, olive groves, pastures, red currant, rice, sugar beet and cane, sunflower, vegetables, tea, tobacco, flowers, ornamental plants, forests, turf.

FORMULATIONS: Dustable powder, emulsifiable concentrates, granules, soluble powder, suspension concentrate, wettable powder.

COMBINATIONS: Dicontal* (+ fenitrothion), Dipterex* MR (+ oxydemeton-methyl) (Bayer AG).

Registration Notes

U.S.: For turf and ornamental use only.

Environmental GuidelinesHAZARDS: Fish: LC₅₀ (96 hr) 0.7 mg/l (rainbow trout). Bird: LD₅₀ 720 mg/kg diet (bobwhite quail). Bee: Nontoxic.

SOLUBILITY: Readily soluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech (Rat): Oral LD₅₀ approx. 250 mg/kg b.w.; Dermal >6000 mg/kg b.w.

HANDLING AND STORAGE CAUTIONS: See label. Store in original container, preferably in locked area, away from children, food, feed.

Emergency Guidelines

ANTIDOTE: Administer atropine sulfate in large therapeutic doses. Repeat as necessary to the point of tolerance. 2-PAM is antidotal and may be administered in conjunction with atropine.

FIRST AID: Get medical aid. Eyes, flush with water for at least 15 minutes. Skin, wash immediately with soap and water. Ingestion, administer water freely and induce vomiting.

EMERGENCY TELEPHONE: 302-892-3000 (AgrEvo USA Co.).

Trichloroacétate de Sodium — see TCA.

Trichloroacetic Acid — see TCA.

Trichlorobenzene**Identification**

CODE NUMBER: CAS 12002-48-1.

OTHER NAME: TCB.

Chemistry

COMPOSITION: 1,2,4-Trichlorobenzene (main component).

Action/Use

ACTION: Herbicide.

USE: For aquatic weed control in irrigation canals, lakes, and ponds.

Trichlorobenzoic Acid**Identification**

COMMON NAMES: 2,3,6-TBA (ISO, BSI, WSSA), acide trichlorobenzoïque (France); TCBA (JMAF).

EXP. CODE NUMBER: HC-1281.

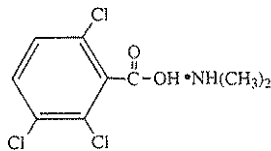
OTHER CODE NUMBERS: CAS 50-31-7 (2,3,6-TBA); SHA 017303.

ADDITIONAL TRADE NAME: Tribac*.

DISCONTINUED NAMES: Benzac* (Union Carbide Corp.); Fen-All* (Tenneco Chemical); Trysben* 200 (Du Pont); Zobar* (+ PBA); Maygon* (+ dicamba + MCPA + mecoprop) (Shell Chemicals UK Ltd.).

Chemistry

COMPOSITION: 2,3,6-Trichlorobenzoic acid.



2,3,6-TBA

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1500 mg/kg as free acid.**Trichlorobenzyl Chloride****Identification**

COMMON NAME: Trichlorobenzyl chloride (IUPAC).

TRIVIAL NAMES: TCBC.

CODE NUMBERS: CAS 1344-32-7; SHA 017304.

DISCONTINUED NAMES: Radox T* (+ CDAA) (Monsanto Agricultural Co.).

Action/Use

ACTION: Herbicide.

USE: Preemergence application only in combination with Radox* on corn.

Trichloroethane

(Discontinued Dow Chemical Co.)

Identification

COMMON NAME: Methyl chloroform.

CODE NUMBERS: CAS 71-55-6; SHA 081201.

DISCONTINUED NAMES: Aerothene TT*, Chlorothene SM*, Chlorothene Nu*.

Chemistry

COMPOSITION: 1,1,1-Trichloroethane (IUPAC).

Action/Use

ACTION: Fumigant.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Dog): Oral LD₅₀ 750 mg/kg. (Rat): vapor toxicity 1000 ppm.**Trichloroethylene****Identification**

CODE NUMBERS: CAS 79-01-6; SHA 081202.

Action/Use

USE: Cancelled for use in fumigant mixtures or as a solvent with other ingredients on grains.

Trichloromethane — see Chloroform.

Trichloronate — see Trichloronate.

Trichloronate**Identification**

COMMON NAMES: Trichloronate (France), trichloronat (BSI), fenophosphon (So. Africa).

EXP. CODE NUMBERS: Bay 37289, S 4400.

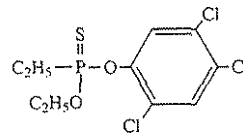
OTHER CODE NUMBER: CAS 327-98-0.

ADDITIONAL TRADE NAMES: Phytosol*.

DISCONTINUED NAMES: Agrisil*, Agritox* (Bayer AG).

Chemistry

COMPOSITION: O-ethyl O-2,4,5-trichlorophenyl ethylphosphonothioate.



Trichloronate

Action/Use

ACTION: Nonsystemic insecticide.

Safety Guidelines

TOXICITY CLASS: II.

Emergency Guidelines

ANTIDOTE: Atropine, PAM.

Trichloronitroethylene — see GASPA* Fumigant; Grand Emulsion; Grandox Fumigant.

Trichloronitromethane — see Chloropicrin.

Trichlorophenol

(Discontinued by Dow Chemical Co.)

Identification

CODE NUMBER: CAS 25167-82-2.

DISCONTINUED NAMES: Dowicide* 2, Dowicide* 2S.

Action/Use

ACTION: Fungicide, bactericide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Guinea pig): Oral LD₅₀ 1000-3000 mg/kg.

Trichlorotox* — see Trichlorfon.

Trichlorophon — see Trichlorfon.

Triclopyr

BP: DowElanco (Garlon*, Grazon*, Grandstand*, Pathfinder*, Redeem*, Remedy*, Turflon*)

Identification

COMMON NAME: Triclopyr (ISO, ANSI, BSI, WSSA).

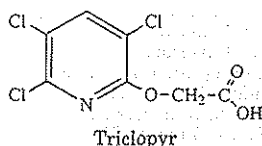
CODE NUMBERS: CAS 55335-06-3; SHA 481900.

DISCONTINUED NAME: Rely* (Hoechst-Roussel).

Chemistry

COMPOSITION: (3,5,6-trichloro-2-pyridinyloxy)acetic acid (CAS 9CI). PROPERTIES: Amber colored. Decomposes at 290°C; photodegrades, low volatility.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.



Action/Use
ACTION: Systemic herbicide.
USE: For control of woody plants and broadleaf weeds on rights-of-way, forests, industrial sites, turf, permanent grass pastures, rangeland, non-irrigation ditchbanks.
COMBINATIONS: Access* (+ picloram), Confront* (+ clopyralid), Crossbow* (+ 2,4-D) (all DowElanco).

Registration Notes
 U.S.: Some or all applications of Access* may be classified RUP.
Environmental Guidelines
SOIL PARTICLE ADSORPTION: Degrades in soil with microbial activity. Soil half life of 20-45 days.

Safety Guidelines
SIGNAL WORD: DANGER (Garlon* 3A, Grandstand*, Redeem*, Turflon* Amine).

CAUTION (Garlon* 4, Grazon* ET, Pathfinder*, Remedy*, Turflon* D, Turflon* Ester).

TOXICITY CLASS: I (Garlon* 3A, Grandstand*, Redeem*, Turflon* Amine).

BI (Garlon* 4, Grazon* ET, Pathfinder*, Remedy*, Turflon* D, Turflon* Ester).

TOXICITY: Tech (Rat, female): Oral LD₅₀ 630 mg/kg.

PROTECTIVE CLOTHING: Safety glasses or chemical goggles (refer to labels).

HANDLING AND STORAGE CAUTIONS: Keep out of reach of children. Do not get in eyes, on skin, or on clothing; harmful if swallowed. Avoid contamination of food. Wash thoroughly after handling.

Emergency Guidelines
FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Inhalation,** remove to fresh air. **Ingestion,** do NOT induce vomiting.

Tri-Clor* — see Chloropicrin.

Tri-Con* — see Chloropicrin.

Tri-Cop* — see Copper, Fixed; Copper Sulfate, Basic.

Tri-cuproxi* — see Maneb; Zineb.

Tricuron* Herbicide (isonuron) — Discontinued by BASF AG.

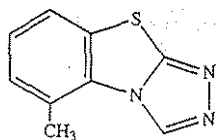
Tricuzin* Fungicide (zineb + copper oxychloride) — Discontinued by Atochem Agri B.V.

Tricyclazole
 BP: DowElanco (Beam*, Bim*)
 Hubei Sanonda Co., Ltd.

Identification
COMMON NAME: Tricyclazole (ISO, ANSI, BSI).
EXP. CODE NUMBER: EL-291 (Eli Lilly & Co.).
OTHER CODE NUMBERS: CAS 41814-78-2; SHA 120201.

Chemistry
COMPOSITION: 5-Methyl-1,2,4-triazolo[3,4-b]-benzothiazole (IUPAC and CAS).

PROPERTIES: Crystalline solid. Melting point 187-188°C. Vapor pressure 2 x 10⁻⁷ mm/Hg at 25°C.



Action/Use
ACTION: Systemic fungicide.
USE: Controls rice blast disease (*Piricularia oryzae*).
FORMULATIONS: Wettable powder, dust, granule.

Registration Notes
 U.S.: Not registered.

OUTSIDE U.S.: Bim* registered in Spanish-speaking countries; Beam* elsewhere.

Environmental Guidelines
SOLUBILITY: In water 700 ppm at 25°C.

Safety Guidelines
SIGNAL WORD: WARNING.

TOXICITY CLASS: II.
TOXICITY: Tech (Mouse): Oral LD₅₀ 250 mg/kg. (Rat) 314 mg/kg.
HANDLING AND STORAGE CAUTIONS: See label. Keep away from children.

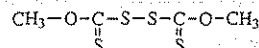
Tricyclohexyl Hydroxytin — see Cyhexatin.

Tridemorph — see Calixin*.

Tridex* Fungicide — see Mancozeb.

Tridex* Herbicide

Chemistry
COMPOSITION: Dimethyl dithiobis (thionoformate).
PROPERTIES: Melting point 22.5-23°C.



Active Ingredient of Tridex*

Action/Use
ACTION: Preemergence herbicide.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 603 mg/kg. Information from "Synthesis of Chemical Herbicides" by Urenovich and Dixon.

See Mancozeb.

Tridiphane

BP: DowElanco (Tandem*)

Identification

COMMON NAME: Tridiphane (ISO, ANSI, BSI).

CODE NUMBERS: CAS 58138-08-2; SHA 126601.

Chemistry

COMPOSITION: (±)-2-(3,5-dichlorophenyl)-2-(2,2,2-trichloroethyl)oxirane (IUPAC).

Action/Use

ACTION: Selective postemergence herbicide.

FORMULATIONS: Emulsifiable concentrate.

Environmental Guidelines

HAZARDS: Fish: Toxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

PROTECTIVE CLOTHING: Wear goggles or face shield and rubber gloves when handling.

HANDLING AND STORAGE CAUTIONS: Causes substantial but temporary eye injury.

Emergency Guidelines

FLASHPOINT: 116°F; 46.7°C (Setaflash). Combustible.

Tri-Endothal* — see Endothal.

Tri-Ester* — see 2,4-D; Dichlorprop; Mecoprop.

Tri-Ester* II — see Dichlorprop; MCPA; Mecoprop.

Trietazine

BP: Hoechst Schering AgrEvo GmbH

Identification

COMMON NAME: Trietazine (ISO, ANSI, BSI, JMAF, WSSA).

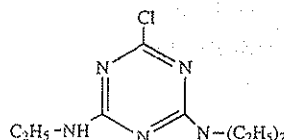
EXP. CODE NUMBER: G 27901.

OTHER CODE NUMBERS: CAS 1912-26-1; SHA 080809.

DISCONTINUED NAMES: Gesafloc* (Ciba-Geigy Ltd.); Bronox* (+ linuron), Pre-Empt* (+ linuron + trifluralin) (Schering AG).

Chemistry

COMPOSITION: 2-Chloro-4-diethylamino-6-ethylamino-1,3,5-triazine (IUPAC).



Action/Use
ACTION: Selective herbicide.

USE: For annual broadleaf weeds in potatoes and peas (Senate*); in peas (Remtal* SC).

FORMULATIONS: Flowable concentrate, wettable powder.

COMBINATIONS: Remtal* SC (+ simazine), Senate* (+ terbutryn) (Hoechst Schering AgrEvo GmbH).

Registration Notes

OUTSIDE U.S.: Remtal* SC in U.K.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 5.5 mg/l (24 hr) (guppy). Bee: Nontoxic. Bird: (Oral) 100 mg/kg (quail).

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator
 Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: a.i. (Rat): Oral LD₅₀ 594-841 mg/kg.**Triethanolamine-Copper Complex** — see A & V-70 Algaecide.**Triethanolamine Methanearsonate****Identification**

CODE NUMBERS: CAS 5902-97-6; SHA 079403.

Action/Use

USE: Formerly sold in mixture with 2,4-D.

Tri-Fen* — see Fenatrol*.

Tri-Fen* Herbicide (chlorfenac) — Discontinued by Tenneco

Chemical Inc.

Trifenmorph — see Frescon*.**Trifenson*** Acaricide (fenson) — Discontinued by Pennwalt Holland B.V.**Trifensulfuron Methyl** — see Pinnacle*.**Triflumizole**

BP: Nippon Soda Co., Ltd. (Trifmine*)

Uniroyal Chemical Co., Inc. (Procure*, Terraguard*)

Identification

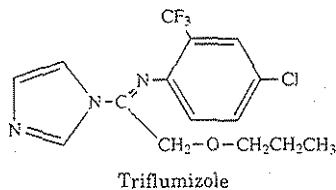
COMMON NAME: Triflumizole (ISO draft, BSI, JMAF).

EXP. CODE NUMBER: NF-114.

OTHER CODE NUMBERS: CAS 99387-89-0 (triflumizole); CAS 68694-11-1 (unspec stereochem).

ChemistryCOMPOSITION: (E)-4-chloro- α,α,α -trifluoro-N-(1-imidazol-1-yl-2-propoxyethylidene)-o-toluidine (IUPAC).

PROPERTIES: Melts at 62.4°C. Crystalline, white to off-white. Solubility in chloroform 2220 g/l; Acetone 1440 g/l; Methanol 496 g/l; Xylene 639 g/l; n-Hexane 17.6 g/l.

**Action/Use**

ACTION: Fungicide.

USE: Systemic fungicide having a broad spectrum of protectant and eradicant activity against certain diseases. For disease control in grapes, apples and pears (Procure*). For management and control of *Cylindrocladium spathiphylli* root and petiole rot in *Spathiphyllum* (Terraguard*).

FORMULATIONS: Wettable powder.

Registration NotesU.S.: Under evaluation for powdery mildew of grape, apple, vegetables, tobacco; scab and rust of apple and pears; brown rot of peaches; stripe and smut of barley; Cladosporium diseases of tomato and some fruit crops. Terraguard* 50W has full registration, as well as a Section 24(c) SLN in Oregon for *Cylindrocladium* control in woody ornamentals.**Environmental Guidelines**

HAZARDS: Fish: 0.58 mg/l (96h.) (rainbow trout); 1.2 mg/l (bluegill sunfish). (Bird): Nontoxic. (Bees): Nontoxic.

SOLUBILITY: In water 12.5 ppm.

Safety Guidelines

SIGNAL WORD: DANGER (Terraguard* 50W); CAUTION (Terraguard* tech).

TOXICITY CLASS: I (Terraguard* 50W); III (Terraguard* tech).

TOXICITY: Tech (Rat): Oral LD₅₀ 1057 mg/kg (male); 1780 mg/kg (female). Dermal LD₅₀ >5000 mg/kg.Terraguard* 50W (Rat): Oral LD₅₀ 2230 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes or clothing. Avoid breathing dust. Wash thoroughly with soap and water after use and before eating or smoking. Remove contaminated clothing and wash before reuse. Store in a cool, dry, well-ventilated place, away from feed, foodstuff, children and animals.

PROTECTIVE CLOTHING: Safety glasses or goggles, rubber gloves, waterproof boots, long-sleeved shirt, long pants and hat.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, drink one or two glasses of water and induce vomiting.**Triflumuron** — see Alsystin*.**Trifluralin**

BP: AQ Group (Sinflouran*)

Atabay Agrochemicals & Veterinary Products Inc.

Atanor S.A. (Triverdax*)

Chemol Trading Ltd. Co. (Olitref*)

Defensa Indústria de Defensivos Agrícolas S.A. (Premerlin* 600-EC, Trifluralin Defensa*)

Diachem S.P.A. (Flurene SE*)

DowElanco (Treflan*)

Drexel Chemical Co.

Gilmore, Inc.

Griffin Corp. (Trilin*, Trilin AT*)

HELM AG

Herbitécnica Defensivos Agrícolas Ltda. (Herbiflan*, Novolate*)

ISAGRO (Digermin*)

Koruma Tarim A.S.

Makhteshim-Agan (Triflurex*)

Pyosa, S.A. de C.V. (Tretox 480*)

Q.E.A.C.A. S.A. (Ipersan*)

Sanachem (Pty) Ltd. (Triflan*, Treffer*)

Identification

COMMON NAMES: Trifluralin (ISO-E, ANSI, BSI, WSSA); trifluraline (ISO-F).

CODE NUMBERS: CAS 1582-09-8; SHA 036101.

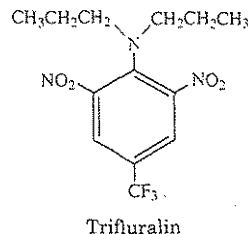
ADDITIONAL TRADE NAMES: Tri-4*, Super T* (American Cyanamid); Ateflox* (Atabay); Sarcline* (Chimac-Agrifhar S.A.); Trifluralina 600* (Defensa); Herbiflurin* (VAPCO).

DISCONTINUED NAMES: Cannon* (+ alachlor) (Monsanto); Elancolan*, Trefanocide*, Treficon*, Trefimid* (+ diphenamid) (Elanco Products Co.); Pre-Empt* (+ linuron + trietazine) (Schering AG); Su Seguro Carpador*; Trim*.

ChemistryCOMPOSITION: α,α,α -Trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine (IUPAC).

FAMILY: Dinitroaniline.

PROPERTIES: Yellow-orange crystals. Melting point 48.5-49°C. Solubility: Digermin* >140°C. Readily soluble in organic solvents such as acetone, xylene, and aromatic naphthas.

**Action/Use**

ACTION: Selective preemergence herbicide.

USE: Treflan* for use on alfalfa (established), almond, apricot, asparagus, barley, beans (dry, castor, guar, lima, snap), broccoli, Brussels sprouts, cabbage, cantaloupe, carrot, cauliflower, celery, collard, corn, cotton, cucumber, grain sorghum (milo), grape (vineyard), grapefruit, hops, kale, lemon, mungbean, mustard (green, seed), nectarine, okra, orange, peach, peanut (Spanish), peas (dry, English), pecan, pepper, potato, plum, prune, safflower, southern pea, soybean, sugar beet, sugarcane, sunflower, tangelo, tangerine, tomato, turnip green, walnut, watermelon, wheat (duram, spring, winter). Check label for specific directions for each crop.

FORMULATIONS: Emulsifiable concentrate, granular, liquid, non-freezable.

COMBINATIONS: Nemifest* (+ linuron) (ISAGRO); Passport* (+ imazethapyr), Tri-Scept* (+ imazaquin) (American Cyanamid); Cotoлина* (+ fluometuron) (Aragonesas Agro S.A.); Broadstrike* + Treflan* (+ flumetsulam), Snapshot* 2.5TG (+ isoxaben), Team* (+ benefin) (DowElanco); Commence* (+ clomazone) (FMC Corp.); Acert* (+ diuron), Lance* (+ alachlor) (Herbitécnica Defensivos Agrícolas Ltda.); Terbalin* (+ terbutryn) (Makhteshim-Agan); Buckle* (+ triallate), Salute* (+ metribuzin) (Miles Inc.); Freedom* (+ alachlor) (Monsanto Co., The Agricultural Group).

Environmental Guidelines

HAZARDS: Fish: Toxic. Bee: Nontoxic. Earthworm: Nontoxic.

SOLUBILITY: Practically insoluble in water (<1 ppm at 27°C).

Safety Guidelines

SIGNAL WORD: DANGER, WARNING, CAUTION (Varies with formulation).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

TOXICITY CLASS: I, II, III (Varies with formulation).
TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg.
 Tretox 480* (Rat): Oral LD₅₀ 3700 mg/kg.
PROTECTIVE CLOTHING: Use eye protection and protective clothing such as coveralls, long-sleeved shirt, and impermeable gloves when handling this product.
HANDLING AND STORAGE CAUTIONS: Causes eye irritation. Do not get in eyes. Avoid contact with skin and clothing. Harmful if swallowed or absorbed through the skin. May cause skin sensitization reactions in certain individuals. Avoid freezing. Store Treflan* E.C. formulations above 40°F. If frozen, poor weed control may result. Do not store near heat or open flame. Store in original container only. Treflan* M.T.F. formulation may be stored in unheated facilities.

Trifluralin Defensa* — see Trifluralin.

Trifluraline — see Trifluralin.

Triflurex* — see Trifluralin.

Trifmine* — see Triflumizole.

Trifocid* — see DNOC.

Triforine

BP: American Cyanamid Co. (Denarin*, Funginex*, Saprol*)

Identification

COMMON NAME: Triforine (ISO, ANSI, BSI, JMAF).

EXP. CODE NUMBERS: CME 10249, CME 74770, Cela W524.

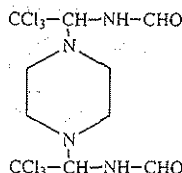
OTHER CODE NUMBERS: CAS 26644-46-2; SHA 107901.

ADDITIONAL TRADE NAMES: Funginex* DC (Ciba); Funginex* DC Monsanto Co., The Agricultural Group); Funginex* WP (Atochem); Triforine* EC (Valent U.S.A.).

Chemistry

COMPOSITION: N,N'-[1,4-piperazinediylbis(2,2,2-trichloroethylidene)]-bis[formamide] (CAS 8 and 9CI).

PROPERTIES: Melts 155°C. Low solubility in acetone, benzene, carbon tetrachloride, chloroform, dichloromethane, light petroleum; slightly soluble in dioxane or cyclohexanone; soluble in tetrahydrofuran; readily soluble in dimethylformamide, dimethyl sulfoxide, or 1-methylpyrrolid-2-one.



Triforine

Action/Use

ACTION: Locally systemic fungicide (protectant, eradicant, and curative).

USE: For use against powdery mildew, scab, rust, and other diseases of fruits, vegetables, cereals, and ornamentals. Scab, powdery mildew, and rust on apples; postharvest for brown rot blossom blight on peaches, nectarines, almonds, apricots; mummyberry disease on high bush blueberries; powdery mildew, black spot, and rust on roses; powdery mildew, rust on various other ornamentals. WP for brown rot postharvest treatment on stone fruit (dips, spray, or combined with wax). May be used in Integrated Pest Management programs.

FORMULATIONS: Dispersible concentrate, wettable powder.

Registration Notes

U.S.: Funginex* WP (Atochem) for postharvest use only. Funginex* DC (Ciba) for commercial and agricultural use only. Funginex* DC (Monsanto) for home and garden use only. Triforine* DC (Valent U.S.A.) for ornamental and greenhouse only.

Environmental Guidelines

HAZARDS: Fish: Nontoxic. Bee: Low hazard.

SOLUBILITY: In water (room temperature) 6 ppm.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Tech (Rat): Oral LD₅₀ >16,000 mg/kg. Dermal >10,000 mg/kg.

PROTECTIVE CLOTHING: Goggles, face shield and impervious clothing including gloves, apron and overshoes when handling.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place; avoid prolonged exposure >100°F. Do not store below 32°F (0°C).

Emergency Guidelines

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water for 15 minutes. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion,** do NOT induce vomiting. Drink promptly a large quantity of milk, egg whites, or gel-

atin solution. Call physician or Poison Control Center immediately. **Inhalation,** remove from contaminated area.

EMERGENCY TELEPHONE: 314-694-4000 (Monsanto Co., The Agricultural Group).

Triforine* EC — see Triforine.

Tri-4* — see Trifluralin.

Trifrina* — see DNOC.

Trifsan* — see Trifluralin.

Trifuncit* — see Dithiocarbamates.

Trifungol* — see Ferbam.

Trigard* — see Cyromazine.

Trigger* Herbicide (isoproturon + triallate) — Discontinued by May & Baker Ltd.

Trigrrr* — see Foliar Trigrrr*; Soil Trigrrr*.

Triherbide-CIPC* — see Chlorpropham; IPC.

Triherbide-IPC* Herbicide (propham) — Discontinued by ELF Atochem Agri B.V.

Tri-iodobenzoic Acid — see TIBA.

Triiin* — see Trifluralin.

Triiin AT* — see Trifluralin.

Trim* Herbicide (trifluralin) — Discontinued.

Trimangol* — see Dithiocarbamates; Maneb.

Trimanin*

BP: ELF Atochem Agri B.V. (Trimanin*)

Chemistry

COMPOSITION: Co-manufactured ethylenebisdithiocarbamate of zinc (high content), and manganese ions.

Action/Use

ACTION: Fungicide.

Trimanoc*

BP: ELF Atochem Agri B.V. (Trimanoc*)

ELF Atochem Agri S.A. (Trimanoc*)

Identification

COMMON NAME: Mancozeb.

Action/Use

ACTION: Fungicide.

FORMULATIONS: Granules, wettable powder.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4620 mg/kg.

Emergency Guidelines

EMERGENCY TELEPHONE: 33-10-4725171 (ELF Atochem Agri B.V.). See Dithiocarbamates.

Trimanzone*

BP: ELF Atochem Agri B.V. (Trimanzone*)

Chemistry

COMPOSITION: Co-manufactured ethylenebisdithiocarbamate of zinc, iron (low content), and manganese (high content) ions.

Action/Use

ACTION: Fungicide.

USE: To control deficiencies and various fungus diseases in a wide range of crops.

FORMULATIONS: Wettable powder.

Emergency Guidelines

EMERGENCY TELEPHONE: 33-10-4725171 (ELF Atochem Agri B.V.)

Trimastan* — see Maneb; Triphenyltin Acetate.

Trimastan 3311* — see Maneb; Triphenyltin Acetate.

Trimaton* — see Metam-Sodium.

Trim-Cut* — see Mefluidide.

Trimec*

BP: PBI-Gordon Corp. (Trimec*)

Identification

Chemistry

COMPOSITION: Dimethylamine salts of 2,4-D, mecoprop, dicamba.

PROPERTIES: Ammonia odor, amber color, very stable.

Action/Use

ACTION: Herbicide.

USE: For hard-to-control broadleaf weed species in turf and home lawns; brush in roadsides.

FORMULATIONS: Liquid concentrate, aerosol grade, dry vermiculite base for fertilizer mixtures, Bentgrass formula for sensitive grasses.

COMBINATIONS: Trimec* 992, Trimec* Bentgrass, Trimec* Classic, Trimec* Southern (all with 2,4-D + MCPP + dicamba), Super Trimec* and Trimec* Brushmaster Brushkiller (both with 2,4-D + dicamba + 2,4-DP), Trimec* Encore* (+ MCPA + MCPP + dicamba), Trimec* Plus (+ 2,4-D + MCPP + dicamba + MSMA) (all PBI/Gordon).

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

SIGNAL WORD: DANGER (eye).
 CAUTION (Trimec* Bentgrass, Trimec* Brushmaster Brushkiller).
 TOXICITY CLASS: I (eye).
 III (Trimec* Bentgrass, Trimec* Brushmaster Brushkiller).
 TOXICITY: (Rat); Oral LD₅₀ 2380 mg/kg.
 HANDLING AND STORAGE CAUTIONS: If frozen, bring to room temperature and agitate.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush with water. Ingestion, induce vomiting.

Trimec* 992 — see 2,4-D; MCPP; Dicamba, Trimec*.
 Trimec* Bentgrass — see 2,4-D; MCPP; Dicamba, Trimec*.
 Trimec* Brushmaster Brushkiller — see 2,4-D; Dicamba; 2,4-DP.
 Trimec* Classic — see 2,4-D; MCPP; Dicamba, Trimec*.
 Trimec* Encore* — see MCPA; MCPP; Dicamba, Trimec*.
 Trimec M* (MCPA + MCPP + dicamba) — Discontinued 1987 by Ciba-Geigy Ltd.
 Trimec* Plus — see 2,4-D; MCPP; Dicamba; MSMA, Trimec*.
 Trimec* Southern — see 2,4-D; MCPP; Dicamba, Trimec*.

Trimecure

BP: Agri-Pharm International Inc.

Chemistry

COMPOSITION: tert-Butyl 4 (or 5)-chloro-2-methylcyclo-hexane-carboxylate.

Action/Use

ACTION: Attractant for the Mediterranean fruit fly.

Trimethacarb

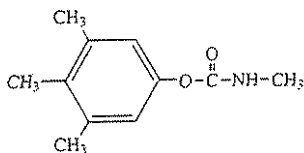
BP: Drexel Chemical Co. (Broot*)

Identification

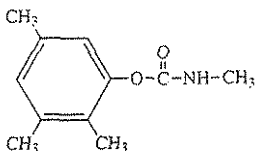
COMMON NAME: Trimethacarb (ISO draft, ANSI, BSI).
 EXP. CODE NUMBERS: UC 27867, SD 8530.
 OTHER CODE NUMBERS: CAS 2655-15-4 (2,3,5-trimethylphenyl methylcarbamate); CAS 2686-99-9 (3,4,5-trimethylphenyl methylcarbamate); CAS 12407-86-2 (trimethacarb); SHA 102401; OMS 597 (WHO).
 DISCONTINUED NAME: Landrin*.

Chemistry

COMPOSITION: 3,4,5- + 2,3,5-isomers of trimethylphenyl methylcarbamate.
 PROPERTIES: Tech: buff to brown crystalline solid at 25°C; melting point 105-114°C; vapor pressure 5.0 × 10⁻⁵ Hg at 23°C. Not readily soluble in organic solvents.



3,4,5-Trimethylphenyl Methylcarbamate



2,3,5-Trimethylphenyl Methylcarbamate

Action/Use

ACTION: Insecticide.
 USE: As granules at planting for control of corn rootworm larvae.
 FORMULATIONS: Granules.

Environmental Guidelines

SOLUBILITY: In water at 23°C, 58 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION (Broot* 15GX).
 TOXICITY CLASS: III (Broot* 15GX).
 TOXICITY: Tech (Rat): Oral LD₅₀ 125 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.
 Broot* 15GX (Rat): Oral LD₅₀ 566 mg/kg. (Rabbit): Dermal LD₅₀ (rabbit) >2000 mg/kg.
 PROTECTIVE CLOTHING: Wear long-sleeved clothing, long pants, and rubber gloves while using.

STORAGE AND HANDLING CAUTIONS: Keep in cool, dry, well ventilated place. Store away from feed and foodstuffs. Keep out of reach of children. Avoid contact with mouth, eyes, and skin.

Emergency Guidelines

ANTIDOTE: Atropine sulfate. Do NOT use 2-PAM or cholinesterase-inhibiting drugs.
 FIRST AID: Get immediate medical aid. Ingestion, drink 1-2 glasses of water, induce vomiting.

Trimection* — see Dimethoate.

Trimeturon

Identification

COMMON NAME: Trimeturon (BSI, France).
 EXP. CODE NUMBER: BAY-40557.
 OTHER CODE NUMBER: CAS 3050-27-9.

Chemistry

COMPOSITION: N-(4-chlorophenyl)-O-N-trimethylisourea; 3-(4-chlorophenyl)-1,1,2-trimethylisourea (IUPAC).

Action/Use

ACTION: Herbicide.

Trimidal*

BP: DowElanco (Trimidal*, Triminol*)

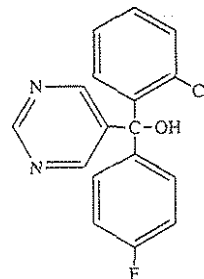
Identification

COMMON NAME: Nuarimol (ISO, ANSI, BSI).
 EXP. CODE NUMBER: EL-228.
 OTHER CODE NUMBERS: CAS 63284-71-9; SHA 224100.

Chemistry

COMPOSITION: (±)-α-(2-chlorophenyl)-α-(4-fluorophenyl)-5-pyrimidinemethanol (CAS).

PROPERTIES: Pure nuarimol is a white crystalline solid, melting point 124-125°C. Vapor pressure is 7.5 × 10⁻⁶ mm/Hg at 23°C. Soluble in most organic solvents.



Nuarimol

Action/Use

ACTION: Fungicide.
 USE: Provides protectant, curative, and eradicator activity against certain diseases.
 Trimidal* is being evaluated for control of diseases of trees and vines, peanuts, and vegetables, and as a seed treatment for cereals.
 FORMULATIONS: Wettable powder, emulsifiable concentrates, suspension concentrates, solution seed coating, aqueous suspension.

Registration Notes

U.S.: Not registered.
 OUTSIDE U.S.: Africa, Belgium, Eastern Europe, France, Greece, Italy, Near East, South Korea, Spain, Switzerland, United Kingdom, West Germany.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 12.1 mg/l (4 day) (bluegill). Bee: Nontoxic.
 SOLUBILITY: Water solubility is 26 ppm at 25°C at pH 7.

Safety Guidelines

SIGNAL WORD: CAUTION.
 TOXICITY CLASS: III.
 TOXICITY: Tech (Mouse): Oral LD₅₀ 2500 mg/kg. (Rat): 1250 mg/kg.
 PROTECTIVE CLOTHING: Wear impermeable gloves during mixing and loading of this product.
 HANDLING AND STORAGE CAUTIONS: Trimidal* E.C. causes skin and eye irritation. Harmful if swallowed, inhaled or absorbed through skin. Avoid breathing spray mist. Avoid contact with skin, eyes, or clothing. Do not store near heat or open flame.

Trimiltox*

BP: Sandoz Agro Ltd. (Trimiltox*)

Chemistry

COMPOSITION: Mancozeb + 3 copper salts (copper oxychloride, copper sulfate, copper carbonate).
 FAMILY: Organophosphorus, nitro-herbicide.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

Action/Use

ACTION: Fungicide.
USE: For the control of downy mildews (Phytophthora, Plasmopara) and other diseases in grapes, potatoes, tomatoes and most other crops.
FORMULATIONS: Wettable powder.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: Formulation (Rat): Oral LD₅₀ 4100 mg/kg. Copper particularly non-toxic.

Emergency Guidelines

ANTIDOTE: EDTA or penicillamine as in copper poisoning.
FIRST AID: Ingestion, induce vomiting.

Triminol* — see Trimidal*.
Trimonal* — see Banvel*; 2,4-D; MCPA.
Trinactin — see Polynactins Complex.
Trinangol* — see Dithiocarbamates.

Trinatox D*

BP: Pyosa, S.A. de C.V.

Identification

OTHER NAME: Gesapax-H*.

Chemistry

COMPOSITION: Ametryn + 2,4-D.

Action/Use

ACTION: Selective herbicide.
USE: Postemergence for annual grasses, broadleaf weeds on sugarcane.

FORMULATIONS: Emulsifiable concentrate.

Safety Guidelines

SIGNAL WORD: WARNING.
TOXICITY CLASS: II.
TOXICITY: (Rat): Oral LD₅₀ 375 mg/kg.
HANDLING AND STORAGE CAUTIONS: Store in original container out of ultraviolet light.

Trinex* — see Trichlorfon.

Trinoxol* Herbicide (2,4,5-T) — Discontinued by Crystal Chemical.

Trio* — see Bromoxynil; 2,4-D; Propanil.

Triofterol* — see Zineb.

Tri-PCNB* — see PCNB.

Tri-P.E.*

Discontinued by Atochem Agri B.V.)

Identification

COMMON NAMES: Dimexan (BSI discontinued), dimexano (ISO, BSI).

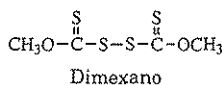
TRIVIAL NAMES: Dimethyl xanthic disulfide; dimethyl dixanthogen.

CODE NUMBER: CAS 1468-37-7

DISCONTINUED NAMES: Trixabon* (+ cycluron + chlorbufam), Trixan* (+ chlorpropham) (Atochem Agri B.V.).

Chemistry

COMPOSITION: O,O-dimethyl dithiobis(thioformate) (IUPAC).



Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: WARNING.
TOXICITY CLASS: II.
TOXICITY: (Rat): Oral LD₅₀ 340 mg/kg.

Tripece* — see Chlorpropham; Propham.

Tri-Penar*

BP: ELF Atochem Agri B.V. (Tri-Penar*)

Identification

CODE NUMBERS: CAS 1920-05-4; SHA 039303.

DISCONTINUED NAMES: Penar* (ELF Atochem North America, Inc.).

Chemistry

COMPOSITION: Dimethyldodecylamine acetate (IUPAC).

Action/Use

ACTION: Plant growth regulator.

Registration Notes

U.S.: Tri-Penar* discontinued by Pennwalt Corp.

OUTSIDE U.S.: Tri-Penar* marketed in Europe.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 800-1500 mg/kg.

Triphenmorphe — see Frescon*.

Triphenyltin Acetate

BP: Hoechst Schering AgrEvo GmbH (Brestan*)

Identification

COMMON NAMES: Triphenyltin acetate (USA), fentin acetate (ISO-E, BSI), fentine acetate (ISO-F), fenolovo acetate (USSR), acetoxytriphenylstannane (IUPAC).

CODE NUMBERS: CAS 900-95-8; SHA 496700; OMS 1020 (WHO); ENT-25208.

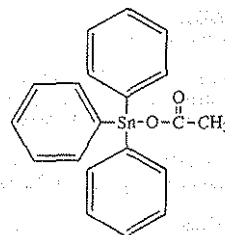
ADDITIONAL TRADE NAMES: Fentin Acetate (Chimac-Agriphar S.A.); Triacetane* F198 (Diachem S.P.A.); Batasan*, Phenostat-A*, Phentinoacetate, Suzu*, TPTA.

DISCONTINUED NAME: Tinestan* (Nihon Nohyaku Co., Ltd.).

Chemistry

COMPOSITION: (Acetoxy)triphenylstannane (CAS).

PROPERTIES: Pure: white crystalline, melting point 121-123°C. Vapor pressure 5 x 10⁻⁹ mbar. Solubility at 20°C, n-hexane approx. 0.5 g/100 ml, toluene approx. 8.9 g/100 ml, ethyl alcohol approx. 2.2 g/100 ml, ethyl acetate approx. 8.2 g/100 ml. Hardly soluble in most organic solvents.



Triphenyltin Acetate

Action/Use

ACTION: Fungicide, algicide, molluscicide.

USE: Controls early and late blight on potatoes; Cercospora spp. on sugar beets, peanuts; scab on pecans.

FORMULATIONS: Flowable suspension, wettable powder.

COMBINATIONS: Trimastan* and Trimastan 3311* (+ maneb) (ELF Atochem Agri B.V.); Brestan* 10, Brestan* 60 (+ maneb).

Environmental Guidelines

SOLUBILITY: Solubility at 20°C, approx. 9 mg/l water (pH 5).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: Tech in starch mucilage (Rat, female): Oral LD₅₀ 140 mg/kg. Dermal >2000 mg/kg.

PROTECTIVE CLOTHING: When handling wear goggles, a respirator, rubber gloves, and protective clothes.

HANDLING AND STORAGE CAUTIONS: Store under dark and dry

Emergency Guidelines

FIRST AID: Eyes, Skin, flush with plenty of water for at least 15 minutes. Ingestion, induce vomiting and treat symptomatically.

Triphenyltin Chloride

Identification

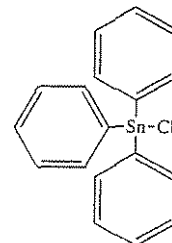
COMMON NAMES: Fentin chloride (ISO-E, BSI); fentine chloride (ISO-F).

CODE NUMBERS: CAS 639-58-7; SHA 496500.

ADDITIONAL TRADE NAMES: Aquatin* (Planters Products), Phenostat-C* (Nitto Kasei Co.), Tinmate*.

Chemistry

PROPERTIES: Colorless crystal, melting point 105.5-107°C. Stable when stored in dark with dry air. Hydrolyzes to hydroxide in water. Moderately soluble in organic solvents. Practically insoluble in most organic solvents.



Fentin Chloride

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Fungicide (Tinmate*); molluscicide (Aquatina* 20 EC).
USE: Controls Cercospora leafspot on sugar beets, and late blight on potato. Tinmate* primarily for fishpond snails (Aquatina* 20 EC).
FORMULATIONS: Emulsifiable concentrate, wettable powder.

Environmental Guidelines

SOLUBILITY: Aquatina*: In water at 20°C is 40 ppm,

Safety Guidelines

SIGNAL WORD: WARNING—POISON.

TOXICITY CLASS: II.

TOXICITY: (Mouse): Oral LD₅₀ 18 mg/kg.

Aquatina* 20 EC (Rat, female), 135 mg/kg.

PROTECTIVE CLOTHING: When handling this material, wear goggles, a respirator, gloves and protective clothing.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry place away from feed and foodstuffs, avoid contact with mouth, skin, eyes. Keep out of reach of children.

Emergency Guidelines

FIRST AID: Eyes, Skin, flush with plenty of water for at least 15 minutes. Ingestion, induce vomiting.

Triphenyltin Hydroxide

BP: Hoechst Schering AgrEvo GmbH (Brestanid*)

Identification

COMMON NAMES: Fentin hydroxide (ISO-E, BSI); fentine hydroxide (ISO-F); triphenyltin hydroxide (U.S., So. Africa).
CODE NUMBERS: CAS 76-87-9; SHA 083601; OMS 1017 (WHO); ENT-28009.

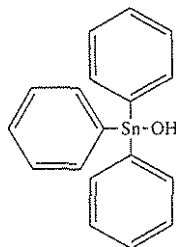
ADDITIONAL TRADE NAMES: Super Tin* (Griffin Corp.); Tubotin* (May & Baker Ltd.); Phenostat-H* (Nitto Kasei Co., Ltd.); Suzu H*; TPTH, TPPOH.

DISCONTINUED NAMES: Flo-Tin* (Agtrol Chemical Products); Duter* (Duphar B.V.); Du-Ter* (Griffin Corp.); Haitin* (Nihon Nohyaku Co., Ltd.); Triple Tin* (Wesley Industries).

Chemistry

COMPOSITION: Triphenyltin hydroxide (IUPAC).

PROPERTIES: Stable at room temperature but dehydration may occur at >230°C. Tech white crystalline solid, melting range 121-123°C. Moderately soluble in most organic solvents.



Fentin Hydroxide

Action/Use

ACTION: Fungicide.

USE: For early and late blight on potatoes, leaf spot on sugar beets, peanuts, scab and several other diseases on pecans. Fungus diseases on rice, beans, garlic, onion, pepper, tomato. Exhibits antifeeding properties for surface-feeding insects.

FORMULATIONS: Dispersion, flowable suspension, wettable powder.

Registration Notes

U.S.: Some or all applications may be classified as RUP.

Environmental Guidelines

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 156 mg/kg. Dermal 1600 mg/kg.

PROTECTIVE CLOTHING: Wear goggles or face shield when handling.

HANDLING AND STORAGE CAUTIONS: Surfactants, spreaders, or stickers should not be added because phytotoxicity may result. Do not use with oil sprays.

Emergency Guidelines

FLASHPOINT: Combustible.

See Triphenyltin Acetate.

Triple-Noctin* L — see Thiram.

Triple Tin* Fungicide (triphenyltin hydroxide) — Discontinued 1991 by Wesley Industries, Inc.

Triplet* — see Banvel*; 2,4-D; Mecoprop.

Tripomol* — see Thiram.

Tri-Power* — see Banvel*; MCPA; Mecoprop.

Triprene — see ZR-619.

Triquintam* Fungicide (PCNB + thiram) — Discontinued by Atochem Agri B.V.

Triran* — see Cyhexatin.

Triran FA* — see Cyhexatin.

Triscabol* — see Ziram.

Tri-Scept*

BP: American Cyanamid Co.

Identification

CODE NUMBERS: CAS 81335-47-9 (imazaquin); CAS 1582-09-8 (trifluralin).

Chemistry

COMPOSITION: Imazaquin + trifluralin.

FAMILY: Imidazoline and dinitroaniline.

PROPERTIES: Orange-yellow emulsion with aromatic hydrocarbon odor. Boiling point 84°C.

Action/Use

ACTION: Herbicide.

USE: Soybeans only in specified states.

Registration Notes

U.S.: Specific states only; see label.

Environmental Guidelines

SOLUBILITY: Emulsifies in water.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: I. Corrosive.

TOXICITY: (Rat): Oral LD₅₀ 3161-7908 mg/kg (male); 4665-8123 mg/kg (female). (Rabbit): Dermal >2000 mg/kg. Moderate eye irritant.

HANDLING AND STORAGE CAUTIONS: Store in secure, dry, ventilated area away from water, food, or feed. Corrosive to carbon steel, iron, brass, copper, zinc. Avoid sources of ignition.

Emergency Guidelines

FLASHPOINT: >205°F (Pensky-Martins).

FIRE EXTINGUISHING MEDIA: Water, foam, dry chemical, CO₂.

FIRST AID: Get medical aid. Ingestion, do NOT induce vomiting. Due to risk of chemical pneumonia or pulmonary edema caused by aspiration of aromatic hydrocarbons into the lungs, vomiting should only be done under medical supervision.

EMERGENCY TELEPHONE: 201-835-3100 (American Cyanamid).

Tritac — see Tritac*.

Tritac*

(Discontinued circa 1969 by Hooker Chemical Corp.)

Identification

COMMON NAME: Tritac (WSSA).

CODE NUMBERS: CAS 1861-44-5; SHA 081801.

Chemistry

COMPOSITION: 1-(2,3,6-trichlorobenzoyloxy)-2-propanol (CAS 8CI).

Action/Use

ACTION: Herbicide.

Tritex-Extra* — see Sethoxydim.

Trithion*

(Discontinued 1987 by Stauffer Chemical Co.)

Identification

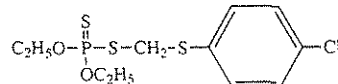
COMMON NAME: Carbophenothion (ISO, ANSI, BSI, ESA).

EXP. CODE NUMBER: R-1303 (Stauffer Chemical Co.).

OTHER CODE NUMBERS: CAS 786-19-6; SHA 058102; OMS 244 (WHO); ENT-23708.

ADDITIONAL TRADE NAMES: Dagadip*, Garrathion*.

DISCONTINUED NAMES: Endyl*, Lethox* (Planters Products).



Carbophenothion

Action/Use

ACTION: Insecticide-acaricide.

Safety Guidelines

SIGNAL WORD: (Tech) DANGER. WARNING.

TOXICITY CLASS: (Tech) I. II.

TOXICITY: Tech (Rat): Oral LD₅₀ 6.8-36.9 mg/kg.

Tritisan* Fungicide (PCNB) — Discontinued 1985 by Hoechst AG.

Tritoflorol* — see Dithiocarbamates; Zineb.

Information is presented herein for preliminary planning only.
 Exclusive reliance must be placed on information/directions supplied by manufacturer.

Tritox***Identification**

CODE NUMBER: CAS 545-06-2.

Chemistry

COMPOSITION: Trichloroacetone nitrile (IUPAC and CAS).

Action/Use

ACTION: A wood preservative.

Triumph* — see Isazofos.

Tri-VC 13* Insecticide (dichlofenthion) — Discontinued 1991 by Atochem Agri B.V.

Triverdax* — see Trifluralin.

Trivial Name

A vernacular name in common usage for a chemical (nicotine, etc.).

Trixabon* Herbicide (dimexan + cylcuron + chlorbufam) — Discontinued by Atochem Agri B.V.

Trixan* Herbicide (dimexan + chlorpropham) — Discontinued by Atochem Agri B.V.

Triziin* 25 — see Nitrofen.

Triziman*

BP: ELF Atochem Agri B.V. (Triziman*)

Chemistry

COMPOSITION: Co-manufactured ethylenebis dithiocarbamate of zinc and manganese and (high content) ions.

Action/Use

ACTION: Fungicide.

Emergency Guidelines

EMERGENCY TELEPHONE: 33-10-4725171 (ELF Atomchem Agri).

Triziman D* — see Vondozeb*.

Trizinoc*

(Discontinued by Atochem Agri B.V.)

Identification

COMMON NAME: Zinoc.

Chemistry

COMPOSITION: N,N'-Methylene di(zinc ethylenebis-dithiocarbamate).

Action/Use

ACTION: Fungicide.

Trizone* Fumigant (chloropicrin + methyl bromide + propargyl bromide) — Discontinued 1968 by Dow Chemical Co.

Troika* — see Prochloraz.

Trolene* — see Ronnel.

Tromb* — see Bromoxynil; Ioxynil; Isoproturon.

Tronabor* Larvicide/Herbicide (borax) — Discontinued by Kerr-McGee.

Tronic* 98

BP: Kalo, Inc. (Tronic* 98)

Chemistry

COMPOSITION: Alkylaryl polyethoxyethanol, free fatty acid, propylene glycol, isopropanol, dimethylpolysiloxane.

PROPERTIES: Clear green liquid with mild alcohol odor.

Action/Use

ACTION: Spreader-activator.

USE: With herbicides.

Environmental Guidelines

SOLUBILITY: Complete in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

PROTECTIVE CLOTHING: Safety glasses, impervious gloves.

HANDLING AND STORAGE CAUTIONS: Use only with adequate ventilation. Avoid contact with eyes, skin, clothing. Causes eye irritation. Do not store above 120°F. Keep away from heat, sparks, open flame. Keep out of reach of children.

Emergency Guidelines

FLASHPOINT: 120°F (TCC).

COMBUSTION PRODUCTS: Isopropyl alcohol.

FIRE EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, alcohol foam.

FIRST AID: Get medical aid. Eyes, skin, flush immediately with plenty of water. Ingestion, drink one or two glasses of water. Inhalation, remove to fresh air, treat symptomatically.

Trooper* Herbicide (dicamba) — Discontinued by Sandoz Crop Protection Corp.

Trophy* — see Acetochlor.

Tropital*

(Discontinued by McLaughlin Gormley King Co.)

Identification

COMMON NAME: Heliotropin acetal.

CODE NUMBERS: CAS 5281-13-0; SHA 068801.

Action/Use

ACTION: Synergist.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4400 mg/kg.

Tropotone* — see MCPB.

Tropotox* — see MCPB.

Tropotox Plus* — see MCPA; MCPB.

Tropuron* — see Diuron; Glyphosate.

Trotis* — see Pencycuron.

Trounce* — see Dimethoate.

Troy-BT* — see *Bacillus thuringiensis* var. *kurstaki*.

Troysan* Copper 8% Fungicide/Wood Preservative (copper naphthenates) — Discontinued by Troy Chemical Corp.

Truban* — see Etridiazole.

Trucidor* — see Kilval*.

Tryad* Adjuvant — Discontinued by Kalo, Inc.

Trycol*

BP: Henkel Corp.

Action/Use

ACTION: Wetting agent, emulsifier.

Trysben* 200 Herbicide (trichlorobenzoic acid) — Discontinued by Du Pont Agricultural Products.

TS-7236 — see Fluazifop-butyl.

Tserenox — see Ceredon*.

Tsisan* (drosolure) — Discontinued 1984 by Tamogan Ltd.

Tsitrex* — see Dodine.

TSM* — see Thiophanate-methyl.

Tsumacide* — see MTMC.

Tsumaphenazin Dust — see Phenazine.

Tuads — see Thiram.

Tubatoxin* — see Rotenone.

Tuberite* — see Propam.

Tubothane* Fungicide (maneb) — Discontinued by Rhone-Poulenc.

Tubotin* — see Triphenyltin Hydroxide.

Tuff Brite* — see Chlorothalonil.

Tuffcide* — see Chlorothalonil.

Tugen* Insecticide (propoxur) — Discontinued 1994 by Bayer AG.

Tugon* Fly Bait (trichlorfon) — Discontinued 1994 by Bayer AG.

Tumbleleaf* (sodium chlorate) — Discontinued by Wilbur-Ellis.

Tumex* — see 8-Quinololinol.

Tunic* — see Probe*.

Tupersan* — see Siduron.

Turbo*

BP: Miles Inc. (Turbo*)

Chemistry

COMPOSITION: Metribuzin + metolachlor.

FAMILY: Triazinone/Acetamide herbicides.

PROPERTIES: True emulsifiable concentrate. Miscible with most organic solvents.

Action/Use

ACTION: Selective herbicide.

USE: For problem grasses, broadleaf weeds in soybeans and potatoes.

FORMULATIONS: Emulsifiable concentrate.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 849 mg/kg (female); 1876 mg/kg (male).(Rabbit): Dermal LD₅₀ >2000 mg/kg. Moderate eye, very slight skin irritation.

PROTECTIVE CLOTHING: Goggles should be used to prevent liquid splashes from getting into eyes. Wear chemical-resistant gloves. Avoid skin contact. Wear long sleeve shirt and trousers.

HANDLING AND STORAGE CAUTIONS: Store in a cool, dry area. Minimum temperature 0° F and maximum temperature not to exceed 100° F average flame. Store in an area designated specifically for pesticides. Do NOT store near any materials intended for use or consumption by humans or animals. Consult label for further instructions and directions for disposal of containers and waste.

Emergency Guidelines

FLASHPOINT: 180°F.

EMERGENCY TELEPHONE: 816-242-2582 (Miles Inc.).

Turcam* — see Bendiocarb.

Turf-Cal* — see Calcium Arsenate.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Turflon* — see Triclopyr.

Turfside* — see PCNB.

Turkey Red Oil

Identification

CODE NUMBERS: CAS 8002-33-3; SHA 079014.

Chemistry

COMPOSITION: Sulfonated castor oil (soluble in castor oil).

Action/Use

ACTION: Liquid adjuvant with emulsifying and wetting properties.
USE: Used when appropriate as an ingredient of formulations; i.e., with various toxicants applied to animal wounds to control screw-worm and promote healing.

Turonex* — see Isoproturon.

Turplex* — see Azatin*.

Tutane* Fungistat (butylamine) — Discontinued by Dow Chemical Co.

Tuzet* — see Urbacid*.

Tween*

BP: ICI Surfactants

Action/Use

ACTION: Series of surfactants.

USE: As emulsifier in formulation of pesticides.

Twin* — see Fenpropimorph; Flusilazole.

Twin-Tak* — see Bromoxynil; Ioxynil; Isoproturon.

Tycap* — see Dyfonate*.

Tycor*

(Discontinued 1990 by Mobay Corp.)

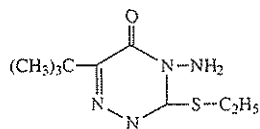
Identification

TRIVIAL NAME: Ethiozin.

EXP. CODE NUMBER: BAY SMY 1500, SMY 1500 (Bayer AG).

OTHER CODE NUMBER: CAS 64529-56-2.

DISCONTINUED NAMES: Lektan* (Mobay Corp.).



Ethiozin

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Tyllanex* — see Terbutylazine.

Type 41 Clay*

BP: Southeastern Clay Co.

Identification

COMMON NAME: Kaolin clay.

CODE NUMBER: CAS 1332-58-7.

OTHER NAMES: Kaolinite, South Carolina Hard Clay.

Chemistry

COMPOSITION: Hydrated aluminum silicate.

PROPERTIES: pH 4.5-5.5. Not reactive.

Action/Use

ACTION: Filler, diluent, carrier.

USE: For insecticides, herbicides, or fertilizer.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

HANDLING AND STORAGE CAUTIONS: Keep dry to prevent caking.

See Clay; Dusts; Kaolin.

Typhoon* — see Fluazifop-P-butyl; Fomesafen.

U 46*

BP: BASF AG (U 46*)

Chemistry

COMPOSITION: Based on phenoxy fatty acids (dichlorprop, mecoprop, 2,4-D, MCPA) in the form of amine salts, potassium and sodium salts, esters, etc.

PROPERTIES: Non-corrosive, liquid. Solubility: (20°C) 2,4-D: ether 25%/100 g; ethanol 49.6 g/100 g; acetone 69.2 g/100 g.

Action/Use

ACTION: Series of selective hormone-type herbicides.

FORMULATIONS: Aqueous solutions, water-soluble, salts, emulsifiable concentrates.

Environmental Guidelines

SOLUBILITY: Water 0.06 g/100 g.

Safety Guidelines

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes or clothing. Store away from foodstuffs.

SPILL CONTROL/CLEANUP: Large spillages should be dammed-off and pumped into containers; soak up remainder with absorbent material and dispose of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Must be disposed of by special means, e.g., suitable incineration, in accordance with local regulations.

Emergency Guidelines

FLASHPOINT: Ca. 60-70° C (ester form).

See 2,4-D; Dichlorprop; MCPA; Mecoprop.

U 46* Combi-Fluid — see 2,4-D; MCPA.

U 46* D-Fluid — see 2,4-D.

U 46* DP-Fluid — see Dichlorprop; MCPA.

U 46* DP-M-Fluid — see Dichlorprop; MCPA.

U 46* KV-Combi-Fluid — see 2,4-D; Mecoprop.

U 46* KV-Fluid — see 2,4-D; Mecoprop.

U 46* M-Fluid — see MCPA.

U 46* M-KV-Fluid — see MCPA; Mecoprop.

U 46* Super — see Dichlorprop; MCPA; Mecoprop.

U-27267

(Discontinued by TUCO)

Identification

CODE NUMBER: CAS 34157-48-7.

Chemistry

COMPOSITION: 3,4,5-Tribromo-N,N- α -trimethyl pyrazole-1-acetamide.

Action/Use

ACTION: Herbicide.

U-36059 — see Amitraz.

UC 7744 — see Carbaryl.

UC 10854

(Discontinued by Rhone-Poulenc)

Identification

EXP. CODE NUMBER: Hercules AC 5727 (BFC Chemical).

OTHER CODE NUMBERS: CAS 64-00-6; ENT-25500.

Chemistry

COMPOSITION: 3-Isopropylphenyl methylcarbamate (IUPAC).

Action/Use

ACTION: Insecticide with broad activity. Little activity against mites.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 41 mg/kg. (Rabbit): Dermal 40 mg/kg.

UC 19786 — see Dinobuton.

UC 2047A — see Trandit*.

UC 21149 — see Temik*.

UC 21865 — see Aldoxycarb.

UC 22463 — see Rowmate*.

UC 27867 — see Trimethacarb.

UC 51762 — see Larvin*.

UC 51769 — see Larvin*.

Ucetam* — see Dithiocarbamates; Metam-Sodium.

Udonkor* Fungicide (CECA) — Discontinued 1975 by Nippon Soda Co., Ltd.

UDVF — see DDVP.

Ujotin* Plant Growth Regulator (2-naphtoxy acetic acid ethyl ester) — Discontinued 1989 by Chemiekombinat Bitterfeld VEB.

Ultima* Plus Herbicide (bentazone + dichlorprop + MCPA) —

Discontinued 1994 by BASF AG.

Ultra* — see Methidathion.

Ultra Low Volume Spray (ULV)

This term on a label signifies that the total volume of spray to be applied per acre is 1/2 gallon or less and is to be applied undiluted.

See Full Coverage Spray; Low Volume Spray.

Ultra PBO* 94% — see Piperonyl Butoxide.

Ultradice* — see Methidathion.

Ultradidin* — see Methidathion.

Ultra-Clor* — see Cadminate*; Potassium Chromate.

ULV — see Ultra Low Volume Spray.

Ulvair* Insecticide/Acaricide (monocrotophos) — Discontinued by Ciba-Geigy Ltd.

Umecron* — see Phosphamidon.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Undecylenic Acid**Identification**

CODE NUMBERS: CAS 112-38-9; SHA 085501.

Chemistry

COMPOSITION: 9-Undecylenic acid.

Action/Use

ACTION: Herbicide and defoliant.

Uden* — see Propoxur.

(The) Unfoamer*

Discontinued 1992 by HACO, Inc.)

Chemistry

COMPOSITION: Dimethylpolysiloxane antifoam compound.

Action/Use

ACTION: Foam suppressant.

Environmental Guidelines

SOLUBILITY: Disperses in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Not likely to produce toxicity under most circumstances.

Uniconazole — see Uniconazole-P.

Uniconazole-P

BP: Sumitomo Chemical Co., Ltd. (Lomica*, Sumagic*, Sumi-seven*)

Valent U.S.A. Corp.

Identification

COMMON NAMES: Uniconazole (ISO, ANSI, BSD); uniconazole-P (ISO, ANSI, BSI).

EXP. CODE NUMBERS: XE-1019-D; S-3307D (Sumitomo Chemical).

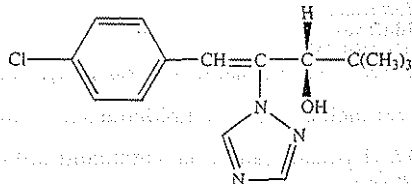
OTHER CODE NUMBERS: CAS 83657-17-4 (uniconazole-P (E)-(S)-(+)-isomer); CAS 83657-16-3 (uniconazole-P (E)-(R)-(-)-isomer); CAS 83657-22-1 (uniconazole).

DISCONTINUED NAMES: Prism*, Prunit* (Sumitomo Chemical Co., Ltd.)

Chemistry

COMPOSITION: (E)-(RS)-1-(4-chlorophenyl)-4,4-dimethyl-2-(1H-1,2,4-triazol-1-yl) pent-1-en-3-ol (IUPAC for uniconazole).

PROPERTIES: White-light brown crystalline solid, melting point 159-160°C. Solubility variable in range of organic solvents.



Uniconazole-P

Action/Use

ACTION: Plant growth regulator.

USE: Used on ornamentals for reducing plant height and increasing flowering.

FORMULATIONS: Water-based/alcohol solution.

Registration Notes

U.S.: Registered.

Environmental Guidelines

SOLUBILITY: 8.4 ppm in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral 2020 mg/kg (male), 1790 mg/kg (female). Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Protective gloves, goggles or full face shield when handling.

HANDLING AND STORAGE CAUTIONS: Avoid contact with mouth, eyes, and skin. Store in original containers away from foodstuffs and animal feed.

Unicrop* CIPC — see Chlorpropham.

Unicrop* DNB (dinoseb) — Discontinued 1989 by Universal Crop Protection Ltd.

Unicrop* Maneb Fungicide (maneb) — Discontinued 1994 by Universal Crop Protection Ltd.

Unidol* — see Methyl Parathion.

Unidron* — see Diuron.

Unifilm*

BP: Custom Chemicides (Unifilm* 707, Unifilm* 8020, Unifilm* N.F.)

Chemistry

COMPOSITION: Alkylarylpolyoxyethylene glycols + isopropanol.

Action/Use

ACTION: Spreader, activator.

USE: For use with insecticides, fungicides, herbicides, miticides.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Unifilm* B

BP: Custom Chemicides

Chemistry

COMPOSITION: Alkylarylpolyoxyethylene glycols + isopropanol + phosphoric acid.

Action/Use

ACTION: Spreader, activator, buffer.

USE: Provides spreading, antifoaming and pH reduction of spray mixed.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Uniflow* — see Sulfur.

Unifos* — see DDVP.

Uni-Mix* Compatibility Agent — Discontinued by TH Agriculture & Nutrition.

Unipon* — see Dalapon.

Uniroyal DO14 — see Propargite.

Unisan* — see PMA.

Unite*

(Discontinued 1992 by HACO, Inc.)

Identification

EXP. CODE NUMBER: HA-914.

Chemistry

COMPOSITION: Acid polyglycols + methyl alcohol.

Action/Use

ACTION: Compatibility agent for liquid fertilizer-pesticide mixtures.

Environmental Guidelines

SOLUBILITY: Completely in water.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: May be fatal or cause blindness if swallowed. Cannot be made nonpoisonous.

Contact may cause eye or skin irritation. Vapor harmful.

Unite*-Ltd. Compatibility Agent — Discontinued by Hopkins Agricultural Chemical Co.

Unitox* Fumigant/Insecticide (DDVP) — Discontinued 1994 by Chemol Trading Ltd. Co.

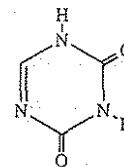
Unitox* Insecticide (chlorfenvinphos) — Discontinued by Quimica Estrella.

Upansals* — see Emulsifier.

Urab* — see Dozer*.

Uracil Herbicides

This class of herbicides includes bromocil and terbacil, characterized by having an uracil nucleus.



Uracil Nucleus

Uradex* Herbicide (bromacil + diuron) — Discontinued 1985 by Makhteshim-Agan.

Uragan* — see Bromacil.

Urbacid*

(Discontinued by Bayer AG)

Identification

CODE NUMBER: CAS 2445-07-0.

ADDITIONAL TRADE NAMES: Monzet*, Tuzet*.

Chemistry

COMPOSITION: Bis(dimethylthio-carbamoylthio)methyl arsine (IUPAC).

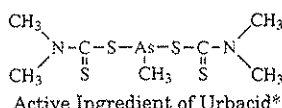
Action/Use

ACTION: Organic fungicide.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.



Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 1000 mg/kg.

Urbasulf — see Rhizoctol*.

Urea — see Harvest Aid Liquid.

Ureabor — see BareSpot* Ureabor.

Ureabor* 8D

(Discontinued by Occidental Chemical Corp.)

Chemistry

COMPOSITION: Sodium metaborate tetrahydrate + diuron.

Action/Use

ACTION: Nonselective herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 3500 mg/kg.

Uribest*

BP: Mitsui Toatsu Chemicals, Inc.

Identification

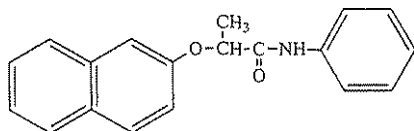
COMMON NAME: Naproanilide (JMAF).

EXP. CODE NUMBER: MT-101.

OTHER CODE NUMBER: CAS 52570-16-8.

Chemistry

COMPOSITION: 2-(2-naphthoxy)propionanilide (IUPAC).
PROPERTIES: White crystalline solid. Melting point 128°C. Vapor pressure 0.5 mbar.



Naproanilide

Action/Use

ACTION: Selective herbicide.
USE: Broadleaf weed control. Cyperaceous, sagitaria weeds in paddy field.

FORMULATIONS: Granule.

COMBINATIONS: With other barnyardgrass herbicides.

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: Fish: T_{1m} 3.4 ppm (48 h) (carp).

SOLUBILITY: In water 0.75 mg/l at 27°C.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 15,000 mg/kg.

Emergency Guidelines

FLASHPOINT: 110°C.

Urox*

(Discontinued 1988 by Hopkins Agricultural Chemical Co.)

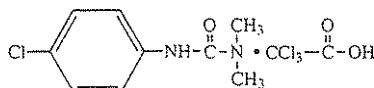
Identification

COMMON NAME: Monuron-TCA (WSSA).

CODE NUMBERS: CAS 140-41-0; SHA 035501.

Chemistry

COMPOSITION: 3-(4-chlorophenyl)-1,1-dimethyluronium trichloroacetate (IUPAC).



Monuron TCA

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: DANGER (liquids 12.81% or more.) CAUTION, WARNING (granules, low conc. liquids).
TOXICITY CLASS: I (liquids > 12.80%) II, III (granules, low conc. liquids).

TOXICITY: Tech (Rat): Oral LD₅₀ 2300-3700 mg/kg. (Rabbit): Dermal LD₅₀ 1000 mg/kg.

Urox* B Herbicide (bromacil) — Discontinued by HACO, Inc.

Urox* D Herbicide (diuron) — Discontinued by Hopkins Agricultural Chemical Co.

Urox* HX Herbicide (bromacil) — Discontinued by HACO, Inc.

U.S. EPA

United States Environmental Protection Agency.

See EPA.

USAN

United States Adopted Name (for a pharmaceutical drug).

See Common Name.

USB-3584 — see Dinitramine*.

USP

Unites States Pharmacopeai.

See Common Name.

Uspulun* Fungicide (phenyl-Hg-acetate) — Discontinued by Bayer AG.

Ustaad* 10EC — see Cypermethrin.

Ustilan*

(Discontinued 1994 by Bayer AG)

Identification

COMMON NAME: Ethidimuron (ISO, BSI).

EXP. CODE NUMBER: MET 1486.

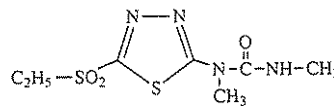
OTHER CODE NUMBERS: CAS 30043-49-3; SHA 122501.

DISCONTINUED NAMES: Ustilan* D (+ diuron), Ustilan* GW (+ amitrole) (Bayer AG).

Chemistry

COMPOSITION: N-[5-(ethylsulfonyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea (CAS).

FAMILY: Substituted urea.



Ustilan*

Action/Use

ACTION: Herbicide.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Tech. (Rat): Dermal LD₅₀ >5000 mg/kg. Oral LD₅₀ >5000 mg/kg.

Ustilan* D Herbicide (diuron + ethidimuron) — Discontinued by Bayer AG.

Ustilan* GW Herbicide (amitrole + ethidimuron) — Discontinued by Bayer AG.

Ustinex* — see Amitrole; Diuron; MCPA.

Vacate* Herbicide (MCPA) — Discontinued 1984 by SDS Biotech Corp.

Vacate 4-EC*

BP: ISK Biosciences Corp.

Identification

CODE NUMBER: CAS 64742-94-5 (heavy aromatic naphtha).

Chemistry

COMPOSITION: Chloropyrifos, heavy aromatic naphtha.

FAMILY: Organophosphorous insecticide.

PROPERTIES: Clear amber liquid with hydrocarbon solvent type odor.

Action/Use

ACTION: Insecticide.

Environmental Guidelines

SOLUBILITY: Forms emulsion in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat, male): LD₅₀ 940 mg/kg. (Rabbit): Dermal 916 mg/kg. (Rat): Inhalation LC₅₀ 2.2 mg/l.

PROTECTIVE CLOTHING: Safety glasses or goggles, impervious gloves, long-sleeved shirt, long pants.

HANDLING AND STORAGE CAUTIONS: Store under lock and key in dry, well-ventilated area away from heat. Keep out of reach of children and animals.

Emergency Guidelines

FLASHPOINT: 140°F (TCC).

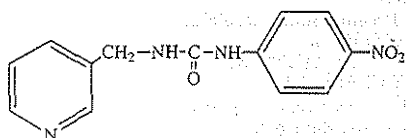
FIRE EXTINGUISHING MEDIA: Foam, carbon dioxide, water spray or dry chemical.

ANTIDOTE: Atropine.

Information is presented herein for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by manufacturer.

FIRST AID: Get medical aid. **Eyes**, flush immediately with plenty of water. **Skin**, wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion**, do NOT induce vomiting. If vomiting occurs give liquids again. **Inhalation**, remove to fresh air. **EMERGENCY TELEPHONE:** 800-424-9300 (ISK Biosciences Corp.).

Vacomil*-MZ — see Mancozeb; Metalaxyl.
Vacomil*-Plus — see Copper Oxychloride; Metalaxyl.
Vacor*
 (Discontinued by Rohm and Haas Co.)
Identification
COMMON NAMES: Pyriminil (JMAF); pyrinuron (ISO, ANSI, BSI).
EXP. CODE NUMBERS: DLP-87, RH-787.
OTHER CODE NUMBERS: CAS 53558-25-1; SHA 104501.
Chemistry
COMPOSITION: 1-(3-Pyridylmethyl)-3-(4-nitrophenyl)urea.



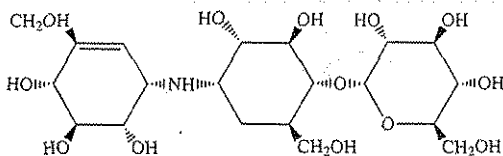
Pyrinuron/Pyriminil

Action/Use
ACTION: Rodenticide.
Safety Guidelines
SIGNAL WORD: WARNING.
TOXICITY CLASS: I.
TOXICITY: (Rat, Norway): LD₅₀ 4.75 mg/kg. (Rat, roof): 18.0. (Cat/Dog): >500. High toxicity to target species; low to nontarget species.

Vacron* — see Monocrotophos.
Val Drop* Defoliant (sodium chlorate) — Discontinued by Occidental Chemical Corp.
Valent Triforine* EC — see Triforine.
Valent* X-77 — see Spreader.
Valexon* Insecticide (phoxim) — Discontinued by Bayer AG.
Valiant* — see Fosetyl-Aluminum.

Validacin*
 BP: Takeda Chemical Industries, Ltd. (Solacol*, Validacin*, Valimun*)

Identification
COMMON NAME: Validamycin A (JARA, JMAF).
CODE NUMBER: CAS 37248-47-8.
DISCONTINUED NAME: Romycin* (Rotam Group).
Chemistry
COMPOSITION: 1L-(1,3,4/2,6)-2,3-dihydroxy-6-hydroxymethyl-4-((1S,4R,5S,6S)-4,5,6-trihydroxy-3-hydroxymethylcyclohex-2-enylamino)cyclohexyl β-D-glucopyranoside (IUPAC).
PROPERTIES: White, hygroscopic powder. Soluble in N,N - dimethylformamide, dimethyl sulphoxide, methanol. Sparingly soluble in acetone, ethanol. Insoluble in ethyl acetate, diethyl ether.



Validamycin A

Action/Use
ACTION: Fungicide.
USE: Used for the control of rice sheath blight, black scurf on seed potatoes, and the damping-off caused by *Rhizoctonia solani*.
FORMULATIONS: 3%, 5% liquid, 0.3% dust.
Environmental Guidelines
HAZARDS: Fish: LC₅₀ >40 mg/l (48h) (carp). Bee: Nontoxic.
SOLUBILITY: Very soluble in water.
Safety Guidelines
TOXICITY CLASS: IV.
TOXICITY: (Rat/Mouse): Oral LD₅₀ >20,000 mg/kg. (Rabbit): No dermal toxic sign, cause no irritation on eyes and skin.
PROTECTIVE CLOTHING: Normal precautions when handling and applying. No special clothing required.
Validamycin A — see Validacin*.
Valimun* — see Validacin*.

Valone*
 (Discontinued 1993 by Motomco Ltd.)
Identification
CODE NUMBERS: CAS 83-28-3; SHA 067702.
DISCONTINUED NAME: PMP* Tracking Powder.
Chemistry
COMPOSITION: 2-Isovaleryl-1,3-indandione (CAS 8CI).
Action/Use
ACTION: Rodenticide.
Emergency Guidelines
ANTIDOTE: Treatment by physician should include administration of oral or intramuscular injection of Vitamin K₁. In critical situations, transfusion with fresh whole blood should be given.
FIRST AID: Get immediate medical aid. **Ingestion**, if conscious, drink 1-2 glasses of water and induce vomiting by touching back of throat with finger. Note: Some physicians may discourage use of saline emesis.

Vamidate* Insecticide (vamidothion) — Discontinued by Rhone-Poulenc.
Vamidothion — see Kilval*.
Van Dyk 264* — see MGK 264*.
Van Gel*

BP: R.T. Vanderbilt Co., Inc.
Identification
COMMON NAMES: Magnesium aluminum silicate, smectite clay.
CODE NUMBER: CAS 12199-37-0.

Action/Use
ACTION: Thickener and suspending agent.
USE: In flowables.
COMBINATIONS: With Rhodopol* 23 Suspending System.
Safety Guidelines
TOXICITY CLASS: IV.
TOXICITY: Nontoxic.

Vancide* 51
 BP: R.T. Vanderbilt Co., Inc.
Chemistry
COMPOSITION: Sodium dimethyldithiocarbamate (27.6%), sodium 2-mercaptobenzothiazole (2.4%).

Action/Use
ACTION: Fungicide.
Registration Notes
 U.S.: All agricultural uses discontinued 1989.
Safety Guidelines
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 3120 (±960) mg/kg.

Emergency Guidelines
FLASHPOINT: Nonflammable.
FIRST AID: Get medical aid. **Eyes**, flush with plenty of water. **Skin**, flush with plenty of water.

Vancide* Maneb 80 Fungicide (maneb) — Discontinued by R.T. Vanderbilt.
Vancide* MZ-96 — see Ziram.
Vancide* TM (thiram) — Discontinued by R.T. Vanderbilt.

Vanguard* Fungicide (etaconazole) — Discontinued.
Vanisect* — see Carbaryl.
Vanisperse* — see Disperant; Lignosulfonates.
Vantage* — see Sethoxydim.

Vantal*
 (Discontinued by Agrimont S.p.A.)
Chemistry
COMPOSITION: Dimethoate + DDT.

Action/Use
ACTION: Insecticide.
Safety Guidelines
SIGNAL WORD: CAUTION.
TOXICITY CLASS: III.
TOXICITY: (Rat): Oral LD₅₀ 900 mg/kg. Dermal >4240 mg/kg.

Vapam* — see Metam-Sodium.
Vapcocidin* — see Fenvalerate.
Vapcothion* — see Dicofol; Tetradifon.
Vapcothoin* — see Deltamethrin.
Vapcozin* — see Amitraz.
Vap-Malathion* — see Malathion.
Vapona* — see DDVP.
Vaponite* Insecticide (DDVP) — Discontinued 1987 by Shell Chemical Co.
Vapor-Gard* — see Pinolene*.

Chemicals are cross-referenced by common and trade name
 * — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Vapor Pressure (V.P.)

The property which causes a liquid to evaporate. The higher the vapor pressure, the more volatile the chemical.

Vapora II* Insecticide (DDVP) — Discontinued by Hopkins Agricultural Chemical Co.

Vapotone* Insecticide (TEPP) — Discontinued by Chevron Chemical Co.

Vardhak* — see Alpha-Naphthylacetic Acid.

Varitox* Herbicide (TCA) — Discontinued by Rhone-Poulenc.

Varsol* — see Mineral Spirits.

Vaspact* — see Impact*.

Vault* WP — see *Bacillus thuringiensis* var. *kurstaki*.

V-Bor* (borax) — Discontinued by Kerr-McGee.

VC-13 Nemacide* — see Dichlofenthion.

VCS 438 — see Probe*.

VectoBac* — see *Bacillus thuringiensis* var. *israelensis*.

Vectocide* — see *Bacillus thuringiensis* var. *israelensis*.

Vector

An animal (insect, nematode, mite, etc.) or plant (dodder) that can carry and transmit a pathogen from one host to another.

Vectrin* — see Resmethrin.

Veegum*

BP: R.T. Vanderbilt Co., Inc.

Identification

COMMON NAME: Smectite clay.

CODE NUMBER: CAS 12199-37-0.

Chemistry

COMPOSITION: Magnesium aluminum silicate.

Action/Use

ACTION: Thixotropic thickener and suspending agent in flowables.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic.

Vega* Herbicide (bentazone + cyanazine + dichlorprop) — Discontinued by BASF AG.

Vega* Plus Herbicide (bentazone + dichlorprop-P + ioxynil) — Discontinued 1994 by BASF AG.

Vegabate* I Herbicide (ammonium sulfamate + monosodium methanearsonate) — Discontinued by Stull Chemical Co.

Vegadex*

(Discontinued by Monsanto Agricultural Co.)

Identification

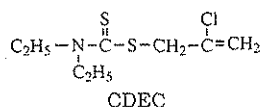
COMMON NAMES: CDEC (WSSA); sulfallate (ISO, BSI).

EXP. CODE NUMBER: CP-4742 (Monsanto Agricultural Co.).

OTHER CODE NUMBERS: CAS 95-06-7; SHA 039001.

Chemistry

COMPOSITION: 2-Chloroallyl diethylthiocarbamate.



Action/Use

ACTION: Preemergence selective herbicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 850 mg/kg.

Vegemec* Herbicide — see 2,4-D; Pramitol*.

Vegetoil*

BP: Drexel Chemical Co.

Chemistry

COMPOSITION: Vegetable oil + emulsifier.

Action/Use

ACTION: Vegetable oil concentrate/spray tank adjuvant.

Vegetox* Insecticide (cartap hydrochloride) — Discontinued.

Vegetta*

Chemistry

COMPOSITION: Ethylene thiuram monosulfide.

Vegfru Colt* — see Cypermethrin.

Vegfru Diafuran* — see Carbofuran.

Vegfru Divap* — see DDVP.

Vegfru Fenrio* — see Fenvalerate.

Vegfru Foratox* — see Phorate.

Vegfru Foxmite* — see Ethion.

Vegfru Heptox* — see Heptachlor.

Vegfru Kadett* — see Monocrotophos.

Vegfru Kitazin* — see IBP.

Vegfru Klofos* — see Methyl Parathion.

Vegfru Malatox* — see Malathion.

Vegfru Snailkil* — see Metaldehyde.

Vegfru Solaro* — see Atrazine.

Vegfru Taurus* — see Isoproturon.

Vegfru Thiotox* — see Endosulfan.

Vegiben*

(Discontinued by Union Carbide Corp.)

Identification

COMMON NAMES: Chloramben (ISO-E, ANSI, BSI, WSSA); chloramben (ISO-F).

CODE NUMBERS: CAS 133-90-4; SHA 029901.

Chemistry

COMPOSITION: 3-Amino-2,5-dichlorobenzoic acid (IUPAC).

Action/Use

ACTION: Preemergence herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Vel 4283* — see Propetamphos.

Vel 5026 — see Ravage*.

Velpar* — see Hexazinone.

Velsicol 1068* Insecticide (chlordane) — Discontinued by Velsicol Chemical Corp.

Vencedor* Fungicide (copper sulfate/copper sulfate, basic)

— Discontinued in 1990 by Atanor S.A.

Venceweed* — see 2,4-DB.

Vendex* — see Fenbutatin-Oxide.

Vengeance* — see Bromethalin.

Ventox* — see Acritet*.

Venturo! — see Diodine.

Venzar* — see Lenacil.

Veon* 245 Herbicide (2,4,5-T) — Discontinued 1985 by Vertac Chemical.

Veraline* 3 Insecticide (anthracene oil + dinitrocresol) — Discontinued by Pechiney Progil.

Veratridine — see Sabadilla.

Veratrin-D* — see Sabadilla.

Veratrum — see Hellebore.

Verdican* — see DDVP.

Verdict*

BP: DowElanco (Verdict*)

Identification

COMMON NAME: Haloxyfop-methyl (ISO draft, ANSI, BSI, WSSA).

EXP. CODE NUMBER: Dowco 453 ME (DowElanco).

OTHER CODE NUMBER: CAS 69806-40-2.

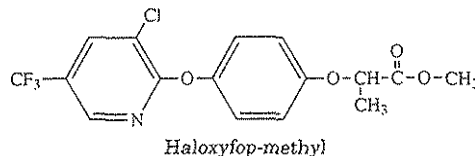
ADDITIONAL TRADE NAME: Gallant* Grasskiller.

Chemistry

COMPOSITION: Methyl 2-[4-[[3-chloro-5-(trifluoromethyl)-2-pyridinyl]oxy]phenoxy]propanoate (CAS).

FAMILY: Propanoate.

PROPERTIES: Forms colorless crystals.



Action/Use

ACTION: Systemic herbicide for postemergence grass control.

FORMULATION: Emulsifiable concentrate.

Registration Notes

U.S.: Registration pending.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 96->1000 mg/l. Bird: Oral LD₅₀ >2150 ppm. (mallard).

SOIL PARTICLE ADSORPTION: Haloxyfop-methyl is converted to haloxyfop. Leaching is moderate.

SOLUBILITY: 43 ppm at 25°C.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 2179 mg/kg. (Rabbit): Dermal LD₅₀ 3536.

PROTECTIVE CLOTHING: Goggles, long-sleeved shirt and water-proof gloves.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

HANDLING AND STORAGE CAUTIONS: Harmful if inhaled, swallowed or absorbed through skin. Do not contaminate water, food or feed by storage or disposal.

Emergency Guidelines

FLASHPOINT: 110°F.

COMBUSTION PRODUCTS: Acid gases.

FIRE EXTINGUISHING MEDIA: Foam, dry chemical, CO₂.

ANTIDOTE: None.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water and continue for 30 min. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes. Inhalation, remove to fresh air. Ingestion, do NOT induce vomiting.

EMERGENCY TELEPHONE: 800-424-9300 (DowElanco).

Verdinal*

(Discontinued 1988 by Schering AG)

Identification

COMMON NAMES: Phenisopham (ISO-E, BSI); phénisophame (ISO-F).

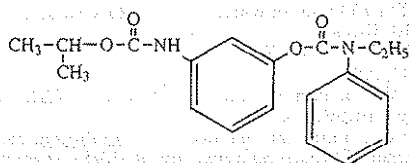
EXP. CODE NUMBER: SN 58132 (Schering AG).

OTHER CODE NUMBER: CAS 57375-63-0.

DISCONTINUED NAME: Diconal* (NOR-AM Chemical).

Chemistry

COMPOSITION: Isopropyl 3-[ethyl(phenyl)carbamoyloxy]carbanilate (IUPAC).



Phenisopham

Action/Use

ACTION: Postemergence herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >4000 mg/kg. (Mouse): >5000 mg/kg.

(Rabbit): Dermal >1000 mg/kg.

Verdipor* — see DDVP.

Verdisol* — see DDVP.

Vergemaster* (2,4-D) — Discontinued by Diamond Shamrock.

Vermiculite

BP: American Vermiculite Corp.

Identification

CODE NUMBER: CAS 1318-00-9.

Chemistry

COMPOSITION: Hydrated magnesium-aluminum-iron silicate.

PROPERTIES: For all practical purposes, expanded vermiculite is neutral. Bulk density, 5-7 pounds/cubic foot. Dominant screen fraction (U.S.S.) for this grade, 20-50. Free-flowing oil-absorption capacity, 100-200% (wt.) on a dry vermiculite basis. Especially selected vermiculite ore is expanded under heat to form a material very light in weight.

Action/Use

USE: For the production of granular pesticide and fertilizer formulations. Less than 1% absorbed water almost assures safety against loss through hydrolysis. Thirty to fifty percent pesticide concentrations are possible with proper formulating techniques such as the use of tumble mixers.

Vernam* — see Vernolate.

Vernolate

BP: Drexel Chemical Co. (Vernam*)

Identification

COMMON NAME: Vernolate (ISO, BSI, JMAF, WSSA).

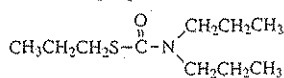
CODE NUMBERS: CAS 1929-77-7; SHA 041404.

DISCONTINUED NAMES: Saverit*, Savirox* (Chemol Trading Ltd.);

Surpass* (ZENECA Ag Products. Company now using trade name for acetochlor).

Chemistry

COMPOSITION: S-Propyl dipropylthiocarbamate (IUPAC).



Vernolate

Action/Use

ACTION: Selective herbicide.

USE: Controls barnyardgrass (watergrass), crabgrass, foxtail (giant, green, yellow), goosegrass, johnsongrass seedlings, yellow nutgrass, carpetweed, coffeeweed, Florida pusley, lambsquarters, annual morninglory, velvetleaf, pigweed, and purslane.

FORMULATIONS: Emulsifiable liquid; 10% granules.

Registration Notes

U.S.: For peanuts and soybeans.

Environmental Guidelines

HAZARDS: Fish: LC₅₀ 6.2 mg/l (24 h) (rainbow trout).

SOIL PARTICLE ADSORPTION: Half-life 10-12 days in clay soil.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Tech: (Rat): Oral LD₅₀ 1800-1900 mg/kg. 7E: 1200-1470 mg/kg.

Vertac* Dinitro Weed Killer (dinoseb) — Discontinued 1987 by Cedar Chemical Corp.

Vertac* General Weed Killer (dinoseb) — Discontinued 1987 by Cedar Chemical Corp.

Vertac* Selective Weed Killer (dinoseb) — Discontinued 1987 by Cedar Chemical Corp.

Vertalec* Insecticide (Verticillium lecanii) — Discontinued by Novo Biokontrol.

Vertebrate Animals

A major category of animals characterized by a segmented backbone. Includes fishes, reptiles (snakes, etc.), birds, rodents, as well as man.

Verthion* Insecticide (fenitrothion) — Discontinued by Shell International Chemical Co. Ltd.

Verticillium lecanii

BP: Koppert B.V. (Mycotal*)

Identification

COMMON NAME: *Verticillium lecanii*.

TRIVIAL NAMES: White halo fungus.

DISCONTINUED NAME: Vertalec* (Novo Biokontrol).

Chemistry

FAMILY: Moniliaceae.

PROPERTIES: Odorless, grayish white color. Specific gravity 0.4-0.5 g/ml (Mycotal*).

Action/Use

USE: Control of whitefly with a side-effect on thrips on protected crops.

FORMULATIONS: Wettable powder.

Registration Notes

U.S.: Not registered.

OUTSIDE U.S.: Registered in the Netherlands, United Kingdom and Switzerland; pending in Jordan, Sri-Lanka and Denmark.

Environmental Guidelines

HAZARDS: Nontoxic.

SOLUBILITY: Slowly soluble in water.

Safety Guidelines

TOXICITY: Nontoxic.

PROTECTIVE CLOTHING: Wear gloves.

HANDLING AND STORAGE CAUTIONS: Store in refrigerated (2-6°C). Shelf life 6 months.

SPILL CONTROL/CLEANUP: Suck up spilled material with vacuum cleaner. Wash away remainder with a large amount of water.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water.

FIRST AID: Eyes, rinse with plenty of water. Skin, rinse with water.

Inhalation, remove to fresh air. Ingestion, rinse mouth, drink plenty of water.

Vertifume*

(Discontinued by Dow Chemical Co.)

Chemistry

COMPOSITION: Carbon tetrachloride + carbon disulfide.

Action/Use

ACTION: Grain fumigant.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: Odor gives warning. Highly toxic vapors. Harmful if swallowed. May cause skin irritation; may burn if confined to skin.

Verton* 2D (2,4-D) — Discontinued by Dow Chemical Co.

Verton* 2T Herbicide (2,4,5-T) — Discontinued by Dow Chemical Co.

Vetaron* — see Methamidophos.

Veteran* 520 — see Banvel*; 2,4-D.

Veteran* 720 — see Banvel*; 2,4-D.

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Vetiver Oil**Chemistry**

COMPOSITION: Essential oil from a perennial grass native to India, Southwest Asia, East Indies and Philippines; cultivated in Haiti.

Action/Use

ACTION: Insecticide.

USE: A perfumer's raw material formerly used as an insecticide; may still be so used in some foreign countries.

Veto*

(Discontinued 1989 by Drexel Chemical Co.)

Chemistry

COMPOSITION: EPN + methyl parathion.

Action/Use

ACTION: Insecticide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 9-25 mg/kg.

Emergency Guidelines

ANTIDOTE: Atropine is the emergency antidote for methyl parathion-EPN poisoning.

Vi Par*

(Discontinued by Vineland Chemical)

Chemistry

COMPOSITION: MCPP + 2,4-D.

Action/Use

ACTION: Herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Vi Pex* (MCP) — Discontinued by Vineland Chemical.

Victenon — see Bancol*.

Victory* Insecticide (*Bacillus thuringiensis* var. *kurstaki*) —

Discontinued 1993 by Olympic Horticultural Products Co.

Vidien D* (dichloropropane-dichloropropene) — Discontinued

by Dow Chemical Co.

Vigil*

BP: ZENECA Agrochemicals

Identification

COMMON NAME: Diclobutrazol (ISO, BSI).

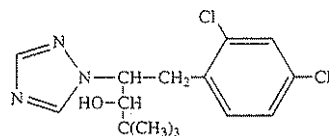
EXP. CODE NUMBER: PP296.

OTHER CODE NUMBER: CAS 75736-33-3.

Chemistry

COMPOSITION: [1-(2,4-dichlorophenyl)-4,4-dimethyl-2-(1H-1,2,4-triazol-1-yl)pentan-3-ol].

PROPERTIES: Off-white crystalline solid, melting point 147-9°C. Density 1.25 g/cm³. Vapor pressure 1 × 10⁻⁶ torr at 20°C. Stable to acid, alkali, heat, air, and moisture.



Diclobutrazol

Action/Use

ACTION: Systemic fungicide.

USE: Controls powdery mildews and rust in cereals.

FORMULATIONS: Aqueous suspension.

COMBINATIONS: With a wide range of insecticides and fungicides.

Vigil* T, Vigil* K (+ carbendazim).

Environmental Guidelines

HAZARDS: Fish: Toxic.

SOLUBILITY: Sparingly soluble in water.

Safety Guidelines

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 4000 mg/kg.

PROTECTIVE CLOTHING: Wear protective gloves, face shield for concentrate.

HANDLING AND STORAGE CAUTIONS: When using, do not eat, drink, or smoke. Wash concentrate from skin or eyes immediately. Wash hands and exposed skin before meals and after work. Keep away from food, drink, and animal feed. Keep out of the reach of children. Do not contaminate ponds, waterways or ditches with chemical or used container. Keep in original container, tightly closed, in a safe place. Wash out container thoroughly, empty washings into spray tank, and dispose of safely. Stable for at least 1 year under normal storage conditions in unopened container.

Vigil* K — see Vigil*.

Vigil* T — see Vigil*.

Vigilante* — see Diflubenzuron.

Vigor Plus*

BP: Stoller, Inc. (Vigor Plus*)

Chemistry

COMPOSITION: Calcium mono carbamide monohydrogen chloride, urea, and humic acid.

Action/Use

ACTION: Fungicide.

USE: Increases seedling vigor and resistance to seedling root disease.

Vikane*

BP: DowElanco (Vikane*)

Identification

COMMON NAME: Sulfuryl fluoride.

CODE NUMBERS: CAS 2699-79-8; SHA 078003.

Chemistry

PROPERTIES: Colorless, odorless compressed gas. Boiling point -67°F. Vapor pressure 9150 mm/Hg at 50°F (10°C).

Action/Use

ACTION: Gas fumigant.

Registration Notes

U.S.: All applications classified RUP.

Environmental Guidelines

SOLUBILITY: 750 ppm in water at 77°F (25°C) and 1 atmosphere.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: May be fatal if inhaled. TLV 5 ppm; STEL 10 ppm.

Emergency Guidelines

FIRST AID: Get immediate medical aid. Inhalation, remove to fresh air. Keep warm. If breathing stops, give artificial respiration.

Physician's note: First symptoms expected are those of respiratory irritation and central nervous system depression; excitation may follow. Treat symptomatically.

Vilex*

BP: Burlington Bio-Medical & Scientific Corp. (Vilex*)

Identification

COMMON NAME: Denatonium benzoate (USP/NF).

CODE NUMBERS: CAS 3734-33-6.

Chemistry

COMPOSITION: Benzyldiethyl [(2,6-xylylcarbonyl)methyl] + ammonium benzoate.

PROPERTIES: White crystalline powder; pH 6.5-7.5; molecular weight 446.59; melting point 165-170°C.

Action/Use

ACTION: Seed treatment preservative and denaturant.

USE: Protects seeds during storage and repels vertebrate pests.

Environmental Guidelines

SOLUBILITY: In water 4.5% (wt/vol) at 20°C.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat) Oral LD₅₀ 612 mg/kg.

PROTECTIVE CLOTHING: Wet filter mask, protective gloves and goggles. Local exhaust recommended (6 air exchange/hr).

HANDLING AND STORAGE CAUTIONS: Extremely bitter; avoid oral contact. Handle in fume hood or glove box to avoid taste. Avoid inhalation. Wash thoroughly after handling and launder clothing. Store in well sealed area.

SPILL CONTROL/CLEANUP: Flush spills with copious amounts of water. Wash area down thoroughly with water. Avoid inhalation.

PRODUCT/WASTE DISPOSAL: Flush away with copious amounts of water.

Emergency Guidelines

FLASHPOINT: > 176-182°C.

FIRE EXTINGUISHING MEDIA: Water, foam, CO₂, or dry powder.

FIRST AID: Eyes, flush with water and obtain medical advice. Skin, flush with water and obtain medical advice. Ingestion, obtain medical advice.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Vincit*

BP: ZENECA Agrochemicals

Chemistry

COMPOSITION: Flutriafol + thiabendazole ± imazalil.

Action/Use

ACTION: Fungicidal systemic seed treatment.

USE: For all major seed-borne diseases.

FORMULATION: Flowable suspension, powder.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Vinclozolin

BP: BASF AG (Curalan*, Ronilan*)
Grace-Sierra Crop Protection Co. (Ornalin*, Vorlan*)

Identification

COMMON NAMES: Vinclozolin (ISO-E, BSI, JMAF); vinclozoline (ISO-F).

CODE NUMBERS: CAS 50471-44-8; SHA 113201; EINECS 256-599-6.

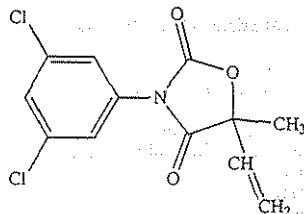
DISCONTINUED NAMES: Ronilan* M (+ maneb), Ronilan* ME Combi (+ metiram), Ronilan* S (+ sulfur) (all BASF AG).

Chemistry

COMPOSITION: 3-(3,5-dichlorophenyl)-5-methyl-5-vinyl-1,3-oxazolidine-2,4-dione (IUPAC).

PROPERTIES: Tech, white solid, melting point 106-108°C. Solubility in xylene ca. 11; cyclohexanone ca. 54; dimethylformamide ca. 82 (g/a.i./100 g/solvent 20°C).

CORROSIVENESS: None.



Vinclozolin

Action/Use

ACTION: Fungicide.

USE: Ronilan* for *Botrytis* spp., *Sclerotinia* spp., *Monilia* spp. in grapes, strawberry, sunflowers, oilseed rape, soft fruits, hops, vegetables, and ornamentals; white rot in onions. Ornalin* for *Botrytis* spp. and *Sclerotinia* spp. on ornamental herbaceous, woody, and bulb crops grown in greenhouses and outside. Vorlan* for all turfgrasses for control of dollar spot (*Sclerotinia homoeocarpa*), Helminthosporium leaf spots and melting out (*Drechslera* spp.), red thread and pink patch (*Laetisaria fuciformis* and *Limonomyces roseipellis*, respectively), and Fusarium patch (*Fusarium nivale*), without prolonged snow cover.

FORMULATIONS: Dry flowable water dispersible granular, flowable, wettable powder.

COMBINATIONS: Konker* (+ carbendazim), Konker* R (+ thiophanate-methyl), Ronilan* Spezial (+ chlorothalonil), Ronilan* T Combi and Silbos* DF (+ thiram) (all BASF AG).

Registration Notes

U.S.: Ronilan* WP, Ronilan* FL and Ronilan* DF cancelled for plum and prune uses (effective 8/27/91).

Environmental Guidelines

HAZARDS: Fish: LC₅₀ >22-32 mg/l (trout). Bird: LD₅₀ 2510 mg/kg body weight (quail). Bee: Nontoxic.

SOLUBILITY: In water 2.6 mg/l (20°C).

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Tech): (Rat): Oral LD₅₀ >10,000 mg/kg. (Rabbit): Mild skin irritation.

Ronilan*: (Rat): Oral LD₅₀ >16,000 mg/kg. Dermal >2000 mg/kg.

PROTECTIVE CLOTHING: Protective clothing and boots when handling the undiluted and diluted formulations. Rubber gloves and apron, and goggles when handling the undiluted formulations.

HANDLING AND STORAGE CAUTIONS: Avoid contact with skin, eyes, or clothing. Contact may cause allergic reactions. Wash clothing thoroughly with soap and water. Keep out of reach of children.

SPILL CONTROL/CLEANUP: Solid spillage should be picked up with an industrial vacuum cleaner and disposed of in accordance with local regulations.

PRODUCT/WASTE DISPOSAL: Dispose of by special means (suitable incineration, etc.) in accordance with local regulations.

Emergency Guidelines

ANTIDOTE: Unknown.

FIRST AID: Get medical aid. **Eyes, Skin**, immediately flush with plenty of water. **Ingestion**, do NOT induce vomiting unless advised by a physician.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Vinclozoline — see Vinclozolin.

Vinyl Carbinol — see Allyl Alcohol.

Vinylphate* — see Chlorfenvinphos.

Viozene* — see Ronnel.

Viricide

A chemical intended for killing virus.

Viricuvire* — see Copper Oxychloride.

Virox* Larvicide (neodiprion sertifer) — Discontinued by Novo Biokontrol.

Virus (Insect)

Any of a group of submicroscopic infective agents, causing diseases of insects. Much research at present is exploring the possibility of using viral diseases of insects in applied insect control. Some success is reported in the aerial application of polyhedrosis virus to control the Douglas-fir tussock moth in the West.

See Heliothis Nuclear Polyhedrosis Virus.

Virus (Plant)

A submicroscopic infective particle believed to be made up of a strand of RNA surrounded by a protein coat, capable of growth and multiplication in living cells and causing diseases in plants as well as in man and lower animals. Examples of virus-caused plant diseases are aster yellows and tobacco mosaic. Such diseases often are transmitted by insects, as in the case of curly top of sugar beets by leafhoppers.

Viscosity

The resistance of a liquid to flow is a measure of its viscosity; the opposite of viscosity is fluidity.

Viscosity Adjuvant

Stabilizes herbicide sprays by increasing droplet size, reducing off-target movement (drift) of spray particles.

Visko-Rhap*

(Discontinued 1992 by Agrolinz, Inc. U.S.A.)

Chemistry

COMPOSITION: Phenoxyacetic herbicides of 2,4-D + 2,4-DP esters, amines.

Action/Use

ACTION: Systemic herbicide, drift reduction aid.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 900 mg/kg.

Vista* — see Fluquinconazole.

Vistar* Herbicide (mefluidide) — Discontinued by 3M.

Vita-Flo* 280 — see Carboxin; Thiram.

Vital* — see Acephate.

Vitatone* Sorba-Spray — see Sorba-Spray*.

Vitavax* — see Captan; Carboxin; Lindane; PCNB; Thiram.

Vitavax T-L* — see Carboxin; Thiram.

Vitavax* 200 — see Carboxin; Thiram.

Vitavax* 30C — see Carboxin.

Vitavax* Extra — see Carboxin; Imazail; Thiabendazole.

Vitavax* PCNB — see Carboxin; PCNB.

Vitavax* Thiram — see Carboxin.

Vitavax* Thiram-Lindane — see Carboxin; Lindane; Thiram*.

Vitigran* Fungicide (copper oxychloride) — Discontinued by Hoechst AG.

Volatility

The ability to become a vapor; that is, to evaporate or give off fumes.

Volaton* — see Baythion*.

Voick Oils* — see Petroleum Oils.

Volid* — see Brodifacoum.

Volphor* 10CG — see Phorate.

Voltage*

BP: Takeda Chemical Industries, Ltd. (Starlex*, Voltage*)

Identification

COMMON NAME: Pyraclofos (ISO draft, BSI).

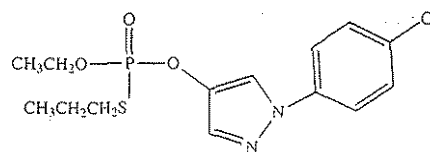
EXP. CODE NUMBER: TIA-230.

OTHER CODE NUMBER: OMS 3040 (WHO), CAS 77458-01-6.

Chemistry

COMPOSITION: (RS)-[O-1-(4-chlorophenyl)pyrazol-4-yl O-ethyl S-propyl phosphorothioate] (IUPAC).

PROPERTIES: Pale yellowish oily liquid. Boiling point 164°C (0.01 mmHg). Soluble with aromatic hydrocarbons, chlorinated hydrocarbons, esters and alcohols.



Pyraclofos

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Action/Use

ACTION: Insecticide.

USE: Effective against lepidopterous, coleopterous, some hemipterous insects, mites and nematodes in vegetables, field crops and ornamentals, etc.

FORMULATIONS: Emulsifiable concentrate, granules, WP.

COMBINATION: Merade* (+ cartap).

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 237 mg/kg. Dermal LD₅₀ >2000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes and skin. Store in the original containers in a cool, dry place away from food and animal feeds.

Emergency Guidelines

FLASHPOINT: 205°C.

ANTIDOTE: Atropine, possibly in conjunction with PAM.

Volthion* EC — see Ethion.

Vondac M* — see Maneb.

Vondalhyde* Plant Growth Regulator (maleic hydrazide) —

Discontinued 1991 by Atochem Agri BV.

Vondcaptan* Fungicide (captan) — Discontinued 1991 by

Atochem Agri BV.

Vondodine* Fungicide (dodine) — Discontinued 1987 by Pen-

nswalt Holland B.V.

Vondozeb*

BP: ELF Atochem Agri B.V. (Vondozeb*)

ELF Atochem North America, Inc. (Vondozeb*)

Identification

CODE NUMBER: CAS 8018-01-7.

ADDITIONAL TRADE NAME: Triziman D* (ELF Atochem Agri).

Chemistry

COMPOSITION: Maneb + zineb.

Action/Use

ACTION: Fungicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >10,000 mg/kg.**Emergency Guidelines**

EMERGENCY TELEPHONE: 33-10-4725171 (ELF Atochem Agri

B.V.); 800-523-0900 (ELF Atochem North America, Inc.

See Dithiocarbamates; maneb; zineb.

Vondozeb Plus* — see Maneb.

Vondrax* Plant Growth Regulator (maleic hydrazide) — Dis-

continued 1991 by Atochem Agri BV.

Vonduci* — see Diuron.

Vonduron* — see Diuron.

Vorlan* — see Vinclozolin.

Vorlex*

(Discontinued 1991 by NOR-AM)

Identification

DISCONTINUED NAME: Di-Trapex* (Schering AG).

Chemistry

COMPOSITION: Methyl isothiocyanate, 1,3-dichloropropene and oth-

er chlorinated C₃ hydrocarbons. Boiling point 100-155°C.**Action/Use**

ACTION: Soil fumigant.

Safety Guidelines

SIGNAL WORD: DANGER—POISON.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 489 mg/kg. Dermal LD₅₀ 961 mg/kg. (Rab-bit): Dermal LD₅₀ 1243 mg/kg.**Emergency Guidelines**FIRST AID: Call physician. Eyes, flush with water for 15 minutes.Skin, flush with water for 15 minutes, remove clothing and shoes. In-halation, remove to fresh air. Ingestion, Do NOT induce vomiting. Use

gastric lavage.

Voronit* Fungicide (fuberidazole) — Discontinued by Bayer AG.

Voronit Special* Fungicide (fuberidazole) — Discontinued 1984

by Bayer AG.

Voronit*-Morkit* Special* Bird Repellent (anthraquinone) —

Discontinued 1984 by Bayer AG.

Vortix*

(Discontinued by Shell) International Chemical Co. Ltd.)

Chemistry

COMPOSITION: Cyanazine + MCPB.

Action/Use

ACTION: Herbicide.

Safety Guidelines

TOXICITY CLASS: IV.

TOXICITY: Nontoxic. Denatured by metals.

VPM — see Metam-Sodium.

Vulkan* — see Bentazone.

Vulkan* T — see Bentazone; Prowl*.

Vuitamol* — see Dispersant.

Vydate* L — see Oxamyl.

W 5769 — see Bidisin*.

Wacker S14/10* Insecticide (dimefox) — Discontinued by Wack-

er-Chemie GmbH.

Wakil* — see Oxadixyl.

Wallop* Herbicide

BP: Monsanto Co., The Agricultural Group (Wallop*)

Identification

EXP. CODE NUMBERS: MON 14437 (Monsanto Co., The Agricultur-

al Group.)

OTHER CODE NUMBERS: CAS 1071-83-6 (glyphosate); CAS 1918-

00-9 (dicamba).

Chemistry

COMPOSITION: Isopropylamine salts of glyphosate + dicamba.

Action/Use

ACTION: Nonselective, postemergence herbicide.

USE: General weed control in rubber and oil palm.

Registration Notes

U.S.: Not registered.

OUTSIDE U.S.: Southeast Asia for use in rubber, oil palm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀

>5000 mg/kg. Slightly irritating to eyes, skin.

PROTECTIVE CLOTHING: Avoid contact with skin, eyes or clothing.

Protective gloves recommended.

HANDLING AND STORAGE CAUTIONS: Avoid breathing vapor or

spray mist. Wash thoroughly with soap and water after handling.

Repeated contact may cause allergic reaction in susceptible individuals.

Emergency Guidelines

FLASHPOINT: >212°F (tag closed cup).

FIRE EXTINGUISHING MEDIA: Water spray, foam, dry chemical,

CO₂, or other Class B extinguishing agents.FIRST AID: Eyes, immediately flush with plenty of water for at least15 minutes. Skin, wash with plenty of water. Remove contaminatedclothing and wash before reusing. Inhalation, remove to fresh air. Getmedical attention if breathing difficulty develops. Ingestion, immedi-

ately dilute by swallowing milk or water.

EMERGENCY TELEPHONE: 314-694-4000 (Monsanto Co., The Ag-

ricultural Group).

Wallop* G Insecticide (propachlor + parathion) — Discontin-

ued 1970 by Monsanto Agricultural Co.

Wanin* — see Dispersant.

Warfarin

BP: All India Medical Corp.

HACCO, Inc. (Cov-R-Tox*, Rodex*, Rodex Blox*, Tox-Hid*)

Motomco Ltd. (Warfarin Concentrate*)

Prentiss Incorporated (Co-Rax*, RAX*)

Identification

COMMON NAMES: Warfarin (ISO-E, BSI, BAN); coumafene

(France); warfarine (ISO-F); zocoumarin (Netherlands and USSR).

CODE NUMBERS: CAS 81-81-2; SHA 086002.

ADDITIONAL TRADE NAMES: Dicusat E* (Diachem S.P.A.), Deth-

mor*, Kypfarin*, Ratoxin*.

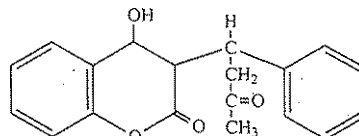
DISCONTINUED NAMES: Warfarin Q* (Bell Labs); Place-Pax*,

Warfarin Plus* (HACCO, Inc.); Contrax-W* (Motomco Ltd.).

ChemistryCOMPOSITION: 3-(α -acetonylbenzyl)-4-hydroxycoumarin.

PROPERTIES: White, essentially odorless powder, melting point 159

- 165°C. Moderately soluble in alcohols.



Warfarin

Action/Use

ACTION: Rodenticide (anticoagulant).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

USE: An anticoagulant for controlling Norway rats and house mice. Odorless and tasteless and effective in very low dosages. Action is not rapid; usually about a week is required before a marked reduction in the rodent population is effected. Rodents do not tend to become bait shy after once tasting warfarin; they continue to consume it until its anti-clotting properties have produced death through internal hemorrhaging.

FORMULATIONS: Water soluble, ready-to-use baits, concentrates, powder, liquid concentrate, nylon pouches, coated talc, dust.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

SOLUBILITY: Essentially insoluble in water except water soluble sodium salt is formed in alkaline solution.

Safety Guidelines

SIGNAL WORD: DANGER (Tech, high conc.); CAUTION (Low conc., ready-to-use baits).

TOXICITY CLASS: I (Tech, high conc.); III (Low conc., ready-to-use baits).

TOXICITY: (Rat): Oral LD₅₀ 3 mg/kg. Warfarin (NIOSH) TLV 0.1 mg M³. No development of ingestion tolerance regardless of rodent sex, age.

PROTECTIVE CLOTHING: Co-Rax*, RAX*: dust mask.

HANDLING AND STORAGE CAUTIONS: Keep away from children, domestic animals, pets, or wildlife. Do not store near feeds and food-stuffs. Avoid contact with mouth, eyes, skin. Store away from heat and open flame.

Emergency Guidelines

ANTIDOTE: Vitamin K₁ (oral and I.V.) combined with blood transfusions as in the case of hemorrhage caused by overdoses bis-hydroxy coumarin.

See Anticoagulant Rodenticide.

Warfarin Concentrate* — see Warfarin.

Warfarin Plus* Rodenticide (warfarin) — Discontinued by HACC, Inc.

Warfarin Q* Rodenticide (warfarin) — Discontinued by Bell Labs.

Warfarine — see Warfarin.

Warning — see Signal Words (under Toxicity-Human).

Water Dispersible Liquid

A formulation made to mix with water, usually for use as a spray. May be a wettable powder (WP), emulsifiable concentrate (EC), or similar formulation requiring surfactants.

Water Dispersible Slurry

A two-phase concentrate that contains solid pesticide suspended in liquid which is capable of suspension in water.

Water Modifier

The AAPCO has adopted this definition: "A substance which is used to change the pH or the chemical composition of dissolved or suspended material in the spray water in order to prevent undesirable behavior." See Safener.

Wax Up* — see Prowl*.

4-Way* Seed Protectant — see Captan; Etridiazole; Maneb; PC-NB.

WBA 8107 — see Ratak*.

WBA 8119 — see Brodifacoum.

WeatherBlok* Bait — see Brodifacoum.

WED*

(Discontinued by Smith-Douglass, Inc.)

Action/Use

ACTION: Spray tank compatibility agent.

Weecon* — see Sodium Cyanate.

Weed

The AAPCO has adopted this definition: "Any plant which grows where not wanted."

Weed Broom* Herbicide (bromacil + 2,4-D + DSMA) — Discontinued by Rhone-Poulenc.

Weed Killer 66* — see 2,4-D.

Weed Pro* Herbicide (atrazine + 2,4-D) — Discontinued 1994 by Cornbelt Chemical.

Weed-Ag-Bar* Herbicide (2,4-D) — Discontinued.

Weedar* 64 — see 2,4-D.

Weedar* Emulsamine* E-3

(Discontinued in 1991 by Rhone-Poulenc)

Chemistry

COMPOSITION: Dodecylamine + tetradecylamine salts of 2,4-D.

Action/Use

ACTION: Herbicide.

Environmental Guidelines

SOLUBILITY: Easily in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 1400 mg/kg.

Weedatul Herbicide (2,4-D) — Discontinued by Atul Products.

Weedazol* — see Amitrole.

Weedazol* T Herbicide (amitrole) — Discontinued by Rhone-Poulenc.

Weedazol* TL — see Amitrole.

Weedbeads* — see Sodium Pentachlorophenate.

Weed-B-Gon* Herbicide (2,4-D) — Discontinued by Chevron Chemical Co.

Weed-E-Rad* Herbicide (MSMA) — Discontinued 1992 by Vineland Chemical.

Weed-E-Rad* 360 Herbicide (DSMA) — Discontinued by Vineland Chemical.

Weedez Wonder Bar* Herbicide (2,4-D) — Discontinued.

Weed-Hoe* Herbicide (MSMA) — Discontinued by Vineland Chemical.

Weedmaster*

BP: Sandoz Agro, Inc.

Chemistry

COMPOSITION: DMA salt of dicamba + DMA salt of 2,4-D.

Action/Use

ACTION: Herbicide.

USE: Annual and perennial broadleaf weeds on pasture and rangeland grasses, and noncropland areas, small grains (not underseeded to legumes); between cropping application in cropland rotated to wheat, sugarcane.

FORMULATIONS: Water soluble liquid.

Environmental Guidelines

SOLUBILITY: Soluble.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >20,000 mg/kg.

HANDLING AND STORAGE CAUTIONS. Store away from seed, fertilizers, insecticides or fungicides in a cool, ventilated area suitable for pesticide storage.

Weedoff* — see Glyphosate.

Weedol* Herbicide (diquat dibromide + paraquat) — Discontinued by ICI Agrochemicals.

Weedone* — see 2,4-D.

Weedone* 170 — see 2,4-D; Dichlorprop.

Weedone* 2,4-DP — see Dichlorprop.

Weedout* — see Butachlor.

Weed-Rhap* — see 2,4-D.

Weedtox* — see 2,4-D.

Weedtrine*

(Discontinued by Applied Biochemists, Inc.)

Action/Use

ACTION: Aquatic herbicide.

Weedtrine*-D — see Diquat Dibromide.

Weedtrine*-Plus Herbicide (diquat dibromide) — Discontinued 1989 by Applied Biochemists, Inc.

Weedtrol* — see 2,4-D.

Wepsyn 155*

(Discontinued by Duphar B.V.)

Identification

COMMON NAME: Triamiphos (ISO, BSD).

CODE NUMBERS: CAS 1031-47-6; SHA 237200; ENT-27223.

Chemistry

COMPOSITION: p-(5-Amino-3-phenyl-1H-1,2,4-triazol-1-yl)-N,N,N',N'-tetramethylphosphonic diamide (CAS 8 and 9CI).

Action/Use

ACTION: Fungicide, insecticide-acaricide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 20 mg/kg. (Rabbit): Dermal LD₅₀ 1500 mg/kg.

Wessalon* — see Silicates (Synthetic Dry)

Wetall* 95

BP: Custom Chemicides

Chemistry

COMPOSITION: Alkylpolyethylene glycols.

Action/Use

ACTION: Penetrating agent.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Wetlands

Area that is regularly saturated by surface or ground water and subsequently is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions. Examples include: swamps, bogs, fens, marshes, and estuaries.

Wettable Powder

A powdered preparation containing sufficient suitable surface active material (wetting agent) so that the powder will be wetted and suspendible in water as a spraying material. The amount of wetting agent must be carefully calculated to avoid excessive run-off when the spray is applied and it may be adversely affected by the type of diluent and by extremely hard or alkaline water.

See Dust Bases.

Wettable Sulfur* Fungicide (sulfur) — Discontinued 1994 by Cuproquim Corp.

Wettable Sulfur 92 — see Sulfur.

Wettasul* 80 — see Sulfur.

Wetting Agent

A substance which, when added to a liquid, increases its spreading and penetrating power by lowering the surface tension. Effectiveness is measured by the increase in spread of a liquid over a surface area and by the "contact angle" of the liquid and surface. Many materials are used as wetting agents, including long chain alcohols, petroleum sulfonates, acid sulfates and derivatives, sulfonated aromatic derivatives, esters of fatty acids and clays.

Used on waxy, hairy or dusty leaf surfaces. As spreader-sticker prevents spotting of fruit or foliage when used with wettable powders. Also suitable for cleaning out spraying machinery.

The AAPCO has adopted this definition: Wetting Agent: "A substance which appreciably lowers the interfacial tension between a liquid and a solid, and increases the tendency of a liquid to make complete contact with the surface of a solid, so that no dry area may remain."

Wetol*

BP: BASF AG (Wetol*)

Action/Use

ACTION: Series of emulsifiers, wetting and dispersing agents.

USE: For the formulation of wettable powders, suspension concentrates, emulsifiable concentrates for crop protection.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: Moderately toxic if ingested. Generally irritating to eyes.

EMERGENCY TELEPHONE: 800-832-4357 (BASF); 800-424-9300 (CHEMTREC).

See Dispersant; Emulsifier; Wetting Agent.

Wetz*

F: Drexel Chemical Co. (Wetz*)

Chemistry

COMPOSITION: Alkylaryl polyethoxyethanol, n-butanol and silicone emulsion.

Action/Use

ACTION: Nonionic, biodegradable, nonflammable surfactant in an anti-foam system.

USE: For use with herbicides, fungicides, and insecticides.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Causes eye irritation. Avoid contact with skin.

Emergency Guidelines

FLASHPOINT: >100°F (CC).

FIRE EXTINGUISHING MEDIA: Alcohol foam, CO₂, water spray.**Wex***

BP: Conklin Co., Inc.

Chemistry

COMPOSITION: Alcohol ethoxylates (surfactants) + propylene glycol + dimethylpolysiloxane (defoamer).

PROPERTIES: Viscous, light liquid containing nonionic surfactants and a defoamer. Near neutral pH.

Action/Use

ACTION: Spray adjuvant. Wetting agent, defoamer.

USE: Increases the effectiveness, application ease of agricultural chemicals.

FORMULATIONS: Liquid.

Environmental Guidelines

SOLUBILITY: 100% water soluble and bio-degradable.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

HANDLING AND STORAGE CAUTIONS: Wash thoroughly after handling. May cause skin and eye irritation. Do not store for extended periods of time in any container other than the original and never place in rusty metal containers. Freezing temperatures will not affect performance, but suggested that extended periods of storage be above 32°F. Rates from 10 oz. - 2 pts./100 gallons.

Emergency Guidelines

FIRST AID: Get medical aid. Eyes, flush with water. Ingestion, call a doctor or the Poison Control Center.

Wham* — see Propanil.

Wheatciene* Herbicide (barban) — Discontinued by Schering AG.

Whip* Herbicide (fenoxaprop-ethyl) — Discontinued 1994 by AgEvo USA Co.

Whip* 1EC — see Fenoxaprop-ethyl.

Whip* 360 — see Fenoxaprop-P-ethyl.

White Oils — see Petroleum Oils.

Whiting — see Calcium Carbonate, Surface-Treated.

Wider* — see Avirosan*; Bentazone.

Widkil* — see Butachlor.

Wiltz-65*

(Discontinued by Esso Chemical Co.)

Chemistry

COMPOSITION: Isomeric 10-carbon + saturated monocarboxylic acids.

Action/Use

ACTION: Cotton desiccant.

Wind-Fall* Adjuvant — Discontinued 1992 by Farmbelt Chemical.

Winner* 41 — see Glyphosate.

Wintergreen Oil — see Masquerade.

Witcospere*

BP: Witco Corp.

Chemistry

COMPOSITION: Surfactants.

Action/Use

ACTION: Series of dry surface-active agents.

Witox* — see EPTC.

Witox C* Fungicide/Wood Preservative (copper naphthenates) — Discontinued 1989 by Witco Corp.

WL 17731 — see Suffix*.

WL 19805 — see Cyanazine.

WL 22361 — see Pano-ram*.

WL 29761 — see Mataven*.

WL 29762 — see Barnon*.

WL 41706 — see Fenpropathrin.

WL 43425 — see Suffix BW*.

WL 108366 — see Storm* (Outside U.S.).

WL 115110 — see Cascade*.

WL 127294 — see Dimethomorph.

Wofatox* — see Methyl Parathion.

Wolf Ace* — see Hinochloa*; Thiobencarb.

Wolman Salts***Chemistry**

COMPOSITION: Sodium fluoride + sodium chromate + disodium arsenate + dinitrophenol.

Action/Use

ACTION: Patented wood preservative.

See Fluor Chrome Arsenate Phenol.

Wood Preservative

There are three main classes of wood preservatives: toxic oils (creosote) that evaporate slowly and are relatively insoluble in water; salts that are injected as water solutions into the wood; those consisting of a small percentage of highly toxic chemicals in a solvent or mixture of solvents other than water. The water-borne types are simple to apply and of low cost, but they are subject to leaching, are more or less poisonous to warm blooded animals, and some are corrosive to iron.

Woodguard CCA-50* (chromated copper arsenate) — Discontinued 1992 by Chapman Chemical Co.

Woody Ring — see Grit-O' Cobs*.

WP — see Wettable Powder.

WSCP

BP: Buckman Laboratories, Inc.

Chemistry

COMPOSITION: Poly(oxyethylene(dimethylimino)-ethylene (dimethylimino)-ethylene dichloride).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

PROPERTIES: Cationic compatible with nonionic and cationic systems. At low concentrations, it may be compatible with anionic systems but it should be tested.

Action/Use

ACTION: Spreader-sticker.

USE: Recommended for testing as a spreader-sticker with pesticides and defoliants such as paraquat and liquid fertilizers.

FORMULATIONS: Liquid.

Registration Notes

U.S.: WSCP 2 discontinued.

Environmental Guidelines

SOLUBILITY: Water soluble.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 3690 mg/kg (male); 1850 mg/kg (female).

WSSA

Designates the Weed Science Society of America.

See Common Name.

W/V

Acronym for weight per volume.

W/W

Acronym for weight per weight.

Wydac* — see Carbaryl; Propanil.

X-52 — see Chlormethoxynil.

X-57* — see Spreader.

X-90* Spreader

F: Cornbelt Chemical Co.

Chemistry

COMPOSITION: Alkylpolyethoxy ethanol, free fatty acids, isopropanol.

Action/Use

ACTION: Spreader/activator.

USE: With insecticides, herbicides, acaricides.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

PROTECTIVE CLOTHING: Chemical impervious gloves, indirect vented goggles, long pants, long-sleeved shirt and apron.

HANDLING AND STORAGE CAUTIONS: Keep away from open flame and strong oxidizers.

Read label.

Emergency Guidelines

FLASHPOINT: 93°F.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contaminated clothing and shoes. **Ingestion,** do NOT induce vomiting. Call a physician immediately.

EMERGENCY TELEPHONE: 800-424-9300 (CHEMTREC).

Xanthan Gum

BP: Kelco, Div. Merck & Co. (Kelzan*)
R.T. Vanderbilt (Rhodopol* 23)

Identification

CODE NUMBER: CAS 11138-66-2.

Chemistry

COMPOSITION: Xanthan gum.

Action/Use

ACTION: Thickener/suspending agent.

USE: Suspends solids in agricultural products such as liquid flowables and suspension fertilizers.

Xanthenone — see Genicide*.

Xanthone — see Genicide*.

X-CYTO* Foliar

F: Conklin Co., Inc.

Chemistry

COMPOSITION: Cytokinins (blend), 0.012% as kinetin based on biological activity.

PROPERTIES: Opaque brown liquid, specific gravity 1.19, water soluble, boiling pt. 100° C, pH 3.5.

Action/Use

ACTION: Plant growth regulator.

USE: Applied to foliage of alfalfa, corn, cotton, peanuts, rice, sorghum, soybeans, sugar beets, triticale, wheat, fruits and vegetables to increase yields; to ornamentals, trees and turf to increase growth and development.

FORMULATIONS: Liquid concentrate.

Environmental Guidelines

SOLUBILITY: Approx. 95% in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses.

HANDLING AND STORAGE CAUTIONS: Store in cool place out of direct sunlight. Temperatures below freezing or >105° F may cause product deterioration.

Emergency Guidelines

FIRST AID: **Eyes,** remove contact lenses, if applicable. Immediately flush with plenty of cool running water; continue flushing for at least 15 min. If irritation persists, contact poison center or seek medical attention. **Skin,** wash thoroughly with soap and water, followed by a thorough rinse with cool water. Remove contaminated clothing and wash before re-use. If irritation persists, contact poison center or seek medical attention. **Ingestion,** if able to swallow, dilute by drinking 1-2 cups of water or milk. Immediately call poison center or physician. **EMERGENCY TELEPHONE:** 800-228-5635 (Conklin Co. Inc.).

X-CYTO* Soil

F: Conklin Co., Inc.

Chemistry

COMPOSITION: Cytokinins (blend), 0.04% as kinetin based on biological activity.

PROPERTIES: Opaque brown liquid, specific gravity 1.09, water soluble, boiling pt. 100° C, pH 3.9.

Action/Use

ACTION: Plant growth regulator.

USE: Applied to soil of alfalfa, corn, cotton, peanuts, rice, sorghum, soybeans, sugar beets, triticale, wheat, fruits and vegetables to increase yields; to ornamentals, trees and turf to increase growth and development.

FORMULATIONS: Liquid concentrate.

Environmental Guidelines

SOLUBILITY: Approx. 95% in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. (Rabbit): Dermal LD₅₀ >2000 mg/kg.

PROTECTIVE CLOTHING: Safety glasses.

HANDLING AND STORAGE CAUTIONS: Store in cool place out of direct sunlight. Temperatures below freezing or >105° F may cause product deterioration.

Emergency Guidelines

FIRST AID: **Eyes,** remove contact lenses, if applicable. Immediately flush with plenty of cool running water; continue flushing for at least 15 min. If irritation persists, contact poison center or seek medical attention. **Skin,** wash thoroughly with soap and water, followed by a thorough rinse with cool water. Remove contaminated clothing and wash before re-use. If irritation persists, contact poison center or seek medical attention. **Ingestion,** if able to swallow, dilute by drinking 1-2 cups of water or milk. Immediately call poison center or physician. **EMERGENCY TELEPHONE:** 800-228-5635 (Conklin Co. Inc.).

XE 799L — see Diniconazole.

XE-1019-D — see Uniconazole-P.

XenTari* — see *Bacillus thuringiensis* var. *aizawai*.

XL*

BP: DowElanco

Chemistry

COMPOSITION: Benefin + oryzalin.

PROPERTIES: Light yellow free-flowing granule with slight aromatic odor.

Action/Use

ACTION: Herbicide.

Environmental Guidelines

SOLUBILITY: Not soluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): LD₅₀ 3750 mg/kg.

PROTECTIVE CLOTHING: Eye protection, impermeable gloves, long-sleeved shirt and long pants.

HANDLING AND STORAGE CAUTIONS: Store in cool, dry, well-ventilated, secure area out of reach of children and animals.

Emergency Guidelines

FIRE EXTINGUISHING MEDIA: Water, CO₂ or dry chemical.

FIRST AID: Get medical aid. **Eyes,** flush immediately with plenty of water. **Skin,** wash thoroughly with soap and water. Remove contami-

Chemicals are cross-referenced by common and trade name

* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

nated clothing and shoes. **Inhalation**, remove to fresh air. **Ingestion**, do NOT induce vomiting, administer 6-8 tsp. activated charcoal and large quantity of water.

XMC

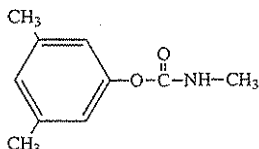
BP: Hodogaya Chemical Co., Ltd.
Jin Hung Fine Chemicals Co., Ltd.

Identification

COMMON NAME: XMC (JMAF).
CODE NUMBER: CAS 2655-14-3.
ADDITIONAL TRADE NAMES: Macbal*, Cosban*.

Chemistry

COMPOSITION: 3,5-Xylyl methylcarbamate (IUPAC).
PROPERTIES: White crystalline solid, melting point 99-100.5°C (>98%). Specific gravity 0.54. Solubility: (20°C g/l): acetone 5.74 g; benzene 2.04; ethanol 3.52; ethyl acetate 2.77.



XMC

Action/Use

ACTION: Insecticide.
USE: For leafhopper, planthopper on rice; tea green leafhopper on tea.
FORMULATIONS: Micro granule, powder, wettable powder.
COMBINATIONS: Package mixes with EDDP, NAC, Diaginone, malathion, MPP.

Registration Notes

U.S.: Not registered.

Environmental Guidelines

HAZARDS: (Fish) TLM 48 >40 ppm (carp).
SOLUBILITY: (20°C g/l): Water 0.47.

Safety Guidelines

SIGNAL WORD: DANGER.
TOXICITY CLASS: I.
TOXICITY: (Rat): Oral LD₅₀ 542 mg/kg. (Rabbit): 374 mg/kg. (Mouse): 245 mg/kg.
PROTECTIVE CLOTHING: Mask and gloves.
HANDLING AND STORAGE CAUTIONS: Keep out of the reach of children. Avoid breathing vapors. Avoid contact with skin, eyes, or clothing.

Emergency Guidelines

ANTIDOTE: Atropine.

X-sipax* — see Ametryn.

X-siprim* — see Atrazine.

X-TRA* — see Fenoxaprop-P-ethyl; Express*; MCPA; Pinnacle*.

Xtragro* — see Ethephon.

Xylene**Identification**

CODE NUMBERS: CAS 68920-06-9; SHA 086803.
OTHER NAME: Xylol.

Chemistry

COMPOSITION: Dimethyl benzene (ortho, meta, and para isomers).
PROPERTIES: Volatile. Petroleum distillate (75-100% aromatic hydrocarbon) boiling between 275° and 300°F.

Action/Use

ACTION: Solvent.
USE: A solvent and diluent of dieldrin, methyl parathion, and various other pesticidal chemicals, especially for emulsifiable concentrates.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: MAC 100 ppm in air for an 8-hour day.

HANDLING AND STORAGE CAUTIONS: Avoid prolonged or repeated contact with the skin or breathing the vapor. Do not use or store near open flame.

2,4-Xylenol**Identification**

CODE NUMBERS: CAS 105-67-9; SHA 086804.

Chemistry

COMPOSITION: 1-Hydroxy-2,6-dimethylbenzene.

Action/Use

ACTION: Disinfectant.

Xylol — see Xylene.

Xylycarb — see Meobal*.

Yaltox* — see Carbofuran.

Yamaclean M*

(Discontinued 1987 by Nissan Chemical Industries, Ltd.)

Chemistry

COMPOSITION: Butyl 2-methyl-4-chlorophenoxyacetate (IUPAC).

Action/Use

ACTION: Hormone type forest herbicide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 914 mg/kg.

Yanock* — see Fluoroacetamide.

Yardex* — see Fluvalinate.

Yasoknock* — see Sodium Fluoroacetate.

Yeh-Yan-Ku* — see Avenge*.

Yellow Cuprocide* — see Copper Oxide.

Yellow Oxide of Mercury

BP: United Phosphorus Ltd.

Identification

COMMON NAME: Mercuric oxide (chemical name accepted in lieu of common name).

CODE NUMBER: CAS 21908-53-2.

DISCONTINUED NAME: Santar* (Sandoz Ltd.).

Chemistry

FORMULA: HgO.

PROPERTIES: Mercuric oxide: yellow solid, melting point 500°C (decomposition). Insoluble in organic solvents.

Action/Use

ACTION: Fungicide.

USE: Applied as paste for wound sealing and canker treatment of fruit trees and rubber trees. Not to be used for sealing graft wounds or for treating pruning cuts in first year.

FORMULATIONS: Thixotropic paste.

Environmental Guidelines

SOLUBILITY: In water 53 mg/l at 25°C. Santar* is miscible with water; after application forms water insoluble coating.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 18 mg/kg.

Yield Shield* — see Thiram.

Yomesan* — see Bayluscid*.

Yukahope*

BP: Mitsubishi Petrochemical Co., Ltd.

Identification

COMMON NAME: Clomeprop (ISO draft, BSI).

EXP. CODE NUMBER: MY-15.

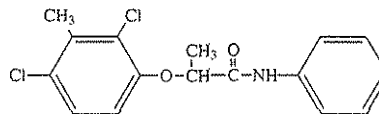
OTHER CODE NUMBER: CAS 84496-56-0.

Chemistry

COMPOSITION: (RS)-2-(2,4-dichloro-m-tolylxy)propionanilide (IUPAC).

PROPERTIES: Melting point 146.0 ~ 147.0°C.

FAMILY: Phenoxy.



Clomeprop

Action/Use

ACTION: Herbicide.

USE: Early postemergent control of annual and perennial broadleaf and sedge which infest paddy rice fields.

FORMULATIONS: Emulsifiable concentrate, granule.

Environmental Guidelines

HAZARDS: Fish: TLM >10 ppm (carp).

SOLUBILITY: In water 0.03 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ >5000 mg/kg. No skin or eye irritation.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes.

Emergency Guidelines

COMBUSTION PRODUCTS: NO_x, CO, CO₂.

FIRE EXTINGUISHING MEDIA: Water, foam, dry chemical, carbon dioxide.

FIRST AID: Eyes, flush with plenty of water. Skin, wash with soap and water.

EMERGENCY TELEPHONE: Japan: 3-3283-5619 (Mitsubishi Petrochemical).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Yukamate*

BP: Mitsubishi Petrochemical Co, Ltd.

Identification

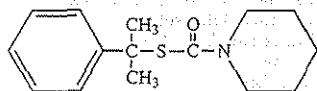
COMMON NAME: Dimepiperate.
CODE NUMBER: CAS 61432-55-1.

Chemistry

COMPOSITION: S-1-methyl-1-phenylethyl piperidine-1-carbothioate (IUPAC).

FAMILY: Carbamate.

PROPERTIES: Melting point 38.8-39.3°C.



Dimepiperate

Action/Use

ACTION: Pre and early postemergent herbicide.

USE: Controls grasses in rice paddies.

FORMULATIONS: EC and granule.

Environmental Guidelines

HAZARDS: Fish: TLm 7 ppm (carp).

SOLUBILITY: Water: 20.0 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

TOXICITY: (Rat): Oral LD₅₀ 950 mg/kg. No skin, eye irritation.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes.

Emergency Guidelines

COMBUSTION PRODUCTS: CO, CO₂, NO_x, SO_x.

FIRE EXTINGUISHING MEDIA: Water, foam, dry chemical, CO₂.

FIRST AID: Get medical aid. Eyes, flush immediately with plenty of water. Skin, wash thoroughly with soap and water. Remove contaminated clothing and shoes.

EMERGENCY TELEPHONE: Japan: 3-3283-5619 (Mitsubishi Petrochemical).

Yukawide*

BP: Mitsubishi Petrochemical Co., Ltd.

Identification

COMMON NAME: Benzofenap (ISO draft, BSD).

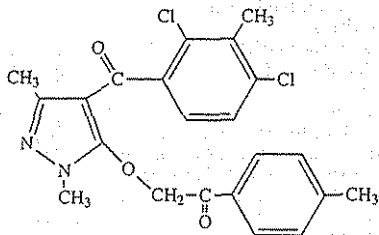
CODE NUMBER: CAS 82692-44-2.

Chemistry

COMPOSITION: 2-[4-(2,4-dichloro-m-toluoyl)-1,3-dimethylpyrazol-5-yloxy]-4'-methylacetophenone (IUPAC).

PROPERTIES: White solid. molecular weight 431.3; melting point 133.1-133.5; vapor pressure <10⁻⁷ mmHg (30°C).

FAMILY: Pyrazole.



Benzofenap

Action/Use

ACTION: Herbicide.

USE: Pre and early postemergent control of annual grass, weeds, sedge which infest paddy rice field.

FORMULATIONS: Flowable, granule.

Environmental Guidelines

HAZARDS: Fish: TLm >10 ppm (carp).

SOLUBILITY: In water 0.13 ppm.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 15,000 mg/kg. (Rat): Dermal >5000. No skin or eye irritation.

HANDLING AND STORAGE CAUTIONS: Avoid contact with eyes.

Emergency Guidelines

COMBUSTION PRODUCTS: NO_x, CO, CO₂, HCl, Cl₂.

FIRE EXTINGUISHING MEDIA: Water, foam, dry chemical, carbon dioxide.

FIRST AID: Eyes, flush with plenty of water. Skin, wash with soap and water.

EMERGENCY TELEPHONE: Japan: 3-3283-5619 (Mitsubishi Petrochemical).

ZAC* — see Goodrite ZAC*

Zark* — see Hinochloa*.

Zark* D — see Hinochloa*.

Zardex*

(Discontinued by Zoecon Corp.)

Identification

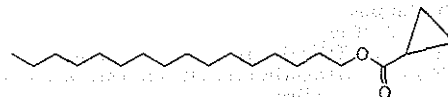
COMMON NAME: Cycloprate.

EXP. CODE NUMBER: ZR-856.

OTHER CODE NUMBERS: CAS 54460-46-7; SHA 115601.

Chemistry

COMPOSITION: Hexadecyl cyclopropanecarboxylate.



Cycloprate

Action/Use

ACTION: Selective acaricide.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: (Rat): Oral LD₅₀ 12,200 mg/kg. (Rabbit): Dermal 6270 mg/kg.

Zassol* — see Sodium Cyanate.

ZBK* — see Sorba-Spray*

Z-C Spray* Fungicide (ziram) — Discontinued by FMC Corp.

Z-9-DDA — see Rak* I Plus.

Zealure* — see Hercon* Luretape.

Zeapos* Herbicide (Atrazine) — Discontinued 1994 by Chemol Trading Ltd. Co.

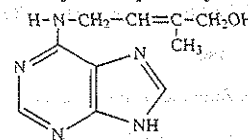
Zeatin

Identification

CODE NUMBER: CAS 1637-39-4.

Chemistry

COMPOSITION: (E)-2-methyl-4-(1H-purin-6-ylamino)-2-buten-1-ol (CAS).



Zeatin

Action/Use

ACTION: Plant growth regulator; naturally occurring of class cytokinins.

Zebtox* — see Zineb.

Zectran* Insecticide (mexacarbate) — Discontinued by Dow Chemical Co.

Zeecon*

(Discontinued 1984 by Crown Zellerbach Corp.)

Action/Use

ACTION: Dispersant.

Zeidane* — see DDT.

Zelan* — see MCPA.

Zeidox* — see Hexythiazox.

Zenit* — see Fenpropidin; Propiconazole.

Zeofree* — see Silicates.

Zeolex* — see Silicates.

Zeolex* 7A

BP: J.M. Huber Corp., Chemicals Div.

Identification

CODE NUMBERS: CAS 1344-00-9; SHA 072605.

Chemistry

COMPOSITION: A precipitated hydrated silicate.

PROPERTIES: Bulk density 16 to 18 pounds/cubic foot; particle size 2-10 micron. Finely divided and produced by precipitation.

Action/Use

ACTION: Carrier and suspending agent.

USE: Used in highly concentrated wettable powders and dust bases and as a conditioning and bulking agent in field strength dusts. Stable with sensitive toxicants.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

Safety GuidelinesTOXICITY: TLV 10 mg/m³.

PROTECTIVE CLOTHING: Approved respirator.

HANDLING AND STORAGE CAUTIONS: Store in a dry place.

Zeosyl* — see Silicates.

Zeosyl 100*

BP: J.M. Huber Corp., Chemicals Div.

Chemistry

COMPOSITION: Precipitated hydrated silicon dioxide.

PROPERTIES: Bulk density 12 to 15 pounds/cubic foot; particle size 2-10 micron. Finely divided and produced by precipitation.

Action/Use

ACTION: Carrier and suspending agent.

USE: Used in highly concentrated wettable powders and dust bases; a conditioning and bulking agent in field strength dusts. Stable with sensitive toxicants.

Safety GuidelinesTOXICITY: TLV 10 mg/m³.

PROTECTIVE CLOTHING: Use approved respirator.

HANDLING AND STORAGE CAUTIONS: Store in dry place.

See Silicates (Synthetic Dry).

Zephiran* — see Benzalkonium Chloride.

Zephyr* — see Abamectin.

Zerdane* — see DDT.

Zerlate* Fungicide (ziram) — Discontinued 1989 by Du Pont Agricultural Products.

Zeta-cypermethrin — see Fury*

Zidan* Fungicide (zineb) — Discontinued by Makhteshim-Agan.

Ziman* — see Mancozeb.

Ziman-Dithane* — see Mancozeb.

Zinc Arsenate**Identification**

CODE NUMBERS: CAS 13464-44-3; SHA 013301.

Chemistry

COMPOSITION: Formulated with other ingredients.

Action/Use

ACTION: Insecticide.

USE: For use on potatoes and tomatoes.

See Copperized Boliden Salts.

Zinc Arsenite**Identification**

CODE NUMBERS: CAS 28837-97-0; SHA 013604.

ChemistryCOMPOSITION: Zn₃(AsO₃)₂.**Action/Use**

ACTION: Insecticide. Zinc meta-arsenite as a wood preservative.

Zinc Chloride

(Discontinued by Du Pont Agricultural Products)

Identification

CODE NUMBERS: CAS 7646-85-7; SHA 087801.

OTHER NAME: Butter of zinc.

Action/Use

ACTION: Wood preservative.

Zinc Fluorarsenate**Identification**

CODE NUMBERS: CAS 16871-71-9; SHA 075307.

Action/Use

ACTION: Stomach insecticide.

Zinc Meta-Arsenite — see Zinc Arsenite.

Zinc Metiram — see Metiram-Complex.

Zinc Naphthenate**Identification**

CODE NUMBER: CAS 12001-85-3.

DISCONTINUED NAME: Zinc Uversol* (Witco Chemical).

Action/Use

ACTION: Fungicide.

USE: Wood preservative (above ground) for fungal decay.

FORMULATIONS: Liquid concentrates, emulsifiable concentrates.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Emergency Guidelines

EMERGENCY TELEPHONE: 901-396-5157.

Zinc Omadine***Action/Use**

ACTION: Systemic fungicide with pronounced antibacterial and anti-fungal properties. Shows upward as well as downward translocation in plants.

Zinc Oxide/Sulfate — see KO-Zinc WP*.

Zinc Petroleum Sulfonate**Identification**

CODE NUMBER: SHA 088503.

Action/Use

USE: Applied to baskets, crates, boxes for harvesting fruits and vegetables.

Zinc Phosphide

BP: Ag Pesticides (Pvt) Ltd. (Agzinphos*)

Aimco Pesticides Ltd. (Tech. 80%)

All India Medical Corp. (Zinc-Tox*)

Delicia GmbH Delitzsch

Excel Industries Ltd. (Commando*)

HACCO, Inc.

Ladda Co., Ltd.

LiphaTech, Inc. (Ridall-Zinc*)

Motomco Ltd. (Rodent Pellets*, Rodenticide AG* Mole and Gopher Bait)

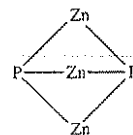
United Phosphorus Ltd. (Ratol*)

Identification

CODE NUMBERS: CAS 1314-84-7; SHA 088601.

ADDITIONAL TRADE NAME: Phosvin*.

DISCONTINUED NAME: Prozap* (HACCO, Inc.); Blue-Ox* (Hopkins Agricultural Chemical Co.); Billy* (Shroffs Indus. Chemical).

ChemistryCOMPOSITION: Zn₃P₂.PROPERTIES: A gray powder with high melting point. Stable when dry. Reacts violently with acids to form (>400°C) phosphine gas (PH₃). Insoluble in alcohol; reacts with acids or more slowly with water.

Zinc Phosphide

Action/Use

ACTION: Rodenticide.

USE: In baits for control of rats, mice, ground squirrels, prairie dogs, voles, moles, and gophers. In tracking powder for house mouse control. Has a disagreeable odor, evidently not offensive to rodents. Under exposed acid free conditions, remains active for long periods of time.

FORMULATIONS: Mixed with bait, tracking powder.

Registration Notes

U.S.: Some or all applications of Ridall-Zinc* may be classified as RUP.

Environmental Guidelines

SOLUBILITY: Insoluble in cold water.

Safety Guidelines

SIGNAL WORD: DANGER. WARNING (Ridall-Zinc* Tracking Powder); CAUTION (Ridall-Zinc* Pelleted Bait, Rodent Pellets*, Mole and Gopher Bait*).

TOXICITY CLASS: I, II (Ridall-Zinc* Tracking Powder); III (Ridall-Zinc* Pelleted Bait, Rodent Pellets*, Mole and Gopher Bait*).

TOXICITY: (a.i.) (Rat): Oral LD₅₀ 45.7 mg/kg. 80% Formulation: 55.5 mg/kg. 1.88% Formulation: 2075 mg/kg.

PROTECTIVE CLOTHING: MSA dust mask, cotton gloves acceptable but rubber, vinyl etc. preferred; chemical safety spectacles, cotton overalls, safety shoes, and hard hat. Provide general room ventilation plus local exhaust at points of potential dust emission. Exhaust system must be designed to cope with hazardous reactive dust.

HANDLING AND STORAGE CAUTIONS: Consult label for specific product cautions. Store in cool, dry, fire-resistant area away from acids or water solutions. Handle carefully to avoid unnecessary dusting. Shelf-life of 3 years for Ridall-Zinc* Products.

Emergency Guidelines

FIRST AID: Get medical aid. Ingestion, do NOT drink water. Do NOT administer anything by mouth or make patient vomit unless advised to do so by a physician.

Zinc Sulfate**Identification**

CODE NUMBERS: CAS 7733-02-0; SHA 089001.

DISCONTINUED NAME: NU-Z* (Tennessee Chemical Co.).

Chemistry

COMPOSITION: Neutral zinc salt.

Action/Use

ACTION: Wood preservative. Fertilizer trace element.

COMBINATIONS: Golden Nutrient (+ sulfur) (Wilbur-Ellis).

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Zinc Sulfate, Basic

(Discontinued 1985 by Woolfolk Chemical Works, Inc.)

Identification

CODE NUMBERS: CAS 68813-94-5; SHA 089101.

ADDITIONAL TRADE NAME: BSZ*.

Chemistry

COMPOSITION: The monohydrate most used in agriculture. (High pH; 20% zinc).

Action/Use

ACTION: Bactericide; safener for lead arsenate.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: III.

Zinc Trichlorophenate

Identification

CODE NUMBERS: CAS 30143-22-7; SHA 064213.

Action/Use

ACTION: Fungicide.

USE: Seed treatment for cotton and peanuts.

Zinc Uversol* Fungicide (zinc naphthenate) — Discontinued 1989 by Witco Chemical Co.

Zincmate* — see Ziram.

Zinc-Tox* — see Zinc Phosphide.

Zineb

- BP: ELF Atochem Agri B.V. (Tritoflorol*)
- Grupo Bioquimico Mexicano S.A. de C.V. (Flonex Z* 400)
- HELM AG
- Hubei Sanonda Co., Ltd.
- Ingenieria Industrial, S.A. de C.V. (Zinesol*)
- ISAGRO (Aspor*, Tiesene*)
- Quimico Industrial, S.A.
- Rhone-Poulenc (Cuprothex*, Super Mixy*)
- Sanex Inc.

Identification

COMMON NAMES: Zineb (ISO-E, BSI, JMAF); zinèbe (ISO-F).

CODE NUMBERS: CAS 12122-67-7; SHA 014506; ENT-14874; EINECS 235-180-1.

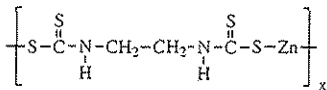
ADDITIONAL TRADE NAMES: Chem Zineb*, Dipher*, Discon-Z* (All India Medical Corp.); Chimac Zin* (Chimac-Agriphar S.A.); Fitozih 80* (Diachem S.P.A.); Hexathane*, Kypzin*, Parzate* C (Du Pont); Zebtox*.

DISCONTINUED NAMES: Cumene*, Galben* A, Galben* Z, Tairel* Z (+ benalaxyl), Tanazon*, Tiazin* (Agrimont S.p.A.); Tricuzin* (+ copper oxychloride) (Atochem Agri BV); Polyram* Z (BASF AG); Lonacol* (Bayer AG); Devizeb* (Devidayal (Sales) Pvt. Ltd.); Zidan* (Makhteshim-Agan); Sperlox* (+ sulfur) (Olin Corp.); Mancozan* (+ maneb), Zinosan* (Rhone-Poulenc); Dithane* Z-78 (Rohm and Haas); Ditiaino* (Rumianca S.p.A.).

Chemistry

COMPOSITION: Zinc ethylenebis(dithiocarbamate) (IUPAC) or [(1,2-ethanediy)bis(carbamodithioato)]-(2-)-zinc complex (CAS 9CI).

PROPERTIES: Light colored powder, practically odorless. Decomposes before melting. Decomposes gradually, accelerated by exposure to moisture, heat or air. Terminal stability (40°C), 1-5% degradation after one month. Density (at 20°C), approx. 1.74. Practically insoluble in most organic solvents. Slightly soluble in pyridine.



Zineb

Action/Use

ACTION: Fungicide.

USE: Used on a variety of fruits and vegetables. Zineb also results from combining nabam (or diammonium or potassium ammonium analogs) with zinc sulfate in the spray tank.

FORMULATIONS: Wettable powder.

COMBINATIONS: Tricuproxi* (+ copper + maneb) (Aragonesas Agro, S.A.); Vondozeb* (+ maneb) (ELF Atochem Agri B.V., ELF Atochem North America, Inc.); Comac Bordeaux MZ* (Super X Macclesfield* in France) (+ pre-reacted bordeaux mixture + maneb) (La Cornubia S.A.); Cuprosan* (+ copper oxychloride) (Rhone-Poulenc); Cupzin* 60 (+ copper oxychloride); Miltox* (+ copper oxychloride) (Sandoz Agro Ltd.); Carbina* TZ (+ thiram); Dicamate* (+ mancozeb); Karamate* (+ mancozeb).

Registration Notes

OUTSIDE U.S.: Flonex Z* 400.

Environmental Guidelines

HAZARDS: Bee: Nontoxic.

SOLUBILITY: Practically insoluble in water.

Safety Guidelines

SIGNAL WORD: CAUTION.

TOXICITY CLASS: IV.

TOXICITY: Tech. (Rat): Oral LD₅₀ >5200 mg/kg. Dermal >10,000 mg/kg.

PROTECTIVE CLOTHING: Protective equipment, clothing.

HANDLING AND STORAGE CAUTIONS: Store in well-aired, fresh (<30°C), dry area away from dwellings, animal shelters and stored food.

Emergency Guidelines

FLASHPOINT: >100°C.

Zinèbe — see Zineb.

Zinesol* — see Zineb.

Zinoc — see Trizinoc*.

Zinophos*

(Discontinued by American Cyanamid Co.)

Identification

COMMON NAMES: Thionazin (ISO-E, BSI); thionazine (ISO-F).

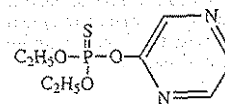
EXP. CODE NUMBER: AC 18133 (American Cyanamid).

OTHER CODE NUMBERS: CAS 297-97-2; SHA 032401; ENT-25580.

ADDITIONAL TRADE NAMES: Cynem*, Nemafo*, Nemaphos*.

Chemistry

COMPOSITION: O,O-Diethyl O-pyrazinyl phosphorothioate (IUPAC and CAS).



Thionazin

Action/Use

ACTION: Insecticide, nematicide.

Safety Guidelines

SIGNAL WORD: DANGER.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 12 mg/kg.

Zinosan* Fungicide (zineb) — Discontinued by Rhone-Poulenc.

Z.I.P.* Repellent (zinc dimethyldithiocarbamate cyclohexylamine complex) — Discontinued by NOR-AM Chemical Co.

Zipak* — see Amitraz.

Ziram

- BP: All India Medical Corp.
- Desarrollo Quimico Industrial, S.A.
- ELF Atochem Agri B.V. (Triscabol*)
- ELF Atochem North America (Ziram 76*)
- General Quimicas S.A. (Fuciram*)
- HELM AG
- India Pesticides Ltd.
- ISAGRO (Mezene*)
- UCB (Agrochemicals Headquarters) (Thionic*, Ziram 76 WDG*, Ziram Granuflo*)
- UCB Chemicals Corp. (Thionic*, Ziram 76 WDG*, Ziram Granuflo*)
- R.T. Vanderbilt Co., Inc. (Vancide* MZ-96)

Identification

COMMON NAMES: Ziram (ISO-E, BSI, JMAF); zirame (ISO-F).

CODE NUMBERS: CAS 137-30-4; SHA 034805; EINECS 205-288-3.

ADDITIONAL TRADE NAMES: Pomarsol* Z (Bayer AG); Micosin F30* (Diachem S.P.A.); Tricarbamix* (ELF Atochem Agri B.V.); ORCAL Ziram 400* (Oregon-California Chemicals, Inc.); Ziretec* (Tecomag); Zincmate*, Zirasan* 90, Zirberk*, Zirex* 90, Ziride*, Zitox*, Cuman*, Hexazir*.

DISCONTINUED NAMES: Zerlate* (Du Pont); Prodaram* (ELF Atochem Agri B.V.); Z-C-Spray*, Ziram 76WDG (FMC Corp.); Tricarbamix* Z (Pennwalt Holland B.V.); Corozate* (PPG Industries); Carbazine*, Zirasan* 90, Zirex* 90 (Rhone-Poulenc); Antene* (Rumianca S.p.A.); Fuklasin Ultra*, Fuklasin* (Schering AG).

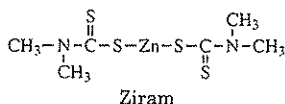
Chemistry

COMPOSITION: Zinc bis(dimethyldithiocarbamate) (IUPAC); (T-4)-bis(dimethyldithiocarbamato-S,S') zinc.

PROPERTIES: White solid. Mezene* melts at approx. 240°C. Soluble to 65 ppm in distilled water; soluble in chloroform; essentially insoluble in alcohol and ether.

Chemicals are cross-referenced by common and trade name
* — Trade Name/R/TM BP — Basic Producer F — Formulator

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1.

**Action/Use**

ACTION: Fungicide.

USE: Used extensively on almond and peaches to control shot hole, brown rot, and peachleaf curl. Used on vegetables. The most stable of the metallic dithiocarbamates; nonphytotoxic except for zinc-sensitive plants. Does not build up in the soil and is rapidly decomposed by weathering. Also used on pecans, apples, and pears to control scab and bull's-eye rot.

FORMULATIONS: Wettable powder, water dispersible granules, flowable liquid.

Registration Notes

U.S.: Agricultural uses cancelled for Vancide* MZ-96 (R. T. Vanderbilt Co.)

Environmental Guidelines

HAZARDS: Fish: Moderately toxic. Bee: Nontoxic.

Safety Guidelines

SIGNAL WORD: DANGER — Depends on formulation.

TOXICITY CLASS: I.

TOXICITY: (Rat): Oral LD₅₀ 1400 mg/kg. Dermal >6000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Store Mezene* in their sealed original containers, in well-aired, fresh and dry storehouses or in shaded and possibly well-aired places. Recommended product temperature: <25-30°C. Stack containers to permit a free circulation of air at the bottom and inside of the piles. Biological activity of Mezene* remains practically unvaried for 2 years under environmental conditions, provided stored as directed.

Ziram 76* — see Ziram.

Ziram Granuflo* — see Ziram.

Ziram 76 WDG* — see Ziram.

Ziram 76WDG Fungicide (ziram) — Discontinued by FMC Corp.

Ziram WG* — see Ziram.

Zirame — see Ziram.

Zirasan* 90 Fungicide (ziram) — Discontinued by Rhone-Poulenc.

Zirberk* — see Ziram.

Ziretec* — see Ziram.

Zirex* 90 Fungicide (ziram) — Discontinued by Rhone-Poulenc.

Ziride* — see Ziram.

Zitan* 85 — see Hydrolyzed Protein.

Zithiol* — see Malathion.

Zitox* — see Ziram.

Z-Nap* — see Zinc Napthenate.

Zobar* Herbicide (PBA + trichlorobenzoic acid) — Discontinued.

Zodiac* TX — see Diflufenican; Isoproturon.

Zolfosol* — see Barium Polysulfide.

Zolfosol 25* — see Lime Sulfur.

Zolone* — see Phosalone.

Zoocoumarin — see Warfarin.

Zorial* — see Norflurazon.

Zotox* Crab Grass Killer — see Arsenic Acid.

ZR-512 — see Hydroprene.

ZR-515 — see Methoprene.

ZR-619 — see Aitorick*.

ZR-777 — see Enstar* II.

ZR-856 — see Zardex*.

Zyban***Chemistry**

BP: Grace-Sierra Crop Protection Co.

COMPOSITION: Dimethyl 4, 4'-O-phenylene-bis (3-thioallophanate) (15%); zinc, manganese ethylenebis dithiocarbamate (60%), and inert ingredients (25%).

Action/Use

ACTION: Foliar fungicide.

USE: For anthracnose, blackspot, flower blight, leaf blight, stem and twig blight, downy mildew, powdery mildew, scab, and rust on horticultural and nursery crops.

FORMULATIONS: Wettable powder.

Environmental Guidelines

HAZARDS: Fish: Toxic.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 10,200 mg/kg. (Rabbit): Dermal 8000 mg/kg.

HANDLING AND STORAGE CAUTIONS: Product causes eye and skin irritation. Store in a dry place (<122°F/50°C) in a well-closed container. Stable, as packaged, for a minimum of two years.

Zytox* Fumigant (methyl bromide + ethylene dibromide) —

Discontinued by Ferguson Fumigants, Inc.

Zytron*

(Discontinued by Dow Chemical Co.)

Identification

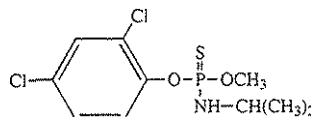
COMMON NAME: DMPA (WSSA).

EXP. CODE NUMBER: K-22023; Dowco 118 (Dow Chemical).

OTHER CODE NUMBERS: CAS 299-85-4; SHA 028401; OMS 115 (WHO).

Chemistry

COMPOSITION: O-2,4-Dichlorophenyl O-methyl isopropylphosphoramidothioate (IUPAC).



Active Ingredient of Zytron*

Action/Use

ACTION: Fly larvicide.

Safety Guidelines

SIGNAL WORD: WARNING.

TOXICITY CLASS: II.

TOXICITY: (Rat): Oral LD₅₀ 270 mg/kg (female).

ZZ-Doricida* Insecticide (bensultap) — Discontinued 1992 by Takeda Chemical Industries, Ltd.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Section C

BIOCONTROLS DICTIONARY

The *Biocontrols Dictionary* includes biochemical pest control agents, microbial pest control agents, and biological control agents (also called beneficial organisms).

Biocontrol agents are defined as biologically derived, or identical to a biologically derived agent. **Biochemical pest control agents** include semiochemicals (pheromones, allomones, kairomones), plant regulators, hormones, and enzymes, either naturally occurring or identical to a natural product, that attract, retard, destroy or otherwise exert a pesticidal activity. **Microbial pest control agents** include viruses, bacteria, fungi, and protozoa. **Biological control agents** (beneficial organisms) include predators, parasites, and weed-feeding invertebrates, living organisms used

for controlling the population or biological activities of another life form considered to be a pest.

The U.S. EPA uses the term "biorational pesticides" and includes microbial pest control agents and biochemical pest control agents. Not included are biological control agents. EPA will determine on a case-by-case basis whether synthetic biochemical agents not identical to natural biochemical agents will be classed as biorational pesticides. Also included in this section are traps and lures, as well as terms relating to biocontrol methods.

Additional biocontrol information may be found in the *Pesticide Dictionary* (Section C). Information about manufacturers and suppliers can be found in the *Company Addresses* (Section G).

Aceria malberbae

Beneficial mite for control of field bindweed.
From Praxis.

Acti-dione* (Discontinued 1987 by NOR-AM)

Antibiotic fungicide.
See *Pesticide Dictionary*.

Agapeta zoegana

Beneficial moth for control of knapweed.
From Praxis.

Agree* (CGA-237218)

Transconjugated strain of *Bacillus thuringiensis* var. *aizawai* used to control lepidoptera in corn, fruits, vegetables and tobacco.
From Ciba.
See *Bacillus thuringiensis* var. *aizawai*.

Agrilus hyperici

Beneficial beetle for control of St. Johnswort weed. Adults feed on flowers and lay eggs at the base of stems. Larvae feed on stems and roots.
From CALTEC Agri Marketing Services; Praxis.

Agri-Mycin* 17

Streptomycin as an antibiotic fungicide.
From Pfizer, Inc.
See *Streptomycin*.

AgriStrep*

Streptomycin as an antibiotic fungicide.
From MSD Agvet.
See *Streptomycin*.

Agrobac*

Microbial insecticide, caterpillar larvicide. Composed of spores and crystalline delta-endotoxin as a.i. which are produced by *Bacillus thuringiensis* var. *kurstaki*, Serotype H-3a3b in fermentation. For most lepidopterous larvae with high gut pH, such as armyworms, cabbage loopers, imported cabbageworm, gypsy moth, spruce bud-

worm, etc. of alfalfa, corn, cotton, forested areas, fruit trees, ornamentals, shade trees, soybeans, tobacco, and vegetables.

From Tecomag.
See *Bacillus thuringiensis* var. *kurstaki*.

Agrobacterium radiobacter

Beneficial bacterium used as a dip or spray on nursery stock to prevent infection by the crown gall pathogen.
See Norbac-84C*.

Agronaa*

Alpha Naphthylacetic Acid. Plant hormone spray.
From Aries Agro-Vet Industries Pvt. Ltd.
See *Pesticide Dictionary*.

Algimycin PLL*

For control of algae found in most small ornamental ponds.
From Great Lakes Biochemical Co., Inc.
See *Streptomycin*.

Align*

Neem extraction biological insecticide. Effective on a variety of food crops against many insect pests, including: whitefly, armyworm, leafminer, cabbage looper, and diamondback moth. Contains azadirachtin (a.i.). Kills targeted insects by interfering with ecdysone, a key insect molting hormone. Affected insects fail to complete the molting process and die before reaching the adult stages.
From AgriDyne Technologies Inc.
See *Azadirachtin*.

Aliolus curculionis

Parasitoid of plum curculio larvae.

Allantonematidae

Several species of this nematode group are considered important biological control agents.

Allelochemic

Substance produced by an organism that induces one of several reactions in an organism of a different species.

* — Trade Name/R/TM

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1

Allelopathic Substances

Secondary chemical compounds produced by plants that inhibit the growth of some other species of plants, including microorganisms.

Allomone

Substance produced by an organism that, on contact with an organism of another species, induces a response favorable to the individual that produced the substance, e.g., the neotropical social wasp *Mischocyttarus drewseni* applies a secretion to the stem of its nest that repels foraging ants.

See Pesticide Dictionary.

Amblyseius barkeri

Predatory mite of onion thrips (*Thrips tabaci*) and western flower thrips (*Frankliniella occidentalis*).

From ARBICO, Inc.; Biobest Biological Systems; IPM Laboratories, Inc.

Amblyseius californicus

See *Neoseiulus (Amblyseius) californicus*.

Amblyseius cucumeris

Predatory mite which prefers fairly high relative humidity levels. Controls onion thrips (*Thrips tabaci*) and western flower thrips (*Frankliniella occidentalis*); cyclamen mites on strawberries; and thrips on greenhouse sweet peppers. Although the numbers of predators decline after control has been achieved, the proportion of leaves on which *Amblyseius* can be found remains high for some weeks.

From ARBICO, Inc.; Better Yield Insects; Biobest Biological Systems; G.B. Systems Inc. (Triplex C*); Hydro-Gardens, Inc.; IPM Laboratories, Inc.; Natural Pest Controls; Rincon-Vitova Insectaries, Inc.

Amblyseius fallacis

Predatory mite of *Panonychus ulmi*, brown mite of apple, twospotted mite, *Tetranychus urticae*, and European red mite.

From Rincon-Vitova Insectaries, Inc.

Amblyseius mckenziei

Predatory mite of thrips.

From Biobest Biological Systems; Natural Pest Controls.

Amblyseius swirskii

Dominant phytoseiid mite predator on citrus along the coastal plain of Israel.

Amblyseius-System*

Biological control of thrips.

From BIOBEST N.V.

Amlure

Insect attractant.

See Pesticide Dictionary.

Anagrus armatus

Mymarid egg parasite of the white apple leafhopper.

Anagrus epos Girault

Egg parasite of the grape leafhopper. Several biotypes appear to be present on the complex of grape leafhopper species.

From Praxis.

Anagrus pseudococci

Wasp that parasitizes mealybug eggs.

From Praxis.

Anaphes flavipes

Wasp that parasitizes cereal leaf beetle eggs.

From Praxis.

Anastatus tenvites

Parasitic wasp for control of Blattaria.

From Praxis.

Anisopteromalus calandrae

Parasitic wasp for weevil control in stored grain.

From CALTEC Agri Marketing Services; Praxis.

Antagonists

Equivalent of natural enemies in biological control of plant pathogens. Non-noxious organisms that occupy the ecological niche and compete for food and space with any potential pest individuals, thereby giving biological control through ecological competition. Many are saprophytes or decomposing organisms that aid in cleaning up dead plant and animal materials that can be an alternate substrate for pests. They can provide an alternate food source for many useful "generalist" feeding predators, particularly spiders.

Antifeeding Compounds

Material which does not repel, but induces insects to stop feeding within a short time. The insects often refuse to eat untreated food afterward. Starvation results through an irreversible adverse effect upon the insect. Largely experimental.

See Antimetabolite.

Antimetabolite

Experimental compound accepted by insects as though it contained normal food components (amino acids, vitamins, etc.), but which blocks growth. May interfere with enzyme secretion in the insect gut or permanently upset the nervous system concerned with normal functioning of the gut.

See Antifeeding Compounds.

Apanteles spp.

Braconid wasps, order Hymenoptera, that attack lepidoptera larvae.

Aphelinus abdominalis

Parasitic wasp that controls greenfly (*Macrosiphum euphorbiae*) in tomatoes.

From Praxis.

Aphelinus mali

Parasitoid of the woolly apple aphid considered to provide appreciable control worldwide.

Aphelinus-System*

Biological control of aphids.

From BIOBEST N.V.

Aphelopus typhlocybae

Dryinid that parasitizes the white apple leafhopper in the late nymphal and adult stages.

Aphex*

See *Aphidoletes aphidimyza*.

Aphidius matricariae

Tiny braconid parasitic wasp, killed by most pesticides, controls 40 aphid species. Since aphid reproduces quickly, timing is crucial. *Aphidius* can fully overtake pest, but action at a low level is necessary to avoid crop damage. Its excellent search and detection capacity makes it beneficial as a preventive control.

From Harmony Farm Supply; IPM Laboratories, Inc.; Praxis; Rincon-Vitova Insectaries, Inc.

Aphidius-System*

Biological control of aphids.

From BIOBEST N.V.

Aphidoletes aphidimyza

Sometimes called a midge larvae or aphid midge, this tiny aphid predator is native to the northern parts of North America and Europe. Adults are very sensitive to chemical pesticides while larvae have somewhat greater resistance. Aphid midges are sensitive to the length of day and will go dormant for the winter without supplemental lighting. Depending on temperatures and available food supply, larvae will continue to kill and feed on aphids for 3-14 days. When the larvae have completed their feeding cycle, they burrow into the growing media and develop into a cocoon, and the

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Exclusive reliance must be placed on information/directions supplied by manufacturer.

- cycle repeats. For preventive control, smaller numbers of aphid predators can be released occasionally during the aphid season.
From ARBICO, Inc.; Better Yield Insects; G.B. Systems Inc. (Aphex*); Harmony Farm Supply; Hydro-Gardens, Inc.; IPM Laboratories, Inc.; Nature's Control; Praxis; Rincon-Vitova Insectaries, Inc.
- Aphidoletes-System***
Biological control of aphids.
From BIOBEST N.V.
- Aphytis holoxanthus**
Chalcid parasite introduced from Hong Kong to control Florida red scale in Florida and Texas.
- Aphytis lepidosaphes**
Chalcid parasite introduced from South China to control purple scale on citrus in the U.S.
- Aphytis lingnanensis**
Chalcid wasp parasite of California red scale.
- Aphytis melinus**
Chalcid parasite attacks second and third instar of red scale.
From ARBICO, Inc.; CALTEC Agri Marketing Services; Harmony Farm Supply; Hydro-Gardens, Inc.; IPM Laboratories, Inc.; Natural Pest Controls; Praxis; Sespe Creek Insectary.
- Aphytis mytilaspidis**
Chalcid parasite considered a major factor in regulating the population of oystershell scale in apple orchards of Quebec, Canada. Also for citrus red scale, oleander scale, San Jose scale, ivy scale, citrus yellow scale, and other soft scales.
- Apion fuscirostre**
Beneficial seed-feeding weevil for control of Scotch broom. Adults lay eggs on newly forming pods. Larvae feed on seeds and pupate in pods.
From CALTEC Agri Marketing Services; Praxis.
- Apion ulicis**
Beneficial weevil for control of gorse weed. Adults feed on flowers and lay eggs on newly forming pods. Larvae feed on seeds and pupate in pods.
From CALTEC Agri Marketing Services; Praxis.
- APM Rope***
Twist-type dispenser which releases pheromone over 60-70 day period. Used on artichoke to control artichoke plume moth.
From Monterey Chemical Co.
- Apneumone**
Chemical from a nonliving source that mediates interactions between individuals of different species, e.g., the ichneumonid parasitoid (*Venturia canescens*) is attracted to the odor of oatmeal, its host's food.
- Apthona flava**
Predatory beetle for control of leafy spurge.
From Praxis.
- AQ 10***
Biological fungicide for control of powdery mildew on apples, cucurbits, grapes, strawberries, tomatoes, and ornamentals.
From Ecogen Inc.
- Archytas marmoratus**
Tachinid parasite of corn earworms and fall armyworm being tested as a biocontrol agent.
- Arise***
See Cytokinins.
- ATTRACT***
Wide range of pheromone traps against common moth pests.
From BIOBEST N.V.
- Attractant**
Substance which lures insects from distances to traps or poison bait stations.
See Pesticide Dictionary.
- Attract'n Kill TPW***
See NoMate* TPW Fiber.
- Azadirachtin**
Biological insecticide, extracted from the kernels of the neem tree (*Azadirachta indica*). Compatible with beneficial insects, this insect growth regulator controls targeted pests by interfering with ecdysone, a key molting hormone. Affected insects fail to complete the molting process and die before reaching adult stages. Controls all major greenhouse, nursery, and interiorscape insects, including aphid, armyworm, fungus gnat, leafminer, thrips, and whitefly.
From AgriDyne Technologies Inc. (Align*, Azatin* EC); Hydro-Gardens, Inc. (Azatin*); Krishna Bio-Tech Pvt. Ltd. (Shakti-man*); Ringer Corp. (Safe* BIONEEM).
- Azatin***
See Azadirachtin.
- Azatin* EC**
See Azadirachtin.
- Bacillus popilliae**
Microbial insecticide effective against Japanese beetle larvae.
See Pesticide Dictionary.
- Bacillus thuringiensis var. aizawai**
Microbial insecticide effective against some caterpillars.
See Pesticide Dictionary.
- Bacillus thuringiensis var. israelensis**
Bacterial insecticide to reduce mosquito larvae populations and kill blackflies and midges.
See Pesticide Dictionary.
- Bacillus thuringiensis var. kurstaki**
Microbial insecticide, effective against some caterpillars.
See Pesticide Dictionary.
- Bacillus thuringiensis var. morrisoni**
Microbial insecticide, caterpillar larvicide. Effective against most lepidopterous larvae with high gut pH, such as armyworm and cabbage looper.
See Pesticide Dictionary.
- Bacillus thuringiensis var. tenebrionis**
Microbial insecticide effective against some beetles, including Colorado potato beetle.
See Pesticide Dictionary.
- Bacillus thuringiensis-System***
Biological control of caterpillars.
From BIOBEST N.V.
- Bactec Bernan***
Bacillus thuringiensis var. *kurstaki*; *Bacillus thuringiensis* var. *morrisoni*. Biological insecticide.
From Bactec Corp.
See *Bacillus thuringiensis* var. *kurstaki*; *Bacillus thuringiensis* var. *morrisoni*.
- Bacteria/Bacterium**
Minute, simple organisms so small they can usually be seen only through a microscope. They consist of single cells, usually have no chlorophyll, and reproduce by fission.
See Pesticide Dictionary.
- Bacterol-100***
Washing process aid for postharvest fruits and vegetables.
From CEQSA Especialidades Quimicas S.A.
See Pesticide Dictionary.

* — Trade Name/R/TM

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1

Bactimos*

Bacillus thuringiensis var. *israelensis*. Microbial insecticide for control of mosquito and blackfly larvae.
From Novo Nordisk Bioindustrials, Inc.
See *Bacillus thuringiensis* var. *israelensis*.

Bactis* (Discontinued by Caffaro S.p.A.)

Bacillus thuringiensis var. *israelensis*. Microbial insecticide.
See *Bacillus thuringiensis* var. *israelensis*.

Bactospeine* (Discontinued 1993 by Novo Nordisk Bioindustrials, Inc.)

Bacillus thuringiensis var. *hurstaki*. Microbial insecticide.
See *Bacillus thuringiensis* var. *hurstaki*.

Bactucide* (Discontinued 1993 by Caffaro S.p.A.)

Bacillus thuringiensis var. *hurstaki*. Microbial insecticide.
See *Bacillus thuringiensis* var. *hurstaki*.

Baculovirus anticarsia

Biological insecticide for control of velvetbean caterpillars (*Anticarsia gemmatilis*). Multiple enveloped nuclear polyhedrosis virus.
From Centro Nacional de Pesquisa de Soja.

Bag-A-Bug* (Discontinued 1985 by J.T. Baker)

Microbial insecticide.
See Pesticide Dictionary.

Bag-A-Bug* Time Release Insecticide Strips (Discontinued 1985 by J.T. Baker)

Systemic insecticide.
See Pesticide Dictionary.

Bangasternus orientalis

Beneficial insect for control of yellow starthistle.
From CALTEC Agri Marketing Services.

Bathyplectes curculionis

Small parasitic wasp for control of alfalfa weevil. Other wasp parasites of the larval stage of alfalfa weevil include *B. anurus* and *B. stenostigma*.
From Praxis.

BAY BIO 1020 (Discontinued 1994 by Bayer AG)

Granular formulation of a non-genetically engineered strain of the entomopathogenic fungus *Metarhizium anisopliae* for biological control of soil inhabiting coleopterous pests in turf, ornamentals, container cultures, and nurseries in or outside of greenhouses.

BDH 10131 (Discontinued 1979 by British Drug House)

Synthetic female sex hormone for use in rat control.

Beauveria bassiana

Fungus known to cause mortality of the twospotted mite (*Tetranychus urticae*), the silkworm (*Bombyx mori*), and many others.

Bee-Here*

Honey bee attractant for improving pollination in crops which require pollen transfer by honeybees.
From Fermone Corp./Troy Biosciences, Inc.

Bee-Scent*

Attractant for improving pollination in crops which require pollen transfer by honeybees.
From Ecogen Inc.

Behavior-Modifying Chemicals

Naturally occurring chemicals that affect the behavior between two different organisms (i.e., between insects or between plants and insects). Examples are feeding stimulants, plant volatiles, kairomones, sex pheromones, and aggregation pheromones.

BINAB* T

Trichoderma polysporum ATCC 20475 and *Trichoderma harzianum* ATCC 20476. Biological fungicide for control of *Chondrostereum purpureum* and other basidiomycetes, besides soilborne

and other fungal pathogens, such as *Fusarium* and *Botrytis* spp. Also enhances plant tissue development through auxin release. Formulations include pellets and wettable powder.
From BINAB Bio-Innovation AB.
See *Trichoderma harzianum/polysporum*.

Biobit*

Bacillus thuringiensis var. *hurstaki*. Microbial insecticide to control vegetable and fruit lepidopterous larvae pests.
From Novo Nordisk Bioindustrials, Inc.
See *Bacillus thuringiensis* var. *hurstaki*.

Biocattura*

See Trapping Systems.

Biocontrol*

See Trapping Systems.

Biocot*

Bacillus thuringiensis var. *hurstaki*. Microbial insecticide. Controls cotton lepidopterous pests — *Heliothis* complex, etc.
From Novo Nordisk Bioindustrials, Inc.
See *Bacillus thuringiensis* var. *hurstaki*.

Biofix

Usually a point in the life of an insect population at which one would start accumulating degree days, i.e., when codling moths are caught in a pheromone trap.

Bio-Kore*

Biological activator for reducing odors and solids in manure lagoons and organic wastes.
From Agro Products, S.A.

Biolinfa*

L-cysteine derivatives for stimulating vegetative and fruiting processes of plants. Compatible with non-alkaline pesticides and foliar fertilizers.
From Biochem S.R.L.
See Pesticide Dictionary.

Biolinfa Plus A*

L-cysteine derivatives plus aminoacids and micronutrients, for stimulating vegetative and fruiting processes of plants. Compatible with non-alkaline pesticides and foliar fertilizers.
From Biochem S.R.L.
See Pesticide Dictionary.

Biological Control

Study and use of parasites, predators, and pathogens for the regulation of population densities of pests.
See Pesticide Dictionary.

BioLure*

Controlled release dispensers containing synthetic sex pheromone and/or attractant for monitoring pest populations throughout the growing season. For aphid, whitefly, thrips, leafminer, apple maggot, boll weevil, codling moth, European pine shoot moth, flour beetle (red/confused), fruit fly, gypsy moth, Mediterranean fruit fly, melon fly, obliquebanded leafroller, omnivorous leafroller, Oriental fruit fly, Oriental fruit moth, peach twig borer, pink bollworm, spruce budworm (Eastern), stored product moths (almond, Indian meal, Mediterranean flour, raisin, tobacco), tomato pinworm, warehouse and Khapra beetle.
From Consep, Inc.
See Pesticide Dictionary.

Biorational Pesticides

Microbial pest control agents such as viruses, bacteria, protozoa, fungi, and biochemical pest control agents, either naturally occurring or identical to a natural product that exerts a pesticidal activity.

BioSafe*-N

Naturally occurring beneficial nematodes *Steinernema carpocapsae* for control of black vine weevil, strawberry root weevil, and cranberry girdler in cranberries.
From biosys.
See *Steinernema carpocapsae*.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

Biotrol VHZ* (Discontinued 1991 by Zoecon Corp.)

Viral insecticide.

See Heliothis Nuclear Polyhedrosis Virus.

BioVector* Biological Insecticide

Beneficial nematodes, *Steinernema carpocapsae*. Formulations include: Citrus for control of larval stages of sugarcane rootstalk borer and bluegreen weevil in citrus groves; artichoke plume moth in artichokes; Mint for control of mint root borer, black vine weevil, strawberry root weevil and mint flea beetle in peppermint and spearmint fields; Vegetable for control of larval stages of billbugs, cucumber beetles, cutworms, flea beetles, rootworms, artichoke plume moths and fungus gnats, *Bradysia* spp., when applied to container or field grown vegetable plantings.

From biosys.

See *Steinernema carpocapsae*.

Blackhole* Rodent Trap

See SureFire*.

Blasticidin*

Antibiotic produced by fermentation of *Streptomyces griseochromogenes* that acts as a contact fungicide. Used mainly for control of *Piricularia oryzae*. Formulations include Blasticidin-S*.

From Kaken Pharmaceutical Co., Ltd.

Blasticidin-S*

See Blasticidin*.

See Pesticide Dictionary.

BMP 123

Bacillus thuringiensis var. *kurstaki*. High potency biological larvicide for control of lepidopterous insect larvae. Formulations include: Aqueous (32LC) 8000 international units (IU)/mg and (48LC) 10,750 (IU)/mg.; (64ES) 17,600 IU/mg; and wettable powder (2XWP) 32,000 (IU)/mg.

From Becker Microbial Products.

See *Bacillus thuringiensis* var. *kurstaki*.

BMP 123 (10G)

Bacillus thuringiensis var. *kurstaki*. Biological larvicide for control of corn borer and fall armyworms on corn. Granule formulation, 1600 international units (IU)/mg.

From Becker Microbial Products.

See *Bacillus thuringiensis* var. *kurstaki*.

BMP 144

Bacillus thuringiensis var. *israelensis*. Biological larvicide for blackfly and mosquito control. Formulations include: Granule for mosquito larvae (200G) 200 international toxic units (ITU)/mg.; and aqueous suspension for mosquito and blackfly larvae (2X) 1200 (ITU)/mg and (3X) 1800 (ITU)/mg.

From Becker Microbial Products.

See *Bacillus thuringiensis* var. *israelensis*.

BMP 144 Primary Powder

Bacillus thuringiensis var. *israelensis*. For manufacturing mosquito biological larvicide. Granule, 7000 international toxic units (ITU)/mg.

From Becker Microbial Products.

See *Bacillus thuringiensis* var. *israelensis*.

Bocep Viti*

Pheromone. Mating disruptant.

From BASF AG.

See RAK* 1 Plus.

Bracon hebetor

Kills larvae of lepidopterous pests in stored grain.

From ARBICO, Inc.; CALTEC Agri Marketing Services; Praxis.

Bracon mellitor

Braconid parasite of the boll weevil. This larval parasite is a predator of grain pests.

Braconid parasites

Entomophagus parasites of Hymenoptera order, Braconidae family. Typically attacks caterpillars, such as the tomato hornworm, catalpa sphinx, and others.

Brevicomin

Sex hormone, *exo-7-ethyl-5-methyl-6,8-dioxyabicyclo-[3.2.1]-octane*. Influences mating behavior of the western pine beetle.

Bug Time* (Discontinued 1984 by Biochem Products)

See *Bacillus thuringiensis* var. *kurstaki*.

BUG-SCAN*

Yellow glue traps for pest monitoring.

From BIOBEST N.V.

BUG-SCAN* B

Blue glue traps for pest monitoring.

From BIOBEST N.V.

Burst* Yield Booster* (Discontinued 1992 by Fermone Corp., Inc.)

Cytokinin which interacts with hormonal system affecting cell division and reproductive activity.

Calosoma sycophanta

Predatory beetle for control of muscoid flies and eggs.

From Praxis.

Carcinops pumilio

Predatory beetle for control of muscoid flies and eggs.

From Praxis.

Carpovirusine*

Cydia pomonella granulosis virus (CpGV) formulated as a liquid suspension of CpGV. Selective biological insecticide for control of codling moth on apples, pears, and walnuts.

From Calliope S.A.; N.P.P.

Casinaría arjuna

Wasp insect egg parasite for control of gypsy moth.

From Praxis.

Caterpillar Attack*

Bacillus thuringiensis var. *kurstaki*. Microbial insecticide.

From Ringer Corp.

See *Bacillus thuringiensis* var. *kurstaki*.

Cephalonomia waterstoni

Parasitic wasp for control of rusty grain beetle.

From Praxis.

Cerosporella ageratinae

Fungus introduced from Jamaica into Hawaii for control of the pamakani weed.

Certain* (Discontinued 1992 by Sandoz Agro, Inc.)

Bacillus thuringiensis var. *aizawai*. Microbial insecticide.

See *Bacillus thuringiensis* var. *aizawai*.

Ceuthorrhynchidius horridus

Beneficial beetle for control of musk thistle.

From Praxis.

Ceutorhynchus assimilis

Species of the insect family Curculionidae infected by the nematode *Neoplectana carpocapsae*, also *C. napae*.

Ceutorhynchus litura

Beneficial weevil for control of Canada thistle.

From Praxis.

Chalcid parasites

Entomophagus parasites (wasp) of Hymenoptera order, Chalcididae super-family. Example: *Trichogramma minutum*, known to attack 150 species of Coleoptera, Diptera, Hemiptera, Hy-

* — Trade Name/R/TM

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menoptera, Lepidoptera, and Neuroptera. Reared in enormous numbers and sold for biological control of such pests as the codling moth, Oriental fruit moth, and sugarcane borer.
See *Trichogramma* spp.

CheckMate* CM

Controls codling moth, *Cydia pomonella*, through mating disruption, in apples, pears, and walnuts. Manually applied dispenser containing codling moth pheromone, codlemone (6.883% a.i.). Each dispenser contains 105 mg of pheromone (a.i.).

From Consep, Inc.
See Pesticide Dictionary.

CheckMate* MRB (Discontinued 1994 by Consep, Inc.)

Controls Mexican rice borer, *Eoreuma loftini*, in sugarcane. Sprayable, controlled release granules containing Mexican rice borer pheromone (85.18% a.i.). Applied through ground and air application equipment. Was only available under EUP to cooperators in the approved EPA EUP program.

From Consep, Inc.
See Pesticide Dictionary.

CheckMate* OFM

Controls Oriental fruit moth, *Grapholita molesta*, through mating disruption, in peaches and nectarines. Hand applied dispenser containing Oriental fruit moth pheromone (10.31% a.i.). Each dispenser contains 180 mg of pheromone (a.i.). Amendment for additional crops and pests pending.

From Consep, Inc.
See Pesticide Dictionary.

CheckMate* PBW

Controls pink bollworm, *Pectinophora gossypiella*, through mating disruption, in cotton. Sprayable, controlled release granules containing pink bollworm pheromone, gossyplure (80.8% a.i.). Applied through conventional ground and air application equipment.

From Consep, Inc.
See Pesticide Dictionary.

CheckMate* TPW

Controls tomato pinworm, *Keiferia lycopersicella*, through mating disruption, in tomatoes. Hand applied dispenser containing tomato pinworm pheromone (2.93% a.i.). Each dispenser contains 48 mg of pheromone (a.i.).

From Consep, Inc.
See Pesticide Dictionary.

Chilocorus spp.

Beneficial beetles to control scale species.
From Praxis.

Chilocorus baileyi

Predator of oleander scale.

Chilocorus circumdatus

Predator of white louse scale.

Chokegard* (Discontinued by Scentry, Inc.)

Pheromone communication disruptant for artichoke plume moth.

Chrysolina quadrigemina

Beneficial beetle for control of St. Johnswort weed. Larvae feed on foliage near the crown. Adults feed on foliage near the crown and higher up on the stem.

From CALTEC Agri Marketing Services; Praxis.

Chrysoperla (Chrysopa) carnea/comanche/oculata/rufilabris (lacewings, aphid lions, golden eyes)

Predator in field crops, orchards, and greenhouses on a spectrum of soft-bodied hosts including aphids, caterpillar eggs/larvae, leafhopper nymphs, mealybugs, spider mites, scales, sweet potato and greenhouse whitefly, thrips, and whiteflies.

From ARBICO, Inc.; Harmony Farm Supply; Rincon-Vitova Insectaries, Inc.
See Green Lacewing; Lacewing.

Cide-Trak*

Insect sex pheromones/mating disruptants for control of agricultural insect pests by pheromone-mediated mating disruption utilizing controlled-release technology in pheromone dispensers.

From Trece, Inc.

ClandoSan*

Biological nematicide. Destroys harmful nematodes.

From Igene Biotechnology, Inc.

Classification of Insects and Mites

Insects and mites belong to the Phylum Arthropoda. More than 75% of all animals belong to this Phylum.

Phyla are divided into Classes. Insects make up the class Insecta. Mites are not insects and belong to the class Arachnida, which also includes spiders and ticks.

Classes are divided into Orders. For insects there are 24 or more orders, of which 8 are major: Lepidoptera (caterpillars, butterflies, and moths. Includes (corn earworm, cotton bollworm, armyworm and cabbage looper); Homoptera (aphid, scale, leafhopper and white fly); Coleoptera (beetles, Colorado potato beetle, flea beetle); Diptera (flies, leafminer, maggots); Thysanoptera (thrips, western flower thrips); Orthoptera (grasshoppers, crickets); Hemiptera (true bugs, plant bug, lace bug); Hymenoptera (wasps, ants, bees).

Orders are divided into Families. The family name is always found by adding the suffix "idae" to the stem of the name of the typical genus. For instance, the order Lepidoptera has many families of which the family Noctuidae includes many important crop pests like armyworms and bollworms.

Families are divided into Genera. Most families have a number of genera based on common characteristics.

Genera (genus) are divided into Species. Members of a species generally interbreed. Members of different species seldom crossbreed. All of the individuals of a species look alike, act alike, eat the same kind of food in the same manner, and are controllable in the same way. Every species is given a scientific name consisting of the genus name and the species name. Scientific names are written in Latin form. Example: The corn earworm/cotton bollworm species in the class Lepidoptera, family Noctuidae, genus and species *Heliothis zea*.

Coccidia

One of a group of organisms in the Phylum Protozoa, with round spores.

Coccophagus gurneyi

Chalcidoid parasite introduced from Australia into California to control citrus mealybug.

Coccophagus lycimnia

Parasitic wasp for control of various scale species.
From Praxis.

Coccygomimus disparis

Parasitic wasp for control of gypsy moth.
From Praxis.

Codlure*

Sex pheromone of the codling moth.

Codlemone*

Synthetic female sex hormone, 8,10-dodecadien-1-ol, used in codling moth baits.

See Pherocon* Insect Monitoring Systems.

Coleophora spp.

Beneficial moths for control of Russian thistle. Eggs are laid on leaves, and larvae mine down into stems.

From CALTEC Agri Marketing Services; Praxis.

Collego* (Discontinued 1993 by Ecogen, Inc.)

Select postemergent mycoherbicide. Contains spores of *Colletotrichum gloeosporioides* f. sp. *aeschyromene* for control of northern jointvetch.

See *Colletotrichum gloeosporioides*.
See Pesticide Dictionary.

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Colletotrichum gloeosporioides

Strain of the fungus *C. gloeosporioides* for control of northern jointvetch.
See Collego*.

Compel* CRW

Insect feeding stimulant as powder in adhesive mixture for use on corn rootworms.
From Ecogen Inc.

Condor*

Bacillus thuringiensis insecticide for control of Lepidopteran pests on a wide variety of crops. Major uses include: cotton for control of cotton bollworm and tobacco budworm; soybean for soybean looper; alfalfa for alfalfa caterpillar and armyworm; and tobacco for tobacco budworm.
From Ecogen Inc.
See Pesticide Dictionary.

Condor* G

Biological insecticide for control of European corn borer on corn in the U.S.
From Ecogen Inc.

Contact*

Pink bollworm pheromone.

Cotesia marginiventris

Larval parasite which attacks cabbage looper, fall armyworm, and *Helicoverpa* spp.
From ARBICO, Inc.; CALTEC Agri Marketing Services; Praxis.

Cotesia melanoscela

Parasitic wasp for control of gypsy moth.
From Praxis.

Cotesia plutella

Diamondback moth parasite.
From ARBICO, Inc.; CALTEC Agri Marketing Services; Praxis.

Cotesia spp.

Parasitic wasps for control of various insects.
From Praxis.

Cryptolaemus montrouzieri (Muisant) "Crypts"

Coccinellid beetles known as "mealybug destroyers." Attacks all species of aboveground mealybugs on citrus, grapes, and ornamentals. Both larvae and adults consume mealybugs, as well as aphids, whitefly scales, and soft scales when mealybugs are not present. Works best with high populations of mealybugs and temperatures of 70-80°F.

From ARBICO, Inc.; Agri-Pharm International, Inc.; CALTEC Agri Marketing Services; G.B. Systems Inc.; Harmony Farm Supply; Hydro-Gardens, Inc.; IPM Laboratories, Inc.; Natural Pest Controls; Praxis; Rincon-Vitova Insectaries, Inc.

Cryptolaemus-System*

Biological control of mealy bugs.
From BIOBEST N.V.

Cuelure*

Melon fruit fly lure used in federal and state programs in the U.S.
From Agri-Pharm International, Inc.; Russell Fine Chemicals Ltd.
See Pesticide Dictionary.

Cue-Lure (Q-Lure)

A chemical, p-acetoxyphenethyl methyl ketone, that acts as food lure for melon fly.
From Agri-Pharm International, Inc.

Cutlass*

Biological insecticide, *Bacillus thuringiensis* var. *kurstaki*, for control of lepidopteran pests on a wide variety of crops. Major uses include: vegetables, nuts, trees and vines for control of diamondback moth, beet armyworm, cabbage looper, peach twig borer, and leaf-roller.

From Ecogen Inc.

See *Bacillus thuringiensis* var. *kurstaki*.

See Pesticide Dictionary.

Cyclophenol

Natural toxin produced by fungi. Kills the same fungi that caused the Irish potato famine of the 1840s.

Cyd-X*

Naturally occurring insect virus for the control of codling moth larvae. Formulated as a liquid concentrate. Registration pending in the U.S.

From InStar Products, Div. of Crop Genetics International.

Cytex*

Plant growth regulator containing mixed cytokinins, mostly zeatin-like.

From Atlantic & Pacific Research Inc.

See Pesticide Dictionary.

CytoFe*

See Cytokinins.

CytoGro*

See Cytokinins.

Cytokin*

See Cytokinins.

Cytokinins

Group of plant growth regulators containing naturally occurring adenine and zeatin, and synthetic kinetin and adenine.

From Plant BioTech, Inc. (Arise*, CytoFe*, CytoGro*, Cytokin*, CytoPlex*, Jump* Plant Regulator, Jump Start* Seedling Booster, XTRA* Blossom Set).

Cytoplasmic Polyhedrosis Viruses (CPV)

Insect pathogenic viruses that infect the cytoplasm of the midgut epithelium of lepidopteran larvae.

CytoPlex*

See Cytokinins.

D-125* (Discontinued 1993 by Microgen, Inc.)

Viruscide, fungicide, bactericide, deodorizer, detergent, cleaner, sanitizer and mildstat. USDA (E-2) registration number 61178-1.

Dacnusa siberica

Most widely used leafminer parasite for greenhouse crops.

From ARBICO, Inc.; Gerhart, Inc. (Minex*); Natural Pest Controls; Praxis.

Dacnusa-System*

Biological control of leafminers.
From BIOBEST N.V.

Dagger* G (Discontinued by Ecogen Inc.)

Pseudomonas fluorescens bacteria for control of *Pythium* and *Rhizoctonia* and damping-off seedling diseases in cotton.

Dahlbominus fuscipennis

Ichneumonid parasitoid of the European spruce sawfly.

Decoy*

Entrapped gossypure pheromone in sprayable formulation, which releases pheromone over 14-21 day period, for disruption of adult pink bollworm moths in cotton. Can be used alone or tank mixed with a variety of insecticides.

From AgriSense, Div. of biosys; AgriSense-BCS Ltd., Sub. of biosys.; Monterey Chemical Co.

Decyde* (Discontinued by MicroGeneSys, Inc.)

Selective microbial insecticide effective against codling moth, *Cydia pomonella* (L).

See Pesticide Dictionary.

* — Trade Name/R/TM

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Degree Days

One method for deciding when to begin sampling for insect pests. Degree days represent the accumulation of heat units above a minimum temperature for a 24-hour period. Below this temperature, no insect development occurs; above this temperature, development occurs. Example: 4° above the minimum for 5 days equals 20 degree days, as does 2° above the minimum for 10 days. Insect development would be the same in both cases. By adding degree days over time, you can determine when an insect has reached a certain growth stage. Degree days are used in pest management programs to time the scouting of insect pests.

Deladenus spp.

A nematode genus with species parasitic to woodwasps, their parasitoids, and bark weevils.

Delphastus pusillus

Beneficial black ladybird beetle for several whitefly species, notably sweet potato whitefly control (*Bemisia tabaci*) and greenhouse whitefly (*Trialeurodes vaporariorum*).

From ARBICO, Inc.; Harmony Farm Supply; Hydro-Gardens, Inc.; IPM Laboratories, Inc.; Praxis; Rincon-Vitova Insectaries, Inc.

Delphastus-System*

Biological control of greenhouse and tobacco whiteflies. From BIOBEST N.V.

Delta Trap*

Trap for field and orchard lepidoptera insects. From Russell Fine Chemicals Ltd.

Deluxe Yellow Jacket Trap

See Surefire*.

Denka-Flylure*

Sex and aggregation pheromone for *musca domestica*. Fly attractant.

From Denka International B.V.
See Muscalure.

Deraeocoris brevis

Predatory bug of pear psylla (*Psylla pyricola*) on pears. From Rincon-Vitova Insectaries, Inc.

Design*

Transconjugated strain of *Bacillus thuringiensis* var. *aizawai* used to control lepidoptera in cotton and soybeans.

From Ciba.
See *Bacillus thuringiensis* var. *aizawai*.

DeVine* (Discontinued 1993 by Abbott Laboratories)

Phytophthora palmivora. Biological herbicide for control of *Morrena odorata*, strangler or milkweed vine, in citrus groves. See Pesticide Dictionary.

Diadegma insulare

Parasitic wasp for diamondback moth control. From ARBICO, Inc.; CALTEC Agri Marketing Services; Praxis.

Diaretiella rapae

Parasite that kills aphids by mummification. From ARBICO, Inc.; Praxis.

Diglyphus isaea

Leafminer parasite commonly used in greenhouse tomatoes. From ARBICO, Inc.; Harmony Farm Supply; Natural Pest Controls; Praxis.

Diglyphus-System*

Biological control of leafminers. From BIOBEST N.V.

DiPel*

Bacillus thuringiensis var. *hurstaki*. Biological insecticide to control specific caterpillars/larvae of lepidopterous insects. From Abbott Laboratories.

See *Bacillus thuringiensis* var. *hurstaki*.

Disparlure

Sex hormone cis-7-8-epoxy-2-methyloctadecane. Influences gypsy moth mating behavior.

From Agri-Pharm International, Inc.
See Pesticide Dictionary.

Disposable Sticky Whitefly Trap

See SureFire*.

Doom*

See Milky Disease Spores.
See Pesticide Dictionary.

Dorsilure*

Lure which attracts Oriental fruit fly. From Russell Fine Chemicals Ltd.

Drinio bohémica

Tachinid parasitoid of the European spruce sawfly.

Ecomask*

See *Steinernema carpocapsae*.

Ectoparasitoid

Parasitoid that feeds on the host externally.

Edovum puttleri

Wasp parasite for control of Colorado potato beetle and Mexican bean beetle.

From Praxis.

Encarsia formosa

Parasitoid of greenhouse whitefly (*Trialeurodes vaporariorum*) and sweet potato whitefly.

From A-1 Unique Insect Control; ARBICO, Inc.; Better Yield Insects; G.B. Systems Inc. (Enstrip*); Harmony Farm Supply Hydro-Gardens; Inc., IPM Laboratories, Inc.; Natural Pest Controls; Nature's Control; Praxis; Rincon-Vitova Insectaries, Inc.

Encarsia-System*

Biological control of whitefly. From BIOBEST N.V.

Encyrtidae

Family of parasitic wasps that attack whiteflies and other pests.

Endoparasitoid

Parasitoid that feeds within the host.

EnGarde* (Discontinued 1992 by Microgen, Inc.)

Broad-spectrum disinfectant for control of bacteria, mold, and viruses.

Enstrip*

See *Encarsia formosa*.

Entomogenous Nematodes

Parasitic nematodes that attack the larvae of harmful insects. Being tested to control the sciarid fly, a major insect pest in mushroom farming.

Entomophagus Insects

Insects that eat or devour other insects. May act as a predator or parasite.

Entomophagus Parasites

Insects that parasitize other insects: e.g., tachinid flies; Ichneumon wasps; Braconid wasps; Chalcid wasps.

Entomophthora

Fungus genus that contains many species that induce diseases in aphids, scales, and certain other insects.

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- Entomophthora gammae**
Microbial agent of entomogenous fungi that affects the larvae of the soybean looper.
- Epiphytotic**
An epidemic or rapid spread of disease among plants.
- Eretomocerus californicus**
Parasitic wasp for control of the sweet potato whitefly.
From Praxis.
- Ergostim***
L-cysteine derivatives and folic acid in stabilized buffered solution for use as a plant growth regulator.
From ISAGRO S.p.A.
See Pesticide Dictionary.
- Erynia radicans**
Fungus being tested on balsam fir trees to kill spruce budworms.
- Eugenol**
Insect attractant derived essentially from clove oil.
From Agri-Pharm International, Inc.
See Pesticide Dictionary.
- Euseius spp.**
Predator mites for control of whitefly egg scale, and various species of red mites.
From Praxis.
- Exenterus claripennis**
Ichneumonid parasitoid of the European spruce sawfly.
- Exenterus vellicatus**
Ichneumonid parasitoid of the European spruce sawfly.
- Feeding Stimulants**
Chemicals that induce insects to feed more aggressively.
- Fire Mite**
Natural enemy of fire ants and other ants.
From CALTEC Agri Marketing Services.
- FLITeTRAK***
Insect attractants and monitoring systems, jointly developed with USDA. Composed of polymeric dispensers with highly active pheromone or food attractants in high capture trap for detecting, surveying, and monitoring of the following beetles in stored products and commodities: FLITeTRAK M* for flour (red/confused), sawtoothed, merchant grain, Khapra, and warehouse beetles; and FLITeTRAK CB* for cigarette beetle. Reusable systems available.
From Trece, Inc.
- FLITeTRAK CB***
See FLITeTRAK*.
- FLITeTRAK M***
See FLITeTRAK*.
- Fly Bar***
Insect barrier for intake vents on greenhouses.
From Hydro-Gardens, Inc.
- Fly Parasites**
Pteromalid wasps that parasitize several species of filth-breeding fly species which are commonly associated with animal manure accumulations. Several species are mass cultured for use in poultry and egg farms, cattle feed lots, horse stalls and other farm animal housings.
From A-1 Unique Insect Control; Beneficial Insectary; Harmony Farm Supply; Natural Pest Controls.
- Fly Predators**
Tiny beneficial insects for control of manure and filth breeding pest flies.
From Spalding Laboratories.
- Fly Scoop* Indoor Fly Trap**
See Surefire*.
- Foil***
Biological insecticide for control of Colorado potato beetle and European corn borer on potatoes, tomatoes, and eggplant.
From Ecogen Inc.
- Foil* BFC**
Bacillus thuringiensis insecticide for control of Colorado potato beetle and European corn borer on potatoes, tomatoes, and eggplant.
From Ecogen Inc.
- Foliar Triggrr***
Mixed cytokinins used as a plant growth regulator.
From Westbridge Agricultural Products.
See Pesticide Dictionary.
- Foray* 48B**
Microbial insecticide. *Bacillus thuringiensis* var. *hurstaki*. Controls forestry lepidopteran pests/gypsy moth, spruce budworm.
From Novo Nordisk Bioindustrials, Inc.
See *Bacillus thuringiensis* var. *hurstaki*.
- Fresca Table Grape Preserver Pad* (SO₂) (Discontinued 1993 by Bactec Corp.)**
For control of postharvest decay (*Botrytis cinerea*).
- Frontalin**
Sex hormone 1,5-dimethyl-6-8-dioxyabicyclo-[3.2.1]-octane. Influences southern pine beetle mating behavior.
- Fruit Tree Pest Trap**
See SureFire*.
- Frutiver***
Triacylglycerols highly hydrogenated from soybeans, for waxing perishable crops.
From CEQSA Especialidades Quimicas S.A.
- F-Stop* (Discontinued 1993 by Eastman Kodak Co.)**
Fungicide which contains spores of *Trichoderma harzianum*. Applied directly to seeds or as seed coating and pelleting materials. Compatible with most insecticides used on seeds.
- Fungus/Fungi**
Anatomically simple plants without stems, leaves, flowers or chlorophyll. These plants belong to a group called Mycophytes, the lowest group in the plant kingdom.
See Pesticide Dictionary.
- Fuscuropoda vegetans**
Predator mite for control of muscoid fly eggs.
From Praxis.
- Futura***
Bacillus thuringiensis var. *hurstaki*. Microbial insecticide.
From Novo Nordisk Bioindustrials, Inc.
See *Bacillus thuringiensis* var. *hurstaki*.
- Galandromus (Metaseiulus) occidentalis/longipes**
Pale colored predator mite for spider mite control in corn, grapes, tomatoes (russet mite), and ornamentals. Tolerant to some pesticides, well-adapted for orchard and outdoor use and in greenhouse or hot situations where humidity remains above 50%. *Galandromus longipes* tolerates lower humidity.
From ARBICO, Inc.; CALTEC Agri Marketing Services; Harmony Farm Supply; IPM Laboratories, Inc.; Natural Pest Controls; Praxis; Rincon-Vitova Insectaries, Inc.
- Galltrol-A***
Agrobacterium radiobacter (strain 84). A preplant prevention of crown gall infection on stems and roots of certain fruits, nuts, vines, and ornamentals.
From AgBioChem, Inc.
See Pesticide Dictionary.

* — Trade Name/R/TM

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1

GBM Rope* (Discontinued 1993 by Biocontrol Ltd.)

Insect sex pheromone for mating disruption control of grape berry moth.
See Isomate-GBM*.

Geolaelaps spp.

Predator mite for control of the fungus gnat.
From Praxis; Rincon-Vitova Insectaries, Inc.
See *Hypoaspis* spp.

Glyptapanteles spp.

Parasitic wasps for control of gypsy moth.
From Praxis.

Glyptolapis confusca

Predator mite for control of muscoid fly.
From Praxis.

Gnatrol*

Bacillus thuringiensis var. *israelensis*. Serotype H-14. Biological insecticide, applied as soil drench to kill larval stage of the fungus gnat. For use in greenhouses on mushrooms and ornamentals.
From Abbott Laboratories.
See *Bacillus thuringiensis* var. *israelensis*.

Goniozus legneri

Parasitic wasp of navel orangeworm (*Amyelois transitella*) for use on almonds and walnuts.
From ARBICO, Inc.; CALTEC Agri Marketing Services; Praxis; Rincon-Vitova Insectaries, Inc.

Gossy lure*

Hexadecadienyl acetate used in trapping pink bollworm.
From Agri-Pharm International, Inc.
See Gossyplure.
See Pesticide Dictionary.

Gossyplure

Sex pheromone, cis, cis-and cis-trans-7, 11-hexadecadienyl acetate. Affects the mating behavior of the pink bollworm.
See Pesticide Dictionary.

Grandlure

Boll weevil sex attractant.
From Agri-Pharm International, Inc.
See Pesticide Dictionary.

Granulosis Viruses (GV)

Insect pathogenic viruses that infect several lepidopterous larvae.

Grasshopper Attack* (Discontinued 1993 by Ringer Corp.)

Nosema locustae Canning. Selective biological insecticide.
See *Nosema locustae* Canning.

Grasshopper Spore* (Discontinued 1987 by Reuter Laboratories)

Nosema locustae Canning. Biological selective insecticide.
See *Nosema locustae* Canning.

Green Lacewing (Chrysopidae)

Larva of the adult lacewing, known as "aphid lion" because of its voracious appetite. Injects paralyzing venom into its prey.
From A-1 Unique Insect Control; ARBICO, Inc.; Beneficial Insectary; Natural Pest Controls; Nature's Control.
See *Chrysoperla carnea/comanche/oculata/rufilabris*; Lacewing.

Gregarina

One of a group of protozoans that are parasitic in insects, worms, crustaceans and other invertebrates. Spores are navicular, or boat shape.

Grub Attack* (Discontinued 1993 by Ringer Corp.)

Bacillus popilliae dutky (Milky Spore Powder). Selective bacterial insecticide for Japanese beetle larvae and grubs, certain May and June beetle grubs and grubs of the Oriental beetle and Rose chafer.
See Milky Spore Powder.

Guardian*

Steinernema feltiae (Mexican strain) parasitic nematode for wax moth larvae and certain mosquito larvae. Kills over 250 types of insect larvae in the soil.
From Hydro-Gardens, Inc.

Gusano*

Naturally occurring insect virus for the control of various caterpillar pests. Formulated as a wettable powder. Registered in the United States.
From InStar Products, Div. of Crop Genetics International.

Gyplure

Gypsy moth attractant.
See Pesticide Dictionary.

Gypsy Moth Trap

See SureFire*.

Gypsy Moth Virus* (Discontinued 1986 by Reuter Laboratories)

Viral insecticide specific for *Lymantria dispar*.
See Pesticide Dictionary.

Gyptol*

Gypsy moth attractant.
See Pesticide Dictionary.

Heliothis Nuclear Polyhedrosis Virus

Viral insecticide specific for *Heliothis* larvae.
See Pesticide Dictionary.

Hemisarcoptes malus

Mite predator considered a major factor in regulating density of oystershell scale in apple orchards in Quebec, Canada.

Hempa

Experimental insect chemosterilant.
See Pesticide Dictionary.

Hercon*

Patented laminated multi-layered dispensers of insect pheromones, attractants, and/or insecticides.
From Hercon Environmental Co.

Hercon* Disrupt*

Multi-layered release insect pheromone dispenser. Aircraft applied for control of pink bollworm, gypsy moth, artichoke plume moth, western pinestem borer, and spruce budworm.
From Hercon Environmental Co.
See Pesticide Dictionary.

Hercon* Disruptape*

Multi-layered controlled release insect pheromone dispenser. Manually applied as mating disruptant.
From Hercon Environmental Co.

Hercon* Lure N Kill* American Cockroach and Ant Killer

See Hercon* Lure N Kill* Killing Station*

Hercon* Lure N Kill* Boll Weevil

See Hercon* Lure N Kill* Killing Station*

Hercon* Lure N Kill* Killing Station*

Multi-layered controlled release dispenser. Contains an attractant which combines insecticide and insect pheromones/attractants in a protected inner reservoir. Formulations for American cockroach and boll weevil.
From Hercon Environmental Co.

Hercon* Lure N Kill * Traps

Selective adult insect trap and synthetic pheromone lure kits. For monitoring, detecting, surveying, and controlling pink bollworm, boll weevil, medfly, Japanese beetle, gypsy moth, Nantucket pine tip moth, and several others.
From Hercon Environmental Co.
See Pesticide Dictionary.

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Hercon* Luretape*

Multi-layered controlled release insect pheromone dispenser. For surveying, monitoring, mass trapping, and detection of target insects, including: gypsy moth, Nantucket pine tip moth, boll weevil, corn earworm, tobacco budworm, codling moth, peachtree borer, and several other vegetable, forest, and fruit insect pests.

From Hercon Environmental Co.
See Pesticide Dictionary.

Heterorhabditis bacteriophora

Highly aggressive parasitic nematode that infests the Japanese Beetle, and many other pests.

From ARBICO, Inc.; Hydro-Gardens, Inc. (Lawn Patrol*).

Heterorhabditis spp.

Species of this nematode genus act as obligate parasites of insects. *H. heliothis* attacks a wide variety of insects but lepidopterous larvae appear most susceptible.

From Ecogen, Inc.; Harmony Farm Supply; Praxis.

Heterotylenchus spp.

Species of this genus of nematodes parasitize flies and beetles.

Hexadienyl isobutyrate

Insect attractant for yellow jackets.

See Pesticide Dictionary.

Hexalure*

Synthetic sex attractant.

From Agri-Pharm International, Inc.

See Pesticide Dictionary.

Hi Coat*

Rhizobium bulk pre-inoculation system for legume crop seed.

From MicroBio Limited.

Flow* (Discontinued 1993 by Agricultural Genetics Co., Ltd.)

Granulation *Rhizobium* inoculant for legume crops during in-furrow application at planting.

HiStick*

Rhizobium inoculants, used for legume crops, based on a sterile peat carrier incorporating a sticking agent for application to the seed at planting.

From MicroBio Limited.

Hippodamia convergens Guerin-Meneville

The most universally applied beneficial insect. Typical of many species of Coccinellidae beetles that are generalist predators of aphids and other soft-bodied insects.

From A-1 Unique Insect Control; ARBICO, Inc.; CALTEC Agri Marketing Services; Harmony Farm Supply; Hydro-Gardens, Inc.; IPM Laboratories, Inc.; Natural Pest Controls; Nature's Control; Praxis.

See Lady beetle (Ladybug).

Hippodamia-System*

Biological control of aphids.

From BIOBEST N.V.

Hollow Microtube Dispensers (Discontinued 1993 by Scentry Inc.)

Plastic microtube capillaries closed at one end and filled with a synthetic insect pheromone, or similar chemical insect attractant.

Hopper Stopper* (Discontinued 1991 by Sandoz Crop Protection)

Nosema locustae Canning. Biological insecticide.

See *Nosema locustae* Canning.

Howardula benigna

Nematode that parasitizes *Diabrotica* adult beetles.

Hyles euphorbiae

Predator moth for control of spurge weed.

From Praxis.

Hyperparasites

Parasites whose hosts are also parasites.

Hyperparasitoids

Parasitoids that attack other parasitoids.

Hypoaspis (Geolaelaps) spp.

Fungus gnat predatory mite which inhabits the top layer of soil. Females lay their eggs in the soil. Nymphs and adults feed on small soil dwelling insects, including fungus gnat larvae, springtails, and thrips pupae.

From ARBICO, Inc.; Harmony Farm Supply; IPM Laboratories, Inc.

See *Geolaelaps* spp.

Ichneumon Parasite

Entomophagous parasite (wasp) of Hymenoptera order, Ichneumonidae family.

Ichneumonid Parasitoid

Parasitoid of the Ichneumonidae insect family.

InCide* (Discontinued 1994 by Crop Genetics International)

Microbial seed inoculant. Controls corn borer on field and sweet corn.

Inoculative Releases

Infrequent releases made to re-establish a species of a natural enemy.

InStar* (Discontinued 1994 by Crop Genetics International)

Naturally occurring insect virus for the control of caterpillar pests.

Isomate*-C

Synthetic insect pheromone for control of codling moth in pome fruits.

From Biocontrol Ltd.

Isomate*-DBM

Synthetic insect pheromone for control of diamondback moth in cole crops.

From Biocontrol Ltd.

Isomate*-GBM

Synthetic insect pheromone for control of grape berry moth in vineyards. Former name: GBM Rope*.

From Biocontrol Ltd.

Isomate*-M

Synthetic insect pheromone for control of Oriental fruit moth in stone fruits.

From Biocontrol Ltd.

Isomate*-P

Synthetic insect pheromone for control of peach tree borer in orchards.

From Biocontrol Ltd.

Japanese Beetle Trap

See SureFire*.

Japidemic*

See Milky Disease Spores.

See Pesticide Dictionary.

Japonilure

Synthetic insect pheromone.

From Agri-Pharm International, Inc.

Javelin* WG

Bacillus thuringiensis var. *kurstaki*. Biological insecticide for use in vegetable, fruit, and field crops.

From Sandoz Agro, Inc.

See *Bacillus thuringiensis* var. *kurstaki*.

* — Trade Name/R/TM

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Jumbo Aphid/Whitefly Trap

See SureFire*.

Jump* Plant Regulator

See Cytokinins.

Jump Start* Seedling Booster

See Cytokinins.

Juvabione

A juvenoid formed in balsam fir which prevents insects from developing into adults.

Juvenile Hormone

Hormone produced by an insect in the process of its immature development which maintains its nymphal or larval form.

See Pesticide Dictionary.

Juvenoid

Chemical that mimics a juvenile hormone and prevents development of the adult insect.

Kairomone

Substance produced or acquired by an organism that, on contact with another species, induces a response favorable to that species. Example: The larval parasitoid *Microplitis croceipes* is stimulated into intensive searching behavior by kairomones found in the frass of *Helicoverpa zea*, *H. virescens*, and *H. subflexa*.

See Pesticide Dictionary.

Kodiak*

Biological fungicide, *Bacillus subtilis*, applied directly to seed. Contains bacteria which colonize the developing root system, competing with disease organisms that attack root systems. Suppresses disease caused by *Rhizoctonia* and *Fusarium*. As root system grows and matures, bacteria grows with the roots to extend protection until harvest. Formulations: Kodiak HB* applied to seed at planting; Kodiak Concentrate* applied with commercial treatment equipment.

From Gustafson, Inc.

See Pesticide Dictionary.

Kodiak HB*

See Kodiak*.

Konsume*

Natural bioenhancement adjuvant designed to be tank-mixed. Enhances control of lepidopterous insects such as beet armyworm, loopers, tomato fruitworm, corn earworm, tobacco budworm, cotton bollworm, sod webworm and various cutworms, as well as pests such as mole crickets, Colorado potato beetle and grasshoppers.

From Fermone Corp./Troy Biosciences, Inc.

Lacewing (*Chrysoperla carnea/comanche/oculata/rufilabris*) (lacewings, aphid lions, golden eyes)

Beneficial insect.

From A-1 Unique Insect Control; ARBICO, Inc.; Beneficial Insectary; CALTEC Agri Marketing Services; Hydro-Gardens, Inc.; IPM Laboratories, Inc.; Natural Pest Controls; Praxis.

See *Chrysoperla carnea/comanche/oculata/rufilabris*; Green Lacewing.

Lady beetle (Ladybug)

Beneficial insect for control of aphids, whitefly, and small insect eggs including caterpillars like corn earworm. Adult and larvae will feed on insects. Female deposits eggs in small yellow clusters under a leaf or stem. Within a week the eggs hatch into tiny alligator-shaped larvae that feed on many insect pests.

From A-1 Unique Insect Control; ARBICO, Inc.; CALTEC Agri Marketing Services; Hydro-Gardens, Inc.; IPM Laboratories, Inc.; Natural Pest Controls; Nature's Control; Praxis.

See *Hippodamia convergens* Guerin-Meneville.

Lady Bug Lure

See SureFire*.

Ladybug

See Lady beetle.

Larvo BT*

See Troy BT*.

Lawn Patrol*

See *Heterorhabditis bacteriophora*.

Leconteivirus*

Nuclear polyhedrosis virus product provisionally registered in Canada for control of redheaded pine sawflies.

Lemophagus crioceritor

Parasitic wasp for control of the asparagus beetle.

From Praxis.

Leptomastida enormis

Parasitic wasp for control of the mealybug.

From IPM Laboratories, Inc.; Praxis.

Leptomastix dactylopii

Parasitic wasp for control of the mealybug.

From ARBICO, Inc.; IPM Laboratories, Inc.; Praxis.

Leptopilina heterotoma

Parasitic wasp for control of various fruit fly species.

From Praxis.

Lesser Vine Sphinx

Biological control agent with reported activity against creeping waterprimrose.

Leucoptera spartifoliella

Beneficial moth for control of Scotch broom. Adults emerge and lay eggs on new growth. Larvae feed in stem tips.

From CALTEC Agri Marketing Services; Praxis.

Lindorus lophanthae

Small black ladybug used to help control scale pests. Most effective indoors.

From ARBICO, Inc.; Harmony Farm Supply; IPM Laboratories, Inc.; Praxis; Sepe Creek Insectary.

Locucide*

Nosema locustae Canning. Biological insecticide.

See *Nosema locustae* Canning.

Longitarsus jacobaeae

Predator beetle for control of tansy ragwort.

From Praxis.

Lydella thompsoni

Parasitic fly for control of European corn borer.

From Praxis.

Lysiphlebus testaceipes

Parasitic wasp for control of aphids.

From Praxis.

MABs

See Monoclonal Antibody.

Macrocentrus ancylivorus

Parasitic wasp for control of Oriental fruit moth.

From CALTEC Agri Marketing Services; Praxis.

Macrolophus-System*

Biological control of greenhouse and tobacco whiteflies.

From BIOBEST N.V.

Magnet*

Lures and traps for monitoring insect pests. Polymer entrapment system enables controlled time-release.

From AgriSense, Div. of biosys; AgriSense-BCS Ltd., Sub. of biosys.

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Mamestrin*

Mamestra brassicae nuclear polyhedrosis virus (MbNPV). Selective biological insecticide for control of *Trichoplusia* sp. (cabbage looper), *Helicoverpa* sp., *Diparopsis* sp., and *Phthorimaea operculella* (potato tuber moth).

From Calliope S.A.; N.P.P.

Mass Culture

Insectary propagation of large numbers of natural enemies for release against selected pests at strategic times.

Mastrap*

Pheromone insect attractant.

From ISAGRO S.p.A.

See Pesticide Dictionary.

Mating Confusants

Pheromones used to suppress mating by confusing male insects.

MCAs

See Monoclonal Antibody.

Medlure*

Lure which attracts Mediterranean fruit fly.

From Agri-Pharm International, Inc.; Russell Fine Chemicals Ltd.

See Pesticide Dictionary.

Mermis nigrescens

Nematode species that is mainly a parasite of grasshoppers.

Mermithids

Obligately parasitic nematodes. Most of their hosts are insects, but spiders, crustaceans, earthworms, leeches, and mollusks may also serve as hosts.

Metaphycus helvolus

Key parasitoid among several introduced for biological control of black scale (*Saissetia oleae*) and other soft scales. Near complete control accomplished.

From ARBICO, Inc.; Harmony Farm Supply; IPM Laboratories, Inc.; Natural Pest Controls; Praxis; Sespe Creek Insectary.

Metaseiulus occidentalis

See *Galandromus (Metaseiulus) occidentalis/longipes*.

Meteorus spp.

Wasp parasite for control of gypsy moth.

From Praxis.

Methiotepa*

Experimental insect chemosterilant.

See Pesticide Dictionary.

Methoprene

Insect growth regulator. Inhibits normal molting processes causing mortality or sterility of insects at or before the adult molt. For control of coleoptera, diptera, homoptera and siphonaptera.

See Pesticide Dictionary.

Methyl Eugenol

Chemical substance that acts as a food lure for Oriental fruit fly.

From Agri-Pharm International, Inc.

See Pesticide Dictionary.

Microbe

Microorganism so small that it can only be seen with a microscope, e.g., bacteria, protozoa, etc.

Microbial Control

Use of microorganisms or their by-products in the control of pests.

Microchelonus blackburni

Parasitic wasp for control of pink bollworm.

From Praxis.

Microlarinus lareynii

Beneficial puncture vine seed-feeding weevil. Adults lay eggs on new pods. Larvae feed and pupate in seed pods. May have 2-3 generations a year depending on temperature. Seed and stem-feeding weevils are in mixed populations.

From CALTEC Agri Marketing Services; Praxis.

Microlarinus lypriformis

Beneficial puncture vine stem-feeding weevil. Adults feed on leaves and underside of stems. Larvae feed and tunnel through stems. Adults are collected in mixed populations with seed-feeding weevils. Target weed is puncturevine seed.

From CALTEC Agri Marketing Services; Praxis.

Microplitis plutella

Parasitic wasp for control of diamondback moth.

From Praxis.

Microsporidia

One of a group of protozoans having oval elongate or crescent-shaped spores. Parasitic species are in the genera *Nosema*, *Thelohania*, and *Plistophora*.

Microsporidian

An entomopathogenic protozoan and an obligate parasite.

Microtunus aethiopoidea

Parasitic insect on adult stage of alfalfa weevil. *M. colesi* is also parasitic in this insect pest.

From Praxis.

Milky Disease Spores

Bacillus popilliae or *Bacillus lentimorbus*. Selective biological insecticide for Japanese beetle larvae and grubs, Oriental beetles, Rose chafers, and certain May and June beetles, including *Phyllophaga ancica*, *P. congrua*, *P. ephelida*, *P. fraterna* and *P. futilus*.

From Fairfax Biological Laboratory, Inc. (Doom*, Japidemic*).

See Pesticide Dictionary.

Milky Spore Powder

Bacillus popilliae dutky. Selective biological insecticide for Japanese beetle larvae and grubs, certain May and June beetle grubs, and grubs of the Oriental beetle and Rose chafer.

See Pesticide Dictionary.

Minex*

Most widely used leafminer parasite for greenhouse crops.

From G.B. Systems, Inc.

See *Dacnusa sibirica*.

M-One* (Discontinued 1992 by Mycogen Corp.)

Bacillus thuringiensis var. *tenebrionis*. Biological insecticide for control of several beetle species in the order Coleoptera.

Monoclonal Antibody (MABs/MCAs)

Highly specific, purified antibody that is derived from only one clone of cells and recognizes only one antigen. Monoclonal antibodies are being tested as diagnostic tools for plant diseases.

See Pesticide Dictionary.

Mormon Cricket Spore* (Discontinued 1987 by Reuter Laboratories)

Nosema locustae Canning. Biological insecticide.

See *Nosema locustae* Canning.

Mosquito Attack* (Discontinued 1993 by Ringer Corp.)

Bacillus thuringiensis var. *israelensis*. Microbial insecticide.

See *Bacillus thuringiensis* var. *israelensis*.

M-Peril*

Bioinsecticide. Ready-to-use sand core granular formulation of delta endotoxin of *Bacillus thuringiensis* var. *kurstaki* encapsulated in killed *Pseudomonas fluorescens*. Controls European corn borer, southwestern corn borer, fall armyworm and tobacco budworm.

From Mycogen Corp.

See *Bacillus thuringiensis* var. *kurstaki*.

* — Trade Name/R/TM

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M-Trak*

Bioinsecticide. Delta endotoxin of *Bacillus thuringiensis* var. *tenebrionis* encapsulated in killed *Pseudomonas fluorescens*. Controls Colorado potato beetle on eggplant, tomato, and potato; elm leaf beetle; and other selected leaf beetles on shade and ornamental trees.

From Mycogen Corp.

See *Bacillus thuringiensis* var. *tenebrionis*.

Musca lure

Sex and aggregation pheromone for *Musca domestica*.

From Agri-Pharm International, Inc.

See Denka-Flylure*.

See Pesticide Dictionary.

Muscidifurax raptor (Gir.)/raptorellus/zaraptor (Kogan & Legner)

Various mixes of these parasitoids are marketed for poultry egg farms, dairies, cattle feed lots, horses (breeding farms and race tracks) and other farm animals kept in pens where wastes accumulate.

From A-1 Unique Insect Control; ARBICO, Inc.; Beneficial Insectary; Natural Pest Controls; Rincon-Vitova Insectaries, Inc.

MVP*

Bioinsecticide. Delta endotoxin of *Bacillus thuringiensis* var. *kurstaki* encapsulated in killed *Pseudomonas fluorescens*. Controls certain caterpillar pests on berries, canola, corn, peanut, nuts, soybean, fruits, vegetables, cotton, tobacco, turf and ornamentals. Labeled for chemigation application.

From Mycogen Corp.

See *Bacillus thuringiensis* var. *kurstaki*.

Mycar* (Discontinued 1991 by Abbott Laboratories)

Hirsutiella thompsonii. Fungus that kills citrus red mites.

See Pesticide Dictionary.

Mycostop* (Streptomyces griseoviridis)

Biofungicide based on naturally occurring microbe for control of fungal plant diseases in various ornamentals and greenhouse-grown vegetables. Controls *Fusarium* wilts, damping-off diseases caused by *Alternaria* sp., and stem and root rot caused by *Phomopsis* spp. Has also shown suppression on *Botrytis* gray mold and *Phyium* and *Phytophthora* root rots.

From Kemira Agro Oy; Hydro-Gardens, Inc.

Mycotal*

Verticillium lecanii (Zimmermann) Viegas is a Deuteromycele of the family Moniliaceae for the control of whitefly with a side-effect on thrips on protected crops only. Not registered in the U.S. Registered in the Netherlands, the U.K. and Switzerland. Registration applied for in Jordan, Sri-Lanka and Denmark.

From Koppert B.V.

See Pesticide Dictionary.

Mylox* (Discontinued 1993 by Cumberland International Corp.)

Homogenized sulfur plus the appropriate compatible mite pheromone.

See Pesticide Dictionary.

Nasonia vitripennis (Walker)

Various mixes of these parasitoids are marketed for poultry egg farms, dairies, cattle feed lots, horses (breeding farms and race tracks) and other farm animals kept in pens where wastes accumulate.

From ARBICO, Inc.; Beneficial Insectary; Harmony Farm Supply & Nursery; Natural Pest Controls.

Nature*

Pheromone monitoring system for lepidopteran insects.

From Russell Fine Chemicals Ltd.

Natural Control Agents

Predators, parasites, nematodes, protozoa, fungi, bacteria, and viruses.

Neem

Neem leaves have been used as a natural insect antifeedant and repellent in Africa, South and East Asia, and India. Natural biologically active compounds extracted from kernels of Neem have been known since ancient times to be toxic to insects. Neem kernels' antifeedant and growth inhibition activity is due to triterpenoids present in the neem kernels, of which *azadirachtin* is the most potent.

See *Azadirachtin*.

Nemasys*

Insect parasitic nematodes (*Steinernema feltiae*) in a dispersible clay formulation used as a biological insecticide against larvae of fungus gnats.

From BIOBEST N.V.; MicroBio Limited.

See *Steinernema feltiae*.

Nemasys H*

Insect parasitic nematodes (*Heterorhabditis megidis*) in a dispersible clay formulation used as a biological insecticide for control of vine weevil larvae.

From BIOBEST N.V.; MicroBio Limited.

See *Heterorhabditis* spp.

Nemesis* CRW (Discontinued 1993 by Biocontrol Ltd.)

Attractant for adult corn rootworm beetles to a toxic bait containing a feeding stimulant.

See Slam*.

Neogregarines

An entomopathogenic protozoan and an obligate parasite.

Neoplectana spp.

Genus of the nematode family Steinernematidae, containing numerous members used as biological control agents. Species of this genus are associated with parasitism of armyworm, bionid flies, corn earworm, and Japanese beetle. *N. carpocapsae* known to parasitize wax moth larvae and certain mosquito larvae (*Galleria mellonella*). Natural infection by *N. carpocapsae* has been found in certain species of the insect orders Coleoptera, Diptera, and Lepidoptera. Experimental infections have been successful in many species of these insect groups.

From Beneficial Insectary.

Neoseiulus spp.

Predatory mite for control of cyclamen mites, European red mites, spider mites, thrips, and various species including Willamette mites.

From Harmony Farm Supply; IPM Laboratories, Inc.; Praxis.

Neoseiulus (Amblyseius) californicus

Predatory spider mite that consumes various species, including Willamette in greenhouses, corn, ornamentals, and interiorscapes. It lives longer at lower host densities than other predatory mites. Species needs a minimum of 60% humidity and temperatures up to 90°F.

From ARBICO, Inc.; CALTEC Agri-Marketing Services; Harmony Farm Supply; Hydro-Gardens, Inc.; IPM Laboratories, Inc.; Natural Pest Controls; Rincon-Vitova Insectaries, Inc.

Neotylenchidae

Several species of this nematode family are considered important biological control agents.

Neuroptera

Insect order that includes lacewings.

N-FIX*

Bioprocess fermentation system used as a supplement with other fertilizers and herbicides.

From Agro Products, S.A.

NOLO-Bait* (Discontinued 1993 by Evans Biocontrol, inc.)

Selective biological insecticide.

See *Nosema locustae* Canning.

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NOLO-BB* (Discontinued 1993 by Evans Biocontrol, Inc.)

Selective biological insecticide.
See *Nosema locustae* Canning.

NOLOC* (Discontinued 1993 by Evans Biocontrol, Inc.)

Biological insecticide.
See *Nosema locustae* Canning.

NoMate* CM

Polymer matrix formulation of a pheromone mating disruptant for codling moth.
From Ecogen Inc.

NoMate* PBW MEC

Sprayable microencapsulated formulation for control of pink bollworm moths (*Pectinophora gossypiella*) in cotton.
From Ecogen Inc.
See Pesticide Dictionary.

NoMate* PBW Fiber

Hollow fiber formulation for control of pink bollworm moths (*Pectinophora gossypiella*) in cotton.
From Ecogen Inc.
See Pesticide Dictionary.

NoMate* PBW Spiral

Hand applied polymer matrix formulation for control of pink bollworm moths (*Pectinophora gossypiella*) in cotton.
From Ecogen Inc.

NoMate* TABM Spiral

Polymer matrix formulation of a pheromone mating disruptant for tufted apple bud moth control.
From Ecogen Inc.

NoMate* TPW Fiber

Pheromone mating disruptant for tomato pinworm control.
Former name: Attract'n Kill TPW*.
From Ecogen Inc.
See Pesticide Dictionary.

NoMate* TPW MEC

Water based microencapsulated sprayable formulation of a pheromone mating disruptant for tomato pinworm control.
From Ecogen Inc.

NoMate* TPW Spiral

Polymer matrix formulation of a pheromone mating disruptant for tomato pinworm control.
From Ecogen Inc.

Nomuraea rileyi

Naturally occurring entomogenous fungus that has been effective on the larval lepidopterous pest complex of soybean: green cloverworm, corn earworm, velvetbean caterpillar, and soybean looper.

Noninclusion Viruses

Insect pathogen viruses that are not enclosed within some type of inclusion body.

Norbac 84-C*

Agrobacterium radiobacter, strain K84, to control crown gall in stone fruits, cane berries, weeping cherries, euonymous, and clematis. May be applied as a dip or spray to seeds, bare-rooted transplants or cuttings.
From IPM Laboratories, Inc.
See *Agrobacterium radiobacter*.

Nosema locustae

Microsporidian (protozoan) that significantly reduces grasshopper populations when spores are applied in a wheat bran bait mixture. Most effective on grasshopper nymphs.
From Harmony Farm Supply; Hydro-Gardens, Inc.

Nosema locustae Canning

Biological, selective insecticide. This microsporidian pathogen infects only grasshoppers and Mormon crickets. Honey bees and beneficial organisms are not affected.
See Pesticide Dictionary.

Nosema spp.

Genus of protozoa having species known to infect the twospotted mite, tobacco budworm, red flour beetle, cotton bollworm, fall cankerworm, fall webworm, Indian meal moth, certain mosquito species, forest tent caterpillar, and certain other insects.

Novabac-3* (Discontinued 1985 by Biochem Products)

Bacillus thuringiensis var. *hurstaki*. Bacterial insecticide.
See *Bacillus thuringiensis* var. *hurstaki*.

Novodor*

Bacillus thuringiensis var. *tenebrionis*. Microbial insecticide. CAS: 68038-71-1. EPA: 58998-16. Controls Colorado potato beetle on potatoes, tomatoes, and eggplant; elm leaf beetle on shade trees and ornamentals.
From Novo Nordisk Bioindustrials, Inc.
See *Bacillus thuringiensis* var. *tenebrionis*.

N-Trap* Elm Bark Beetle (Discontinued 1993 by Scentry Inc.)

Pheromone attractant for European elm bark beetle (*Scolytus multistriatus*).
See Pesticide Dictionary.

Nuclear Polyhedrosis Viruses (NPV)

Insect pathogenic viruses. Most infect lepidopterous larvae.

Oberea erythrocephala

Weed predator beetle for control of leafy spurge.
From Praxis.

Obligate Parasite

Parasites that can live only as parasites, and usually only on one species of host.

Oblimone*

Insect attractant.
See Pherocon*.

Octomyomermis spp.

Genus of nematodes in the mermithid group containing at least two species, *O. muspratti* and *O. troglodytis*. Known to parasitize mosquitoes.

Ooencyrtus submetallicus

This insect is an egg parasite of stink bugs. Reported effective in laboratory studies but ineffective in the field.

Orfamone* (Discontinued 1986 by Zoecon Corp.)

Attractant for Oriental fruit moth.

Orfralure

Insect attractant.
See Hercon* Luretape*.

Orius insidiosus/tristicolor

Polyphagous predator, very susceptible to various chemical pesticides, with an adult lifespan of 3-5 weeks. *Orius* (minute pirate bug) has a preference for thrips larvae, but also kills adults; the higher the infestations, the greater the kill. It is recommended to combine with *Amblyseius cucumeris* when controlling thrips. Also controls aphids, lepidopterous eggs, lygus nymphs, mites, psyllids, scales, whiteflies, and first instar larvae of soft-bodied insects. *Orius* can be used preventively in pepper crops. Not recommended for use from September to April, due to short day length which reduces diapause (dormant state).
From ARBICO, Inc.; Harmony Farm Supply; Hydro-Gardens, Inc.; IPM Laboratories, Inc.; Praxis.

Orius-System*

Biological control of thrips.
From BIOBEST N.V.

* — Trade Name/R/TM

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Ornitrol* (Discontinued 1994 by Avitrol Corp.)

Chemosterilant chemically coated onto whole kernel corn for pigeon control.

See Pesticide Dictionary.

Ostramone

Insect attractant based on pheromone chemistry.

Otinem*

Beneficial nematode. Live infective third stage larvae of *Heterorhabditis bacteriophora* formulated in a wettable powder for control of black vine weevil, certain turf grass grubs, and other soil-borne insect pests.

From Ecogen, Inc.

See *Heterorhabditis* spp.

Otinem-S*

Beneficial nematode. Live infective third stage larvae of *Steinernema feltiae* formulated in a wettable powder for control of greenhouse sciarids and other fungus gnats, particularly *bradysia* and *lycoryella* species.

From Ecogen, Inc.

See *Steinernema feltiae*.

Outdoor House Fly Trap

See Surefire*.

Pachycrepoides vindemiae

Parasitoids marketed for poultry egg farms, dairies, cattle feed lots, horses (breeding farms and race tracks) and other farm animals kept in pens where wastes accumulate.

From Praxis.

Parasite

An organism that lives in or on a living plant or animal (called a host) and obtains all or part of its nutrients from it. A parasite is usually smaller than its host, and usually does not kill the host; however, under epidemic conditions the host may be killed. Tapeworms, lice, and fleas are parasitic animals. Rust, smut, mildew, dodder, and mistletoe are examples of parasitic plants.

Parasitoid

Although often placed in the parasite category, this organism is considered a special kind of predator, which usually completes development at the expense of a single host (prey) individual, i.e., internal, external, gregarious, etc. Requires only one host for development into a free-living adult.

Patasson luna

Parasitic insect on the egg stage of alfalfa weevil.

Pathogen

Agent, e.g., virus, fungus, protozoan, etc., capable of inducing disease.

See Pesticide Dictionary.

Pawpaw Extracts

Compounds derived from these common plants in the midwestern U.S. are used to combat nematodes, Mexican bean beetles, and mosquito larvae.

PB Rope*

Twist-type dispenser which releases gossypure over 45-70 day period. Used on cotton to control pink bollworm.

From Monterey Chemical Co.

Pediobius foveolatus

Wasps used to control Mexican bean beetle.

From ARBICO, Inc; Praxis.

Penfluron

Experimental chemosterilant and reproduction control agent for cotton boll weevil.

Pentalitomastix spp.

Navel orangeworm parasite.

From ARBICO, Inc; Praxis.

6-Pentyl-Pyrone

Derived from a fungus, this experimental substance inhibits the growth of *aspergillus flavus*, which under certain environmental conditions grows on grains and other field crops and produces a potent carcinogen.

Perillus bioculatus

Insect predator of Colorado potato beetle larvae.

From Praxis.

Periplanone B

Synthetic chemical that acts like the male attractant produced by the female American cockroach (*Periplaneta americana*).

Pest Barrier Glue

See SureFire*.

PGR-IV*

Gibberellic acid. Hormone-like compounds in nutrient solution to stimulate plant growth.

From Plant Growth Formulations, Inc.

Pheast*

Phagostimulant (feeding stimulant) to be mixed with conventional insecticides to encourage increased ingestion of that insecticide. Masks the repellency of synthetic pyrethroids and protects other sensitive biorationals, such as viral agents, from environmental degradation.

From Miller Chemical.

Phenology

The stage of development of an organism, especially as it relates to the accumulation of degree days, i.e., it may take an insect 200 degree days to reach the third instar.

Phenylpropanoids

Natural toxins which make up about 20% of seed oil of some kinds of carrots. Experimental. Small concentration of a carrot toxin used to prevent germination of ryegrass without impacting cucumber or radish seeds.

Pherocon* Insect Monitoring Systems

Traps and lures based on pheromone chemistry for monitoring, detecting, and surveying agriculturally important insect pests in orchard and field crops. Systems available for over 100 insect pests.

From Trece, Inc.

See Pesticide Dictionary.

Pheromone

Substance produced by an organism or synthesized, that induces one or several reactions in an organism of the same species.

See Pesticide Dictionary.

Pherotrapp* (Discontinued 1993 by Sandoz Ltd.)

Trap used in monitoring male tufted apple budworms.

Pheomycin

Antibiotic fungicide isolated from *Streptomyces* cultures. Used to prevent or cure rust of snap beans.

See Pesticide Dictionary.

Photoalexins

Self-defense toxins produced by cotton plants. May be generated more rapidly within a cotton plant's system by crossbreeding varieties which are most efficient in producing toxins.

Phrydiuchus tau

Beneficial weevil for control of Mediterranean sage. Adults feed on foliage and lay eggs in the fall. Larvae feed into the crown and roots of plants.

From CALTEC Agri Marketing Services; Praxis.

Phytopack* (Discontinued by Brinkman B.V. Co. and Buntings Biological Control Ltd.)

Sterile paper bag containing a number of adults together with a proportion of nymphal stages of the predator mite *Phytoseiulus*

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persimilis. When bag is opened, the adult and young predators will emerge and move through the crop seeking their prey.

See *Phytoseiulus persimilis*.

Phytoseiids

Predaceous mites. Species of phytoseiids have been reported as predators of certain pest mites on fruits: *Typhlodromus occidentalis*, *Amblyseius hibisci*, *Amblyseius stipulatus*, *Iphiseius degenerans*, and *Phytoseiulus persimilis*.

Phytoseiulus longipes

See *Phytoseiulus mesoseiulus*.

Phytoseiulus (longipes) mesoseiulus

Predatory spider mite, native to Africa, applied in greenhouses and interiorscapes for use on almonds, grapes, strawberries, and ornamentals. Thrives best in high humidity (up to 85°F); tolerates temperatures up to 100°F, and lower humidities (40% at 70°F). Requires more moisture as temperature increases.

From ARBICO, Inc.; Harmony Farm Supply; IPM Laboratories, Inc.; Natural Pest Controls; Rincon-Vitova Insectaries, Inc.

Phytoseiulus persimilis

Orange colored predator feeds voraciously on two-spotted mite and other spider mites (red spider) in the family Tetranychidae. Used in greenhouses, interiorscapes, and California coastal strawberries. Releases should be made when pest levels are low. Humidity of 60-90% necessary. This predator is not appropriate for use in hot, dry climates with temperatures above 90°F (35°C) and relative humidities below 40%.

From ARBICO, Inc.; Better Yield Insects; CALTEC Agri Marketing Services; Gerhart, Inc. (Spidex*); Harmony Farm Supply; Hydro-Gardens, Inc.; IPM Laboratories, Inc.; Natural Pest Controls; Nature's Control; Praxis.

*Phytoseiulus-System**

Biological control of red spider mites.

From BIOBEST N.V.

PIN-DOWN*

Insect sex pheromone/mating disruptant for control of tomato pinworm (*Keiferia lycopersicella*) by pheromone-mediated mating disruption, utilizing easy-to-apply "puzzle-piece" style pheromone dispenser system.

From Trece, Inc.

Pit* Slug and Snail Trap

See SureFire*.

Plant Volatiles

Naturally occurring plant scents that are attractive to insects and draw them to the host plant.

Plantomycin*

Streptomycin antibiotic bactericide for control of a number of bacterial plant pathogens.

From Aries Agro-Vet Industries Pvt. Ltd.

See *Streptomycin*.

Podisus maculiventris

Mexican bean beetle, cabbage looper, and imported cabbage worm predator.

From ARBICO, Inc; Praxis.

Polycore* TML

Sprayable controlled release formulation of trimedlure—Mediterranean fruit fly (*Ceratitis capitata*) attractant. For lure and kill when tank-mixed with conventional insecticides.

From AgriSense-BCS Ltd., Sub. of biosys.

Polyphagous Predators

Generalist predator. No specific single host, but feeds generally on whatever host is common. Ladybug adults feed generally on many kinds of hosts but lay eggs only after contact with aphids in the case of *Hippodamia* spp. or mites in the case of *Stethorus* spp.

Potassium Soap

Insecticide for control of aphids, whitefly, and psyllids on vegetables and fruits.

From Tecomag SRL.

Praying mantis eggs (*Tenodera aridifolia sinensis*)

For control of aphids, scale, mites, mosquitoes, etc. Eggs should begin hatching after two to eight weeks of warm weather. Adults eat locusts, flies, and other large insects.

From A-1 Unique Insect Control; ARBICO, Inc.; Natural Pest Controls; Praxis.

Predator

Free-living organism which throughout its life feeds on its prey and may kill it. Usually larger than its prey (host), and requires more than one prey to complete its development. Examples: Mantids, spiders, and many species of lady beetles. Development is separate from the body of its source of food.

Predatory mites

See *Neoseiulus (Amblyseius) californicus*; *Metaseiulus occidentalis*; *Phytoseiulus persimilis*.

Pred-Feed IPM*

Protein substances which attract, hold, and increase predator insect populations (beneficials) and decrease pest populations in various crops.

From Custom Chemicides.

See Pesticide Dictionary.

Preserve* (Discontinued 1987 by MicroGeneSys, Inc.)

Nuclear polyhedrosis virus of neodiprion sertifer. Selective microbial insecticide for control of European pine sawfly.

See Pesticide Dictionary.

Primary Parasitoids

When compared to secondary, tertiary or quaternary parasitoids, the primary is the first to attack its particular host individual. The higher levels must find hosts already parasitized by primary parasitoids. They all attack their particular host directly. Primary parasitoids are only considered beneficial if they attack a species that is a potential pest to man and agriculture. Primary parasitoids attack beneficial predators like lacewings and ladybugs and are not beneficial themselves in this case.

Prodenia

A product containing nuclear polyhedrosis viruses.

ProGibb*

Gibberellic acid, GA₃. Plant growth regulator to aid in growth and development, and improve production of fruits and vegetables.

From Abbott Laboratories.

See Pesticide Dictionary.

Promalin*

Gibberellins A₁A₂ and 6-benzyladenine. Plant growth regulator to improve shape of Red and Golden Delicious apples, increase weight per fruit, overall yield per tree, increase lateral bud break and shoot growth, and improve branch angles.

From Abbott Laboratories.

See Pesticide Dictionary.

Propylea quatuordecimpunctata

Insect predator beetle that controls aphids.

From Praxis.

Propylure

Attractant formerly reported as the natural sex lure secreted by the female pink bollworm moth.

ProShear*

N-(Phenylmethyl)-1H-purine-6-amine. Plant growth regulator for use on white pine to increase lateral bud set the year of application and branch development the year following application.

From Abbott Laboratories.

See Pesticide Dictionary.

* — Trade Name/R/TM

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Prospaltella ichorensis

Phytoseiid of citrus whitefly.

Prospaltella lutea

Indigenous parasite of the black citrus aleyrodid (*Acaudaleyrodes citri*) that has kept this pest well below the threshold of economic injury on citrus.

Prospaltella perniciosi

Aphelinid parasite of San Jose scale.

Protozoan

One-celled animal that belongs to the phylum Protozoa. Protozoans are the simplest type of animal and therefore the lowest group in the animal kingdom. Malaria and African sleeping sickness are caused by protozoans.

ProVide*

Gibberellic acid, A₁A₂. Plant growth regulator to correct undesirable cell development in skin of fruit that results in russet on Red and Golden Delicious apples; reduce susceptibility to preharvest cracking among Stayman apples; and increase fruit length. From Abbott Laboratories.

Pseudomonas fluorescens

Bacterium for use on cotton to control *Pythium* and *Rhizoctonia*.

Psyllotylenchus

Members of this nematode genus parasitize fleas.

Pteromalidae

Parasitic wasps that attack flies and other insects. From Beneficial Insectary.

Pyemotes tritici (Discontinued 1994 by ARBICO, Inc.)

Mite that infests fire ants, stored grain pests, and eggs of other pest insects.

Q-Lure

See Cue-Lure.

Quant* G.m.

Mating disruptant. Pheromone of the oriental fruit moth (*Grapholitha molesta*) for use as a species-specific mating disruptant. From BASF AG. See RAK* 5.

Quant* L.b.

Mating disruptant. Pheromone of the grapevine moth (*Lobesia botrana*) for use as a species-specific mating disruptant. From BASF AG. See RAK* 2.

Quantum 4000* HB

Biological inoculant consisting of a unique strain of naturally occurring *Bacillus subtilis*. Biological organism colonizes on the developing root system, reducing available areas for disease organism establishment. From Gustafson, Inc.

Quantum 4000* WP (Discontinued 1991 by Gustafson, Inc.)

See Quantum 4000* HB.

Quassia Extract

Insecticide for control of aphids on fruits, vegetables and ornamentals. Mixing with potassium soap extends and enhances activity. From Tecomag SRL.

RAK* 1 Plus

Pheromone of the grape berry moth (*Eupoecilia ambiguella*), used as a species-specific mating disruptant. From BASF AG. See Bocep* Viti. See Pesticide Dictionary.

RAK* 2

Pheromone of the grape vine moth (*Lobesia botrana*), used as species-specific mating disruptant. From BASF AG. See Quant* L.b. See Pesticide Dictionary.

RAK* 5

Pheromone of the Oriental fruit moth (*Grapholitha molesta*), used as species-specific mating disruptant. From BASF AG. See Quant* G.m. See Pesticide Dictionary.

Raven*

Bacillus thuringiensis insecticide for control of Colorado potato beetle and lepidopterous pests on potatoes, tomatoes, and eggplant. From Ecogen Inc.

Reagron* Ador (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for summer fruit twist (*Adoxophyes orana*).

Reagron* Agex (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for exclamation cutworm (*Agrotis exclamationis*).

Reagron* Alin (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for peach twig borer (*Anarsia lineatella*).

Reagron* Ambi (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for European grapeberry moth (*Eupoecilia ambiguella*).

Reagron* Brassi (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for cabbage moth (*Mamestra brassicae*).

Reagron* Caca (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for almond moth (*Cadra cautella*).

Reagron* Cypom (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for codling moth (*Cydia pomonella*).

Reagron* Efor (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for cherry bark tortrix (*Enarmonia formosana*).

Reagron* Eku (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for flour moth (*Ephestia kuehniella*).

Reagron* Elu (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for warehouse moth (*Ephestia elutella*).

Reagron* Grafu (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for plum moth (*Grapholita funebrana*).

Reagron* Gramo (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for Oriental fruit moth (*Grapholita molesta*).

Reagron* Hyma (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for apple ermine moth (*Yponomeuta malinellus*).

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Reagron* Hypa (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for small ermine moth (*Yponomeuta odellus*).

Reagron* Lesci (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for mountain ash bentwing (*Leucoptera scitella*).

Reagron* Libla (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for apple leaf midget moth (*Lithocolletis blancardella*).

Reagron* Lobo (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for grapevine moth (*Lobesia botrana*).

Reagron* Oler (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for tomato moth (*Mamestra oleracea*).

Reagron* Ostri-E (Discontinued 1994 by Chemol Trading Ltd. Co.)

E strain. Pheromone for European corn borer moth (*Ostrinia nubilalis*).

Reagron* Ostri-H (Discontinued 1994 by Chemol Trading Ltd. Co.)

Hybrid strain. Pheromone for European corn borer (*Ostrinia nubilalis*).

Reagron* Ostri-Z (Discontinued 1994 by Chemol Trading Ltd. Co.)

Z strain. Pheromone for European corn borer (*Ostrinia nubilalis*).

Reagron* Pexim (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for hollyhock groundling (*Pexicopia malvella*).

Reagron* Pidm (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for Indian meal moth (*Plodia interpunctella*).

Reagron* Plasu (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for cotton stem moth (*Platyedra subcinerea*).

Reagron* Pluma (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for diamondback moth (*Plutella zyllostella*).

Reagron* Rhybu (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for European pine shoot moth (*Rhyacionia buoliana*).

Reagron* Sice (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for angoumois grain moth (*Sitotroga cerealella*).

Reagron* Spille (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for striped comb (*Sparganothis pilleriana*).

Reagron* Syfor (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for red-tipped clearwing (*Synanthedon formicaeformis*).

Reagron* Symy (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for apple clearwing moth (*Synanthedon myopaeformis*).

Reagron* Sytip (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for currant borer (*Synanthedon tipuliformis*).

Reagron* Torvi (Discontinued 1994 by Chemol Trading Ltd. Co.)

Pheromone for oak leafroller moth (*Tortrix viridana*).

Release*

Gibberellic acid, GA₃. Plant growth regulator. Used as a topical seed treatment for semi-dwarf and tall rice varieties to improve germination and development of rice plant.

From Abbott Laboratories.

See Pesticide Dictionary.

Rhabditis insectivora

Nematode species described as a parasite of the cerambycid beetle.

Rhinocyllus conicus

Beneficial seed head weevil for control of Italian thistle, milk thistle, and musk thistle weeds. Adults feed on late winter or spring foliage, and lay eggs on developing flower heads. Larvae feed and develop inside the flower receptacle during the summer.

From CALTEC Agri Marketing Services; Praxis.

Rickettsiae

Group of bacteria which, like viruses, are obligate pathogens. Transmitted by ticks, lice, mosquitoes, and certain other arthropods, inducing such diseases as yellow fever, dengue, typhus, malaria, etc.

Rimifoot Paste*

Polybutenes sticky paste for trapping moths and flies.

From Jewnin-Joffe Industry Ltd.

Rimifoot Spray*

Polybutenes sticky paste, to be diluted with water for spraying on polyethylene sheets, for trapping flying insects.

From Jewnin-Joffe Industry Ltd.

Rimilure*

Insect sex attractant for monitoring and/or trapping populations of various pests. Formulations include: Rimilure* CM for codling moth in orchards, Rimilure CRS* for California red scale, Rimilure CFM* for *Prays citri* in lemon groves, and Rimilure GVM* for European grapevine moths in vineyards.

From Jewnin-Joffe Industry Ltd.

Rimilure OZ* (Discontinued 1992 by Jewnin-Joffe Industry Ltd.)

Sex attractant for monitoring and/or trapping populations of pink bollworm.

Rimilure PC* (Discontinued 1992 by Jewnin-Joffe Industry Ltd.)

Sex attractant for monitoring and/or trapping populations of pink bollworm.

Rimi-Trap Blue*

Sticky color trap to monitor and control Western flower thrips (*Frankliniella occidentalis*).

From Jewnin-Joffe Industry Ltd.

Rimi-Trap Yellow*

Sticky color trap to monitor and control flying insects without pesticides.

From Jewnin-Joffe Industry Ltd.

RK190* (Discontinued 1992 by Microferm Ltd.)

Crop stimulant, based on naturally occurring algal compounds that improve photosynthesis, root growth, and drought tolerance.

Rodolia cardinalis (Lady beetle)

Probably the most universally known beneficial insect for control of aphids, small worms, and a variety of soft-bodied insects.

* — Trade Name/R/TM

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1

Romanomermis spp.

Genus of nematodes in the mermithid group, containing at least five species parasitic to mosquitoes. Of the five, *R. culicivora* is the most effective biological control agent.

Rotstop* (Phlebiopsis gigantea)

Biofungicide based on naturally occurring wood-decomposing white-rot fungus for summer season control in conifers of root and butt rot caused by *Heterobasidion annosum*.
From Kemira Agro Oy.

Rumina decollata

Predatory snails used to reduce population of small-to-medium brown garden snails.
From ARBICO, Inc.; Sespe Creek Insectary.

RyzUp*

Gibberellic acid, GA₃. Plant growth regulator to stimulate seedling growth of commercial rice varieties and aid in growth and development of rice plant.
From Abbott Laboratories.
See Pesticide Dictionary.

Safer* BioNEEM

Botanical insecticide concentrate of azadirachtin (a.i.) from the neem tree. For control of juvenile leaf chewing and other insect pests on ornamentals, flowers, and lawns.
From Ringer Corp.
See *Azadirachtin*.
See Pesticide Dictionary.

Safer* Garden Fungicide

Sulfur fungicide containing no lye concentrate. Ready-to-use formulations for black spot, rust, powdery mildew on roses, fruits, and vegetables.
From Ringer Corp.
See Pesticide Dictionary.

Safer* Vegetable Insect Attack

Bacillus thuringiensis var. *kurstaki*. Microbial insecticide.
From Ringer Corp.
See *Bacillus thuringiensis* var. *kurstaki*.

Scambus pterophori

Parasitizes Lepidoptera and Coleoptera that occur in plant stems. Known also to parasitize sawfly larvae that enter the stem to pupate.

Scanmask*

See *Steinernema carpocapsae*.

Scentry Pheromone Lures

Parallel array of hollow plastic microtube capillaries mounted on adhesive tape and filled with a synthetic pheromone or chemical insect attractant. Rubber septer lures filled with synthetic pheromone or chemical insect attractant.
From Ecogen Inc.

Selibate* CS

Hand-applied pheromone based product for control of rice stem borer *Chilo suppressalis* in rice.
From AgriSense-BCS Ltd., Sub. of biosys.

Selibate* PBW

Hand-applied pheromone based product for season-long control of pink bollworm *Pectinophora gossypiella* in cotton.
From AgriSense-BCS Ltd., Sub. of biosys.

Semiochemicals

Broad class of naturally or synthetically produced substances that modify insect behavior.
See Pesticide Dictionary.

Semiolactictoxin

Term used to describe controlled release pheromones which are tank-mixed with the toxicant or included in the toxicant formulation.

Sertan*

Insecticide. Polyhedral inclusion bodies of *N. Sertifer* nuclear polyhedrosis virus.

Sex Lure

Synthetic chemical that acts as the natural lure (pheromone) for one sex of an insect species.

Shaktiman*

See *Azadirachtin*.

Sig lure

Attractant for Mediterranean fruit fly.

Skeetal*

Bacillus thuringiensis var. *israelensis*. Biological insecticide.
From Novo Nordisk Bioindustrials, Inc.
See *Bacillus thuringiensis* var. *israelensis*.

Smart Mouse Trap - Catch and Release

See SureFire*.

Soil Triggrr*

Mixed cytokinins used as a plant growth regulator.
From Westbridge Agricultural Products.
See Pesticide Dictionary.

SOK-Bt* (Discontinued 1986 by TUCO, Div. of Upjohn Co.)

Bacillus thuringiensis var. *kurstaki*. Bacterial insecticide.
See *Bacillus thuringiensis* var. *kurstaki*.

Spalangia cameroni, Spalangia endius (Walker), Spalangia nigroaenea

Various mixes of these parasitoids are marketed for poultry egg farms, dairies, cattle feed lots, horses (breeding farms and race tracks) and other farm animals kept in pens where wastes accumulate.

From A-1 Unique Insect Control; Beneficial Insectary; Harmony Farm Supply; Natural Pest Controls; Rincon-Vitova Insectaries, Inc.

Sphenoptera jugoslavica

Predatory root boring beetle that controls knapweed.
From Praxis.

Spidex*

See *Phytoseiulus persimilis*.

Spod-X*

Naturally occurring insect virus for the control of beet armyworm on various crops. Formulated as a liquid concentrate and a wettable powder. Registered in the U.S. and Holland.
From InStar Products, Div. of Crop Genetics International.

Spurgia esulae

Fly parasite for control of leafy spurge.
From Praxis.

Steinernema spp.

Beneficial nematode. Live infestive stage larvae of *Scapterisli S. feltiae* and *S. riobpavis* for control of male crickets, fungus gnats, mushroom flies, citrus rootweevil, etc.

From ARBICO, Inc.; BioLogic Co. (Ecomask*, Scanmask*); biosys (BioSafe*-N; BioVector*); Ecogen, Inc.; Harmony Farm Supply; IPM Laboratories, Inc. (Ecomask*, Scanmask*); Praxis.

Steinernema carpocapsae

Insect pathogenic nematode for control of a wide range of insects, including black vine weevils, borers, cutworms, fungus gnat larvae, root maggots, rootworms, strawberry weevils, and white grubs that attack plant root zones, tree galleries, thatch of lawns, bark cracks, crowns of plants, and corn tassels.

From ARBICO, Inc.; BioLogic Co. (Ecomask*, Scanmask*); biosys (BioSafe*-N; BioVector*); Harmony Farm Supply; IPM Laboratories, Inc. (Ecomask*, Scanmask*); Praxis.

Information is presented herein for preliminary planning only.
Exclusive reliance must be placed on information/directions supplied by manufacturer.

***Steinernema feltiae* (Mexican strain)**

See Guardian*; Nemasys*; Otinem-S*; *Steinernema* spp.

Sterile Male Technique

A genetic control method by introduction of sterile males, i.e., males that produce inactive sperm or no sperm.

Stethorus punctillum

Predatory coccinellid of European red mite and two-spotted mite. Commonly called ladybird beetle.
From Praxis.

Sticky Trapping Systems

Any of a number of systems designed to attract targeted insects for monitoring. Formulations composed of mixtures of several grades of polybutenes and stabilizers on cardboard panels, plastic cards, cylindrical or sphere traps.

From ISAGRO S.p.A. (Traptest*); The Tanglefoot Co. (Tangle-Trap* Sticky Trapping Systems).

Stikem Green* (Discontinued 1993 by Seabright Laboratories)

Sticky compound with copper sulfate. Used to trap or repel slugs, snails, caterpillars, beetles, ants, earwigs, and mites; as a banding compound around trees and shrubs to stop crawling pests such as beetles, ants, earwigs, caterpillars, and weevils; and as a bird repellent.

Stikem Special*

Sticky compound used for trapping Medflies and other insects; as a barrier around trees and shrubs to stop crawling pests such as beetles, ants, earwigs, caterpillars, and weevils; and as a bird repellent.

From Seabright Laboratories.

Sticky Ribbons*

Sticky plastic ribbons (yellow or blue) for control of whiteflies, leafminers, aphids, and thrips.

From Olson Products, Inc.

Sticky Stuff*

Thick, white latex paint-like formulation for trapping thrips or leafminer pupae and larvae.

From Olson Products, Inc.

Sticky Whitefly Trap*

Yellow sticky traps used to monitor insect populations in greenhouses, orchards, and vineyards.

From Seabright Laboratories.

Stimukil*

Bait of methomyl and muscalure, for control of houseflies.

From Ferme Corp./Troy Biosciences, Inc.

See Muscalure.

Stimulate* (Discontinued 1992 by Pesticide Service Consultants)

Bio stimulant and bioregulator composed of plant amino acids.

See Pesticide Dictionary.

Stirrup* M

Behavior modifying semiochemical for control of mites.

From Ferme Corp./Troy Biosciences, Inc.

See Pesticide Dictionary.

Stirrup PBW*

Behavior modifying semiochemical for pink bollworm control.

From Troy Biosciences, Inc.

Storgard*

Insect attractants and trapping systems for monitoring, detecting, and surveying insect pests in stored products.

From Trece, Inc.

See Pesticide Dictionary.

Streptomycin

Bactericide recovered from fermentation broth of *Streptomyces griseus*.

See Pesticide Dictionary.

SureFire*

Controlled release dispensers with synthetic sex pheromone and/or attractant with traps and Teflon* non-pesticide crawling insect barriers. Used to monitor, trap, and exclude specific pests. Formulations include: Blackhole* Rodent Trap; Deluxe Yellow Jacket Trap; Disposable Sticky Whitefly Trap; The Fly Scoop* Indoor Fly Trap; Fruit Tree Pest Trap - Apple Maggot; Fruit Tree Pest Trap - Codling Moth; Gypsy Moth Trap; Japanese Beetle Trap; Jumbo Aphid/Whitefly Trap; Lady Bug Lure; Outdoor House Fly Trap; The Pantry Pest* Trap; Pest Barrier Glue; Pit* Slug and Snail Trap; Smart Mouse Trap - Catch and Release; Teflon* Gypsy Moth Trap; and The Ultimate Roach Trap.

From Consep, Inc.

See Pesticide Dictionary.

***Sympiesis* spp.**

Some species of this genus parasitize leafmining lepidoptera, leafmining diptera, coleoptera, and hymenoptera.

Synomone

Substance emitted or received by an organism that induces a favorable response in both the emitter and receiver.

Tachinid Parasite

Entomophagous parasite (fly) of Diptera order, Tachinidae family. This family of flies is equally important to hymenoptera for being parasitoids in biological control. This function is most underrated and underresearched.

Tanglefoot Bird Repellent*

Clear, sticky gel, composed of polybutenes and stabilizers, for repelling pigeons, starlings and English sparrows. Treat window sills, roof lines, gutter edges and other roosting places. Registered with U.S. EPA.

From The Tanglefoot Co.

See Pesticide Dictionary.

Tangle-Trap Insect Trap Coating*

Clear, odorless, sticky gel composed of polybutenes and stabilizers. All-weather trapping adhesive, coats sticky traps used to detect and monitor insect populations. Allows use of color and pheromone attractants without interference or distortion.

From The Tanglefoot Co.

See Pesticide Dictionary.

Tangle-Trap* Sticky Trapping Systems

Plastic, yellow, sticky traps and plastic red sphere traps. Detects, monitors, and traps whiteflies, aphids, carrot rust flies, fungus gnats, leafminer flies, and apple maggot flies. Can be used effectively with scented lures.

From The Tanglefoot Co.

See Sticky Trapping Systems.

Technical Pheromone Gossyplure

(Z)-7-(Z,E)-11-Hexadecadien-1-ol, Acetate. Technical grade chemical for manufacturing or formulating registered biochemical pesticide products. May be used to manufacture pheromone traps in which it is the sole active ingredient (a.i.).

Technical Pheromone Z-11

(Z)-11-Hexadecadienyl. Technical grade chemical for manufacturing or formulating registered biochemical pesticide products or devices. May be used to manufacture pheromone traps in which it is the sole active ingredient (a.i.).

Teflon* Crawling Insect Barrier Spray/Tape (Discontinued 1994 by Consep, Inc.)

Controlled release dispensers with synthetic sex pheromone and/or attractant with traps and Teflon* non-pesticide crawling insect barriers, to monitor, trap, and exclude specific pests.

* — Trade Name/R/TM

Companies that did not return updated listings for 1995 are footnoted in the Company Address Section on page G1

Teflon* Gypsy Moth Tape

See SureFire*.

Teknar*

Bacillus thuringiensis var. *israelensis*. Microbial insecticide.
From Sandoz Agro, Inc.
See *Bacillus thuringiensis* var. *israelensis*.

Tenodera ardifolia sinensis

See praying mantis eggs.

Tentoxin

Fungal toxin for corn or soybeans to control Johnsongrass, mustard seed, barnyard grass, and morningglory.

Tepa

Insect chemosterilant.

Tetanocera spp.

Parasitic fly for control of various species of slugs, including European slugs.
From Praxis.

Tetrastichus spp.

Parasitic wasp for control of various insect pests.
From Praxis.

Thripex B* (Discontinued 1992 by Gerhart, Inc.)

See *Amblyseius cucumeris*.

Thripex C*

See *Amblyseius cucumeris*.

Thripobius semiluteus

Parasite for control of greenhouse thrips in citrus and avocados.
From ARBICO, Inc.; CALTEC Agri Marketing Services.

Thripot*

Orius (minute pirate bug) is a very aggressive predator of all stages of thrips. Works especially well in combination with *Amblyseius Cucumeris* to control aphids, lepidopterous eggs, lygus nymphs, mites, psyllids, scales, whiteflies, thrips, and first instar larvae of soft-bodied insects.
From G.B. Systems Inc.
See *Orius insidiosus/tricolor*.

Thripstick*

Controls onion thrips (*Thrips tabaci*) and western flower thrips (*Frankliniella occidentalis*) in greenhouse crops.
From Aquaspersions Ltd.

Thuricide*

Bacillus thuringiensis var. *kurstaki*. Microbial insecticide.
From Sandoz Agro, Inc.
See *Bacillus thuringiensis* var. *kurstaki*.

Tomato Worm Attack* (Discontinued 1993 by Ringer Corp.)

Bacillus thuringiensis var. *kurstaki*. Microbial insecticide.
See *Bacillus thuringiensis* var. *kurstaki*.

Toxorhynchites spp.

This genus is perhaps the most promising invertebrate predator for naturalistic control of mosquito larvae. Most active species is said to be *T. brevipalpis*.

Transitory Parasites

Parasites that pass certain life stages with one host and are free-living in their other life stages.

Trapit*

Kits of traps and pheromone lures for monitoring many insect pests in agricultural crops, forestry, horticulture, food manufacture, and stored food commodities.
From AgriSense, Div. of biosys; AgriSense-BCS Ltd., Sub. of biosys.

Trapping Systems

Any of a number of systems designed to attract targeted insects for monitoring. Various formulations for specific insect pests, usually pheromone-based and nontoxic.
From Biochem S.R.L. (Biocattura*, Biocontrol*); ISAGRO S.p.A.; Tecomag S.R.L.

Traptest*

Sticky trap for monitoring lepidopterous adults in various crops.
From ISAGRO S.p.A.
See Sticky Trapping Systems.
See Pesticide Dictionary.

Tree Tanglefoot* Pest Barrier

Sticky, viscous paste composed of gum resins, castor oil, and vegetable wax. Sticky insect barrier for all-weather control of destructive climbing insects, ants, cutworms, and foliar feeding larvae on fruit trees, shade trees, and ornamentals.
From The Tanglefoot Co.
See Pesticide Dictionary.

Triacantanol

An experimental plant growth regulator which is a natural alcohol occurring in alfalfa and some other plants; it increases the growth and protein content of several vegetable and field crops.

Tribactur* (Discontinued 1991 by Pennwalt Holland B.V.)

Bacillus thuringiensis var. *kurstaki*. Bacterial insecticide.

Trichoderma harzianum/polysporum

Naturally occurring microorganisms that help protect tree wounds from decay. Also used for disease suppression on crops and suppression of postharvest diseases on fruits and vegetables.

Trichogramma evanescens

Hymenopterous egg parasitoids that attack European corn borer.
From Praxis.

Trichogramma minutum

Hymenoptera order. Egg parasitoids of lepidopterous pests, used mainly in orchards in the eastern U.S.
From A-1 Unique Insect Control; ARBICO, Inc.; Beneficial Insectary; Harmony Farm Supply; Praxis.

Trichogramma platneri

Hymenopterous egg parasitoids used in orchards and avocado groves to control lepidopterous pests.
From A-1 Unique Insect Control; ARBICO, Inc.; Beneficial Insectary; Harmony Farm Supply; Praxis; Rincon-Vitova Insectaries, Inc.

Trichogramma pretiosum

Hymenopterous egg parasitoids that attack *Heliothis* spp. and cabbage loopers on cotton, corn, tomatoes, and many other vegetables.
From A-1 Unique Insect Control; ARBICO, Inc.; Beneficial Insectary; CALTEC Agri Marketing Services; Harmony Farm Supply; Praxis; Rincon-Vitova Insectaries, Inc.

Trichogramma spp.

Parasitic wasps that kill the host by laying their eggs inside the host's eggs. *Trichogramma* egg laid inside the host egg will hatch into a larvae which consumes the inside of the host egg. After the feeding period the larvae will pupate (shipped in this stage) and the *Trichogramma* adult develops and emerges. For control of most moth eggs, armyworms, bollworms, cane borers, codling moth, cutworms, fruitworms, leafworms, and most pest butterfly eggs. Hymenopterous egg parasitoids are clearly the most utilized beneficial insects throughout the world. Many species and strains or races are produced in insectaries and colonized for a wide number of lepidoptera hosts. Russia, China, and many Third World countries use these egg parasites on millions of hectares of crops.
From A-1 Unique Insect Control; ARBICO, Inc.; Beneficial Insectary; Natural Pest Controls; Nature's Control; Praxis.

Trichogramma-System*

Biological control of caterpillars.
From BIOBEST N.V.

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Exclusive reliance must be placed on information/directions supplied by manufacturer.

Trichogrammatoidea

Parasitic wasps that attack eggs of many insect species.

Trichogrammatoidea bactrae

Parasitoid of pink bollworm and other tiny eggs.
From Rincon-Vitova Insectaries, Inc.

Trichopodes pennipes

Dipterous parasite of adult stinkbug, *Nezara viridula*.

Trichosirocalus horridus

Predatory weevil for control of musk thistle.
From Praxis.

Trident* (Discontinued 1992 by Sandoz Crop Protection)

Bacillus thuringiensis var. *tenebrionis*. For control of Colorado potato beetle on potatoes.
See *Bacillus thuringiensis* var. *tenebrionis*.

Trimedlure

Chemical substance, t-butyl-2-methyl-4-chlorocyclohexanecarboxylate, that acts as a food lure for Mediterranean fruit fly.
From Agri-Pharm International, Inc.
See Pesticide Dictionary.

Trioxys pallidus

Relatively new ecotype of *Trioxys pallidus*, a parasite of the walnut aphid (*Chromaphis juglandicola*).
From Praxis.

Tripex C*

See *Neoseiulus (Amblyseius) californicus*.

Troy BT*

Bacillus thuringiensis var. *hurstaki*. Microbial insecticide effective against many lepidopterous pests. Former name: Larvo BT*.
From Fermone Corp./Troy Biosciences, Inc.
See *Bacillus thuringiensis* var. *hurstaki*.

Typhlodromus athiasae

Dominant phytoseiid mite predator on citrus in Israel in the interior valleys and Galilee.

Typhlodromus-System*

Biological control of phytophagous mites in orchards and vineyards.
From BIOBEST N.V.

Tyria jacobaeae

Beneficial moth for control of tansy ragwort. Eggs are laid on developing plant rosettes. Larvae defoliate plants during the summer. Complements Longitarsus flea beetles in reducing plant abundance and density.
From CALTEC Agri Marketing Services; Praxis.

The Ultimate Roach Trap

See Surefire*.

Urophora spp.

Parasitic flies that control knapweed.
From Praxis.

Validacin*

Fungicide (Validamycin A) resulting from fermentation of *Streptomyces hygroscopicus* var. *limoneus*.
From Takeda Chemical Industries, Ltd.
See Pesticide Dictionary.

Vault WP*

Bacillus thuringiensis var. *hurstaki*. Biological insecticide for control of lepidopterous larvae.
From Sandoz Agro, Inc.
See *Bacillus thuringiensis* var. *hurstaki*.

VectoBac*

Bacillus thuringiensis var. *israelensis*, Serotype H-14. Biological larvicide to control/kill mosquito and black fly larvae.
From Abbott Laboratories.
See *Bacillus thuringiensis* var. *israelensis*.

Verticillium lecanii

Contains living fungal spores for insecticidal use against most aphids, and greenhouse whitefly (*Trialeurodes vaporariorum*).
See Pesticide Dictionary.

Virus

Defined by some authorities as an obligate, intracellular, parasitic pathogen, composed of protein and nucleic acid, and smaller than 200 μ m.
See Pesticide Dictionary.

X-CYTO* Foliar

Cytokinins blend, 0.012% as kinetin based on biological activity. Plant growth regulator applied to foliage to increase yields of alfalfa, corn, cotton, peanuts, rice, sorghum, soybeans, sugar beets, triticale, wheat, fruits and vegetable. Applied to increase growth and development of ornamentals, trees and turf. Liquid concentrate formulation.
From Conklin Co., Inc.
See Pesticide Dictionary.

X-CYTO* Soil

Cytokinins blend, 0.004% as kinetin based on biological activity. Plant growth regulator applied to soil to increase yields of alfalfa, corn, cotton, peanuts, rice, sorghum, soybeans, sugar beets, triticale, wheat, fruits and vegetable. Applied to increase growth and development of ornamentals, trees and turf. Liquid concentrate formulation.
From Conklin Co., Inc.
See Pesticide Dictionary.

XenTari*

Bacillus thuringiensis var. *aizawai*. Biological insecticide for control of specific caterpillars and larvae of lepidopterous insects.
From Abbott Laboratories.
See *Bacillus thuringiensis* var. *aizawai*.

XTRA* Blossom Set

See Cytokinins.

Xylocoris flavipes

Predator of eggs and larvae of beetles and moths which infest stored grains.
From ARBICO, Inc.; Praxis.

Yellow Sticky Strips/Traps

Plastic yellow sheets coated with a special non-drying insect trapping compound and covered with protective release paper. Controls whiteflies, leafminers, aphids, and thrips.
From Olson Products, Inc.

Zeuxidiplosis giardi

Beneficial gall fly for control of St. Johnswort. Emerging adults lay eggs on tips of plants. Larvae cause plants to form galls.
From CALTEC Agri Marketing Services.

* — Trade Name/R/TM

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Notes

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SECTION D

REGULATORY FILE

The Regulatory File provides an accessible and condensed overview of various Federal and State laws, regulations, and policies which impact the manufacturer, importer, formulator, distributor, dealer, applicator, and farmer. Special "Action Needed" and "Need Help?" boxes provide reporting details and contacts for additional information. The guide to abbreviations and acronyms will help you interpret government "shorthand." Also included are a quick reference guide to state regulations, EPA regional office locations, and complete lists of state pesticide and fertilizer control officials and state pesticide coordinators. The Regulatory File is co-authored by Edgar R. Butts, Chris Myrick, and Todd A. King.

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1995 REGULATORY FILE

By EDGAR R. BUTTS, CHRIS MYRICK,
and TODD A. KING

Various Federal and State laws, regulations, and policies governing the pesticide industry impact the manufacturer, importer, formulator, distributor, dealer, dealer/applicator, and farmer. The purpose of the Regulatory File is to provide an accessible and condensed overview of these important laws, regulations, and policies which impact our industry. Many are so complex that regulatory experts often interpret them differently. Therefore, this Regulatory File should be relied upon only as a general guide. The 1995 Regulatory File includes changes in regulations and/or new regulations in place October 1994.

Violations of any Federal or State regulation regarding registration, use, transport, export, worker safety, hazard communication, or spill or disposal of pesticides can result in fines and/or penalties.

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About Rules and Regulations

Laws or acts are passed by Congress. Regulations are promulgated to enact a law. These regulations are contained in titles of the Code of Federal Regulations (CFR), such as:

Agriculture—Title 7

Food and Drugs—Title 21

Labor—Title 29

Protection of the Environment—Title 40

Transportation—Title 49

Wildlife and Fisheries—Title 50

References to specific parts of applicable titles of the Code of Federal Regulations are included throughout the Regulatory File.

Nothing is more frustrating than trying to interpret abbreviations and acronyms. Opposite is a list of some of the abbreviations and acronyms used by EPA and other government agencies.

The descriptions found in the Regulatory File are overviews only. For exact wording, consult the appropriate laws, the Code of Federal Regulations, and sections of the Federal Register.

For additional information, use the "Need Help?" boxes to contact the appropriate agencies. ■

IMPORTANT ABBREVIATIONS AND ACRONYMS

ACARP	Agricultural Conservation Acreage Reserve Program	NOAEL	No Observable Adverse Effect Level
ACGIH	American Conference of Governmental Industrial Hygienists	NOEL	No Observable Effect Level
ANSI	American National Standards Institute	NOIC	Notice of Intent to Cancel
APHIS	Animal and Plant Health Inspection Service	NOIS	Notice of Intent to Suspend
BACT	Best Available Control Technology	N.O.S.	Not Otherwise Specified
BBEP	Biotechnology and Environmental Protection (USDA/APHIS)	NPDES	National Pollutant Discharge Elimination System
BEAD	Biological and Economic Analysis Division (OPP)	NPHAP	National Pesticide Hazard Assessment Program
BMP	Best Management Practices	NPIRS	National Pesticide Information Retrieval System
BOD	Biochemical Oxygen Demand	NPRM	Notice of Proposed Rule Making
BPT	Best Practicable Control Technology Currently Available	NSPS	New Source Performance Standard
CAA	Clean Air Act	NTIS	National Technical Information Services
CAIR	Comprehensive Assessment Information Rule	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OAQPS	Office of Air Quality Planning and Standards
CDL	Commercial Driver's License	OHMS	Office of Hazardous Materials Safety
CERCLA	Comprehensive Environmental Response Compensation and Liability Act	OHMT	Office of Hazardous Materials Transportation
CFR	Code of Federal Regulations	OPP	Office of Pesticide Programs
CHEMTREC	Chemical Transportation Emergency Center	ORM	Other Regulated Materials
CHP	Chemical Hygiene Plan	ORM-A	Other Regulated Material carried on airlines
CMA	Chemical Manufacturers Association	OSHA	Occupational Safety and Health Act/Administration
COD	Chemical Oxygen Demand	OTS	Office of Toxic Substances
CRP	Conservation Reserve Program	OWEP	Office of Wetlands Protection
CWA	Clean Water Act	PAG	Pesticide Assessment Guidelines
DCI	Data Call-In	PAIR	Preliminary Assessment Information Rule
DCN	Document Control Number	PAM	Pesticide Analytical Manual
DOT	U.S. Department of Transportation	PATS	Pesticide Action Tracking System
EHS	Extremely Hazardous Substances	PD	Pesticide Document
EPA	Environmental Protection Agency	PDMS	Pesticide Document Management System
ERP	Enforcement Response Policy	PEL	Permissible Exposure Limit
ES	Enforcement Standard	PIH	Poison Inhalation Hazard
ESA	Endangered Species Act	PG	Packing Group
EUP	Experimental Use Permit	PIMS	Pesticide Incident Monitoring System
FDA	Food and Drug Administration	PM	Product Manager (OPP)
FDCA	Food, Drug and Cosmetic Act	PMN	Premanufacture Notification
FPEP	FIFRA Pesticide Export Policy	POTW	Publicly Owned Treatment Works
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act	PQA	Plant Quarantine Act
FOI	Freedom of Information	PR	Pesticide Registration (Notice)
FOIA	Freedom of Information Act	PSD	Prevent Significant Deterioration
FPPA	Federal Plant Pest Act	PSES	Pretreatment Standards for Existing Sources
FR	Federal Register	PSNS	Pretreatment Standards for New Sources
FWS	U.S. Fish & Wildlife Service	RCRA	Resource Conservation and Recovery Act
GLP	Good Laboratory Practices	RED	Registration Eligibility Document
GRAS	Generally Regarded As Safe	REI	Restricted Entry Interval
HAP	Hazardous Air Pollutants	RIN	Request Identification Number
HCS	Hazard Communication Standard	RPAR	Rebuttable Presumption Against Registration
HED	Hazard Evaluation Division	RQ	Reportable Quantity
HMTA	Hazardous Materials Transportation Act	RSPA	Research & Special Programs Administration
HMTUSA	Hazardous Materials Transportation Uniform Safety Act	RSPG	Registration Standards Policy Group
IARC	Interagency Regulatory Council	RTECS	Registry of Toxic Effects of Chemical Substances
IUPAC	International Union of Pure & Applied Chemistry	SAP	Scientific Advisory Panel
LDR	Land Disposal Restrictions	SARA	Superfund Amendments and Reauthorization Act
LEPC	Local Emergency Planning Committees	SEP	Standard Evaluation Procedure
LEPD	Local Emergency Planning Districts	SERC	State Emergency Response Commission
LIP	Label Improvement Program	SIC	Standard Industrial Code
MACT	Maximum Achievable Control Technology	SIP	State Improvement Plans
MPCA	Microbial Pest Control Agents	SNUN	Significant New Use Notice
MRL	Maximum Residue Level	SNUR	Significant New Use Rules
MSDS	Material Safety Data Sheets	SPCC	Spill Prevention Control and Countermeasure
NAS	National Academy of Sciences	STEL	Short Term Exposure Limit
NAAQS	National Ambient Air Quality Standards	TCLP	Toxicity Characteristic Leaching Procedure
NACA	National Agricultural Chemicals Association	TLV	Threshold Limit Value
NAPIAP	National Agricultural Pesticide Impact Assessment Program	TPQ	Threshold Planning Quantity
NEPA	National Environmental Policy Act	TSCA	Toxic Substances Control Act
NESHAP	National Emission Standards for Hazardous Air Pollutants	TSD	Treatment, Storage, or Disposal
NIH	National Institutes of Health	TWA	Time-Weighted Averages
NIOSH	National Institute of Occupational Safety and Health	UN	United Nations
		USDA	U.S. Department of Agriculture
		VOC	Volatile Organic Carbon
		WHMIS	Workplace Hazardous Materials Information System
		WPS	Worker Protection Standard

Agricultural Biotechnology Regulations

- Nongenetically engineered microorganisms
- Genetically engineered or nonindigenous microorganisms
- Plants and nonpesticidal microbials

Microbial Pest Control Agents

Overview

Microbial pesticides are regulated by EPA. APHIS may also regulate microbial pesticides depending on their origin and potential to be a pest.

APHIS regulates the importation and may regulate the interstate movement of a microbial pesticide. Environmental release may be regulated by the Office of Pesticide Programs of EPA and by APHIS. Pesticide use is regulated by both EPA and the states. A microbial pesticide registered with EPA must also be registered with the state before it can be marketed in that state.

Permitting

APHIS has the authority to regulate certain microorganisms, including microbial pesticides, under the authority of the Federal Plant Pest Act (FPPA), and the Plant Quarantine Act (PQA). Permits for any microorganisms which are nonindigenous or genetically engineered, or that may be a potential pest to U.S. agriculture, are required for the following: importation; interstate movement; and release into the environment.

Initially, a permit application for regulated nongenetically engineered microorganisms must be submitted to the state which will be the destination of the importation and/or interstate movement or where an environmental release is planned. Once the state approves the permit, it will forward it to APHIS for final consideration. Permit applications for genetically engineered organisms are submitted directly to APHIS.

Small-Scale Environmental Release

Experimental Use Permit regulations (40 CFR Part 172) were amended on September 1, 1994, to require notification of EPA prior to initiation of small-scale field testing of certain microbial pest control agents (MPCA) in the environment. The amended regulations generally do not require notification for small-scale field testing of nonindigenous MPCAs. Prior policy required that EPA be notified prior to small-scale field testing of both genetically altered and nonindigenous MPCAs.

The key points of the final rule are as follows:

1. EPA must be notified before initiation of small-scale testing of MPCAs that have been deliberately modified to enhance their pesticidal properties.

2. Notification is not required for rearrangement(s) or deletion(s) of genetic material of an MPCA that may occur naturally.

3. Notification is required only for nonindigenous MPCAs that have not been reviewed by APHIS.

4. Notification is not required for MPCAs tested in a facility with adequate containment and inactivation control.

5. One may petition to request the exemption of specific MPCAs or categories of MPCAs from the small-scale field testing notification requirement.

Experimental Use Permits And Registration

The Experimental Use Permit and registration process for a microbial pesticide is comparable to that of a conventional chemical pesticide. The EPA Pesticide Assessment Guidelines - Subdivision M detail the general data requirements necessary to obtain an Experimental Use Permit and a registration. The data required to register a microbial pesticide are generally significantly less than the data required to register a conventional chemical pesticide.

Transgenic Plants

FDA issued a "Statement of Policy - Foods Derived from New Plant Varieties" covering the plants developed using recombinant DNA (deoxyribonucleic acid) techniques on May 29, 1992. The policy was issued to "ensure that relevant scientific, safety, and regulatory issues are resolved prior to the introduction of such products to the marketplace."

FDA is responsible for food safety. EPA regulates pesticides and sets tolerances for residues of pesticides in food and feed. USDA regulates organisms which may be a pest for U.S. agriculture.

FDA and EPA intend to consult closely regarding the regulation of foods derived from new plant varieties. The policy statement clarifies that authority.

FDA is responsible for plants altered to contain:

1. Substances intended to alter the nutritional composition of the food, such as amino acids or carbohydrates;
2. Substances intended to enhance the plant's resistance to chemical herbicides; and
3. Substances intended to alter the flavor or the texture of the food.

EPA is responsible for plants altered to contain:

1. Substances intended to kill insects;
2. Substances intended to protect plants from viral, fungal, or bacterial infection; and
3. Substances intended as plant regulators.

EPA is in the process of determining how or if it will exert oversight of the above.

It should also be noted that permits must be obtained from USDA/APHIS/Biotechnology and Environmental Protection (BBEP), and from each state where testing of a transgenic plant is proposed before testing can begin. BBEP has published a very helpful document entitled "User's Guide for Introducing Genetically Engineered Plants and Microorganisms." (APHIS Technical Bulletin 1783). ■

Clean Air Act

- Sets standards of emission performance for fertilizer and pesticide plants
- New amendments will result in 75% reduction of toxic chemical emissions, including several pesticides
- New amendments require regulations to prevent, detect, and respond to accidental releases, including ammonia
- Potential for regulating application drift

The Clean Air Act (CAA) has several goals: to protect and improve the nation's air resources, thereby fostering public health and welfare; to establish national research and development programs to prevent and control air pollution; to provide technical and financial assistance to state and local governments, enabling them to establish and implement air pollution and control programs; and to promote and assist in the development of regional air pollution control programs.

EPA was given authority by Congress to establish regulations to implement the CAA. States were, in turn, delegated authority by EPA to administer certain provisions of the Act. The sections of CAA which have a significant impact on industry include the requirements to:

- Publish and update a list of criteria pollutants released from stationary or mobile sources (CAA Section 108).
- Set "National Ambient Air Quality Standards" (NAAQS) establishing maximum levels for the criteria pollutants (CAA Section 109).

To date, NAAQS have been issued for only six substances: carbon monoxide, sulfur dioxide, nitrogen dioxide, particulate matter less than 10 microns (PM-10), ozone, and lead.

- Promulgate State Implementation Plans (SIP) for implementing, maintaining, and enforcing NAAQS in each quality control region within the states (CAA Section 110); establish permitting programs for modification of existing facilities or construction of new facilities to assure compliance with NAAQS (CAA Section 110).

- Set New Source Performance Standards (NSPS) for criteria and designated pollutants from new, modified, or reconstructed stationary source categories. Industrial facilities are subject to NSPSs for their particular performance categories if the facilities are constructed or modified after EPA proposes the NSPSs (CAA Section 111).

- Issue regulations to "Prevent Significant Deterioration" (PSD) of the air quality (when constructing a major facility) in an "attainment" area (where NAAQS are being met) or in an unclassified area. PSD applies to a "major source" in any industrial category. The rule defines a major source as a source that has the potential to emit more than 250 tons per year of any single criteria pollutant. The triggering emission threshold is lower (100 tons per year) for a facility

classified in one of 28 major stationary source industrial categories specified in CAA.

- Establish National Emission Standards for Hazardous Air Pollutants (NESHAP) for listed hazardous pollutants emitted from new and existing sources (CAA Section 112). Between 1970 and 1990, emission limits were set for only eight substances: asbestos, benzene, beryllium, inorganic arsenic, mercury, radionuclides, vinyl chloride, and radon-222. As discussed later, the scope and applicability of the NESHAP program was dramatically expanded by the CAA amendments of 1990.

- Require a New Source permit in non-attainment areas for new stationary sources or when major modifications are made to existing sources. These sources will not only have to meet New Source Performance Standards (NSPS), but will also have to offset the new emissions by a reduction of up to 1.5:1. This is to provide net air quality improvement in these areas (CAA Sections 172, 173).

In general, the pesticide industry must be in compliance with the air quality standards and emission limits of the CAA. Pesticide formulating and manufacturing facilities' permits will dictate the allowable concentrations of specified pollutants emitted in these operations based on state and federal limits.

There exists the potential for an individual state, based upon its State Implementation Plan (SIP), to regulate application methods which release pesticides, either as particulates or as organic emissions, to the air (e.g., aerial dusting, truck spraying).

Existing federal air regulations which apply to the pesticide and fertilizer industries are found in Title 40 of the Code of Federal Regulations, Part 60 - EPA Standards of Performance for New Stationary Sources. These standards apply to all new or modified facilities. The following subparts should be consulted:

Subpart A: General Provisions

Subpart C: Emission Guidelines and Compliance Times

Subpart G: Standards of Performance for Nitric Acid Plants

Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984

Subpart T: Standards of Performance for the Phosphate Fertilizer Industry: Wet-Process Phosphoric Acid Plants

Subpart U: Standards of Performance for the Phosphate Fertilizer Industry: Superphosphoric Acid Plants

Subpart V: Standards of Performance for the Phosphate Fertilizer Industry: Diammonium Phosphate Plants

Subpart W: Standards of Performance for the Phosphate Fertilizer Industry: Triple Superphosphate Plants

Subpart X: Standards of Performance for the Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities

Subpart HH: Standards of Performance for Lime Manufacturing Plants

Subpart NN: Standards of Performance for Phosphate Rock Plants

Subpart PP: Standards of Performance for Ammonium Sulfate Manufacture

(Continued on page D6)

The latest amendments to the Clean Air Act were signed into law on November 15, 1990, and are contained in seven titles: Attainment of Air Quality Standards; Mobile Sources; Air Toxics; Acid Deposition; Permitting; Stratospheric Ozone; and Enforcement.

Of these, the air toxics section is expected to have the most significant impact upon industry, including manufacturers and processors of pesticides and fertilizers. Under the provisions of this title, the procedure whereby EPA regulates air emissions is drastically changed. Under the old Clean Air rules, EPA developed regulations for specific chemicals based upon health standards, after studying each chemical. Using this approach, EPA has regulated only some sources of the eight chemicals listed above under NESHAP. However, under the new Air Toxics provisions, Congress established a list of 189 Hazardous Air Pollutants (HAP); several pesticides, as well as chemicals used in their production and/or formulation, are among the HAPs. Congress mandated that EPA publish a compilation of "major" and "area" (non-major) sources that emit one or more of the HAPs and subsequently establish appropriate emission standards for every category of listed sources. On July 16, 1992 (57 FR 31576), EPA published its initial list of categories and sub-categories of sources, and dates by which a standard is to be promulgated. The following are included among the more than 165 major and eight area sources scheduled (promulgation dates shown in parentheses):

Mineral Products Processing (November 15, 2000)

Lime Manufacturing

Agricultural Chemicals Production (November 15, 1997)

2,4-D salts and esters

4-Chloro-2-methylphenoxyacetic acid

4,6-Dinitro-o-cresol

Captafol

Captan

Chloroneb

Chlorothalonil

Dacthal

Sodium Pentachlorophenate

Tordon

Inorganic Chemicals Production (November 15, 2000)

Phosphate Fertilizers

In establishing national standards for industrial air emissions, EPA must determine the best control technology, defined as Maximum Achievable Control Technology (MACT) for a listed pollutant emitted by a certain source category, and then require industries in that category to utilize that technology. These standards are expected to be capable of achieving a 75% reduction in emissions within 10 years.

For new sources, MACT must be at least as tough as the most stringent controls currently in use; for existing sources MACT must be at least as stringent as the average control efficiency of the best controlled 12% of similar sources. Existing sources which voluntarily reduce their emissions to 10% (for organics) or 5% (for particulates) of their 1987 levels will be granted an additional six-year extension. (Final regulations implementing this early reduction program were issued on December 29, 1992 [57 FR 61970-62002].)

Under the Clean Air Amendments, EPA must determine and report to Congress the risk remaining after applying MACT. EPA must establish residual risk standards, with an "ample margin of safety" within eight years of MACT promulgation, if needed.

On December 31, 1992, EPA proposed MACT standards governing emissions of 149 HAPs from synthetic organic chemical manufacturing industry (SOCMI) production processes. The proposed rule, referred to as the Hazardous Organic NESHAP, or HON, addresses HAP emissions from both new and existing SOCMI sources and from equipment leaks from a number of specified industrial categories including pesticide production (see 57 FR 62608-62797). It is expected that the requirements in this rule will serve as a model in developing MACT for other sources of air pollution.

The permitting section of the amendments is also expected to have a major impact on industry, including manufacturers and processors of pesticides and fertilizers. Every state is required to establish new permitting rules. Many previously unpermitted sources will be required to obtain the new air permits.

The Federal Clean Air Act Amendments of 1990 require each state to establish a Small Business Stationary Source Technical and Environmental Compliance Assistance Program. The implementation of the CAA provisions will require regulation of small businesses to attain and maintain National Ambient Air Quality Standards and control toxic air emissions.

As defined by Section 507 of the CAA amendments of 1990, a small business stationary source:

- Is a stationary source that is owned or operated by a person who employs 100 or fewer individuals;
- Is a small business concern as defined in the Small Business Act;
- Is not a major stationary source;
- Does not emit 50 tons or more per year of any regulated pollutant; and
- Emits less than 75 tons per year of all regulated pollutants.

Retail crop protection chemical and fertilizer dealers may be impacted by CAA regulations with regard to Volatile Organic Carbon (VOC) and particulate matter (PM-10) emissions from bulk storage tanks and certain fertilizer product emissions. Small businesses are encouraged to contact their state regulatory authority for compliance information. ■

NEED HELP?

For help on Federal air regulations, contact:

Office of Policy, Analysis and Review

202-260-5580

Fax: 202-260-9766

OR

Office of Air Quality Planning

& Standards

202-260-5575

Fax: 202-260-0451

Clean Water Act

- Prohibits discharge of toxic pollutants into navigable waters without permit
- Establishes pretreatment standards for wastewaters sent to POTW
- Requires permits for stormwater discharges

As of this printing, Congress is expected to undertake a comprehensive reauthorization of the Clean Water Act (CWA) in 1995. Changes to the CWA may affect the agricultural chemical industry.

The Clean Water Act (CWA) has as its objectives the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters through the prohibition of the discharge of toxic pollutants into the navigable waters of the United States. Navigable waters include ponds, lakes, streams, rivers, wetlands, and literally all surface waters, regardless of navigability. EPA is responsible for developing regulations to implement these goals.

The Act is made up of several elements:

1. National Pollutant Discharge Elimination System (NPDES) permit program.
2. Pretreatment standards for toxic pollutants introduced from non-domestic sources into publicly owned treatment works (POTW).
3. Industry-specific toxic pollutant effluent limitations and guidelines for existing and new sources.
4. Oil and hazardous substance liability provisions.
5. Spill prevention control and countermeasure (SPCC) planning.
6. Non-point source agricultural pollution control mechanisms under Section 319.

The CWA affects all industries that produce wastewater discharges, and it can have major impact on fertilizer and pesticide manufacturing facilities. Section 307 of CWA requires EPA to issue a list of toxic pollutants and to establish effluent limits for discharges of these pollutants. The toxic pollutants include 65 chemicals plus chemical categories.

These chemicals and chemical categories are ranked by EPA according to occurrence and risk, resulting in 126 chemicals, known as priority pollutants, which are required to be regulated. These priority pollutants are incorporated into effluent guidelines and pretreatment standards. The priority pollutants include several pesticides which may have either specific discharge limits or a "no discharge" limit as with aldrin/dieldrin, DDT, endrin, and others.

The EPA's NPDES permit program regulates point sources or discreet discharges (pipes, ditches, channels, etc.). Section 301 of the Act establishes uniform national standards for discharges of each type of pollutant from each category of industrial point source, including fertilizer and pesticide manufacture. In general, NPDES permit limits include conventional pollutants such as Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), pH, etc., as well as many specific toxic substances and "Hazardous

Substances" including the "Priority Pollutants" (40 CFR Section 423, Appendix A). Many of these chemicals are pesticides or inert ingredients used in pesticide formulations.

Guidelines for NPDES permit writers and for State water quality standards are included in Section 304. EPA published effluent guidelines and standards for pesticide chemicals in 40 CFR 455. These guidelines and standards are based upon the application of the "Best Practicable Control Technology Currently Available" (BPT). Subpart A covers the Organic Pesticide Chemicals Manufacturing Subcategory. The Metallo-Organic Pesticides Chemicals Manufacturing Subcategory is dealt with in Subpart B, while the Pesticide Chemicals Formulating and Packaging Subcategory is regulated in Subpart C. Organic chemical pesticide manufacturing has conventional pollutant criteria (BOD, COD, pH, etc.) and quantitative criteria for the active ingredient. A guideline of "no discharge" to navigable waters was set for metallo-organic pesticide manufacturing, and for pesticide chemical formulating and packaging. In addition many states now require bioassay testing to maintain water quality standards.

Discharges of effluent from industry and other non-domestic sources to a publicly owned treatment works do not require a Federal NPDES permit (State regulations occasionally mandate permits), but may be subject to pretreatment regulations. EPA issued pretreatment standards for the pesticide industry which regulate the indirect discharge through POTWs. These standards have been challenged in court by the industry and were remanded to EPA until the issue is settled. Thus, pesticide industry discharges into a publicly owned treatment works are currently subject only to general pollution discharge prohibitions imposed by the POTW. Both the industrial discharger and the treatment works must have a program in effect to assure compliance with pretreatment limitations and guidelines.

NEED HELP?

For help on wastewater treatment technologies or water conservation, contact:

Small Flows Clearing House
800-624-8301
Fax: 304-293-3161

For help on federal drinking water regulations, contact:

Safe Drinking Water Hotline
800-624-8301

On April 10, 1992, EPA issued a proposed rule covering the first two Subcategories, i.e., Organic Pesticide Chemicals and Metallo-Organic Pesticides Chemicals Manufac-

(Continued on page D8)

turing. In the case of the former, EPA intends to expand the BPT requirements to an additional 15 organic and all organotin pesticide active ingredients, and to require the use of "Best Available Technology Economically Achievable" (BAT) for existing facilities; EPA is proposing New Source Performance Standards (NSPS) for new facilities. NSPS are based on best available demonstrated treatment technologies for all pollutants (i.e., conventional, nonconventional, and priority). Facilities that indirectly discharge through a POTW would be subject to Pretreatment Standards for Existing Sources (PSES) or New Sources (PSNS); pretreatment standards are technology-based and analogous to BAT effluent limitations.

As discussed above, current BAT limitations for Subcategory B (Metallo-Organic Pesticide Chemicals Manufacturing) require no discharge of process wastewater pollutants. EPA is making no change to these limitations, but is proposing to reserve BPT, BAT, NSPS, PSES, and PSNS for this subcategory.

EPA is also proposing to add a new Subpart D which incorporates analytical methods to be used in determining compliance with the proposed effluent limitation guidelines and standards.

The effluent guidelines and standards for fertilizer manufacturing are found in 40 Part 418. The following subcategories are covered:

Subcategory	Subpart
Phosphate	A
Ammonia	B
Urea	C
Ammonium Nitrate	D
Nitric Acid	E
Ammonium Sulfate	F
Mixed and Blend Fertilizer Production	G

These effluent guidelines cover both direct and indirect discharges.

On November 16, 1990, EPA issued regulations which require NPDES permits for stormwater discharges which are "associated with industrial activity" (55 Federal Register pp. 47990-48091). Such discharges occur through any conveyance (pipe, channel, ditches, etc.), and must be directly related to manufacturing, processing, or raw materials storage areas at an industrial plant. They do not include areas separate from the plant's industrial activities, such as office buildings and accompanying parking lots, provided the drainage from these areas is not mixed with waters from the industrial portion of the plant. The regulations (40 CFR 126) specify, by SIC code, which types of industrial facilities are covered; pesticide manufacturing and processing, and fertilizer manufacturing are included. Under this rule, a facility must, in general, obtain a permit individually, as part of a group application, or under a general permit covering a large area; however, since effluent guidelines for stormwater from the fertilizer manufacturing sector have been issued (40 CFR 418), no action is needed if the facility has a current NPDES permit. When the permit expires, the facility must apply for an individual permit.

It is important to note that a permit is required **even if the discharge occurs through a municipal or non-municipal separate storm sewer**. If the discharge is through a municipal separate storm sewer system, additional notifications must be made to the operator of the system (40 CFR 122.26(a)(4)).

NEED HELP?

Toxic Pollutant Effluent Standards, covering several pesticides, are found in Title 40 of the Code of Federal Regulations Part 129.

General Provisions For Effluent Guidelines and Standards are published in Title 40 of the Code of Federal Regulations Part 401.

Criteria and Standards for the National Pollution Discharge Elimination System are located in Title 40 of the Code of Federal Regulations Part 125.

Pretreatment Standards are codified at Title 40 of the Code of Federal Regulations Part 403.

Effluent Guidelines and Standards for Fertilizer Manufacturing are published in Title 40 of the Code of Federal Regulations Part 418, while those for Pesticide Chemicals Manufacturing are in Part 455.

For help on Federal Regulations, contact:

**National Response Center
for Water Pollution
202-426-2675**

In another important rulemaking, EPA issued regulations addressing hazardous wastes which are discharged to a POTW **on or after August 23, 1990**. This rule impacts all industrial users subject to Categorical Pretreatment Standards, and industrial plants discharging more than 25,000 gallons per day or contributing more than 5% of the sewer system capacity. A covered facility must determine if its sewer discharge, if otherwise disposed of, would be a hazardous waste by characterizing it according to RCRA procedures (40 CFR 262.11). If it is determined to be hazard-

ous, then each POTW receiving hazardous waste, as well as regional EPA offices and state agencies, must be notified of the type of discharge, and its RCRA classification; for discharges which exceed 100 kg/month, detailed information on identification and quantity of hazardous constituents is also required. Additional reporting is required of Significant Noncategorical Industrial Users. All Industrial Users must notify their POTWs of any substantial changes in the volume or character of pollutants.

In addition, the following are prohibited:

- Waste streams with flashpoints below 140°F.
- Discharges causing toxic gases, vapors, or fumes within the POTW.
- Oils or greases that will interfere with, or pass through, the POTW.
- Discharge of truck and hauled wastes, except at discharge points designated by the POTW.

Certain fertilizers and pesticides and many compounds used in pesticide formulations as inert ingredients are included in CWA Section 311 Oil and Hazardous Substance List. Owners and operators of onshore and offshore manufacturing or formulating facilities must immediately notify the National Response Center (Telephone: 800-424-8802) of any discharge of a Section 311 substance, in excess of designated quantities, into navigable waters.

EPA requires all facilities that store oil in tanks, including petroleum oil, fuel oil, sludge, etc., above certain quantity limits, to prepare and implement a Spill Prevention

Control and Countermeasure (SPCC) plan if the facility has the potential for discharging any oil into navigable waters (40 CFR 112). The plan must provide for preventing, controlling, and cleaning up a spill. It must be kept at the facility and provided to EPA upon request. Additional regulations requiring SPCC plans for hazardous substances have been proposed, but have not yet been issued.

On April 14, 1994 (59 FR 17850), the EPA issued a proposed rule under CWA to limit the discharge of pollutants into navigable waters of the U.S. and into publicly owned treatment works by existing and new facilities that formulate, package or repack products containing pesticide active ingredients. This regulation proposes effluent limitation guidelines based on "best practicable control technologies" (BPT), "best conventional pollutant control technology" (BCT), "best available technology" (BAT), and pretreatment standards for new and existing indirect discharges (PSNS and PSES, respectively.)

The proposed regulation does not change existing effluent limitation guidelines based on the achievement of BPT; however, it is proposing to establish a new subcategory which applies to refilling establishments (primarily bulk and mini-bulk pesticide repackagers) whose principal business is retail sale. The proposed standard, expected to become a final regulation in late 1995 or early 1996, prohibits any discharge of process wastewater pollutants. ■

For information on the potential of pesticides to leach into groundwater and run off into surface water, see the Environmental and Safety Section (page E 1).

Comprehensive Environmental Response Compensation And Liability Act

- Requires notification of spills or releases of hazardous substances
- Mandates clean-up of spills and releases, including past disposals
- Normal application of pesticides and fertilizers excluded

As of this printing, the Comprehensive Environmental Response Compensation And Liability Act (CERCLA) is undergoing reauthorization by Congress and resulting changes may affect the agricultural chemical industry.

CERCLA gives EPA authority to enforce or to carry out cleanups of releases or threatened releases of "Hazardous Substances," pollutants, and contaminants resulting from chemical spills or from hazardous waste sites, when there is an imminent and substantial danger to public health, welfare, or the environment. This Act provides EPA with funds, generated primarily from the chemical and petroleum industries, and the authority to clean up the so-called "Superfund" environmentally "damaged" sites. EPA can then recover these funds from responsible parties. Under Section 106 of CERCLA, the EPA can also require responsible parties to investigate and clean up such sites.

ACTION NEEDED:

What: Release to the environment of a Reportable Quantity (RQ) of a hazardous substance which occurs during any 24-hour period.

How: Immediate telephone call.

Who: National Response Center:
800-424-8802

In addition to the above, if, during any 24-hour period, a designated "hazardous substance" is released into the environment (land, water or air) at or above a specific reportable quantity (RQ) for that material, CERCLA requires an immediate call to the National Response Center (800-424-8802). Section 102(b) of CERCLA establishes RQs of 1 pound for hazardous substance releases, except for those hazardous substances that have been assigned higher RQs

as per Section 311 of the Clean Water Act. There are now about 725 CERCLA hazardous substances plus 1500 radionuclides, most of which have been assigned specific reportable quantities of 1, 10, 100, 1000, or 5000 pounds (Note: RQs for radionuclides are in curies). Hazardous substances that do not have a formally assigned RQ retain the statutory RQ of 1 pound. Substances are periodically added (or removed) from the CERCLA RQ list.

EPA's regulations covering the designation of hazardous substances and their associated reportable quantities, as well as notification requirements under CERCLA are found in 40 CFR 302. The list of hazardous substances, specified at 40 CFR 302.4, encompasses elements, compounds, mixtures, solutions, and hazardous wastes; many pesticides named in other Acts are included. Clearly, then, numerous pesticide active ingredients, formulations, and inert ingredients are regulated as hazardous substances under CERCLA; however, Section 103 of CERCLA specifically exempts the following activities from release notification:

1. The application of pesticides registered under FIFRA when such pesticides are applied in accordance with the registered label instructions.
2. The storage and handling of a registered pesticide product by an agricultural producer.

The normal application of fertilizer is also excluded from release reporting (40 CFR 302.3 - definition of "release").

Releases of pesticides that occur during handling and storage, and releases that result during transportation, are covered under provisions of CERCLA. The transportation provisions of the act direct the U.S. Department of Transportation to list and regulate hazardous substances. In compliance, DOT has listed the hazardous substances in an Appendix to the Hazardous Materials Table (49 CFR 172.101), and requires special markings and shipping paper entries to alert a carrier that he is transporting them. ■

NEED HELP?

The regulations which implement CERCLA release reporting are found in Title 40 of the Code of Federal Regulations, Part 302.

For help on CERCLA questions, contact:

RCRA/Superfund Hotline
800-424-9346

Coastal Zone Management Act

- Creates nonpoint pollution control program
- Gives States increased authority to control use of fertilizers and pesticides
- Authorizes federal grants to States that establish an approved coastal zone management program.

The purpose of the Coastal Zone Management Act (CZMA) of 1990 was to enhance the effectiveness of the CZMA of 1972 by increasing our understanding of the coastal environment and expanding the ability of State coastal zone management programs to address coastal environmental problems. Congress cited a significant decrease in the water quality in and around coastal areas, as well as the increasing knowledge regarding the impact of nonpoint source pollution, as its primary reason for approving the CZMA of 1990.

Of specific interest to farm chemical users was the Act's concentration on nonpoint source pollution control by creating the Nonpoint Pollution Control Program (NPCP). Through this program, CZMA gives States increased authority to implement control measures on the use of fertilizers and pesticides. Increasing States' authority is a means of decreasing nonpoint source pollution beyond what is required under the existing provisions contained in Section 319 of the Federal Water Pollution Control Act.

CZMA authorizes federal grants to States that establish an approved coastal zone management plan. However, these programs must be approved by the federal government before any grant money is offered, except for years 1991-93 in which the federal government offers a \$200,000, four-to-one, Federal to State matching grant to get management plans up and running.

In establishing a management plan, the State must:

1. Identify boundaries of the program;
2. Create definition of what shall constitute permissible land and water uses within the coastal zone;
3. Inventory and designate particular areas of concern;
4. Identify means by which State proposes to exert control over land and water uses;
5. Create broad guidelines regarding priorities of uses in particular areas;
6. Describe the organizational structure proposed to implement such a program;
7. Define the term *beach* and a planning process for protection;
8. Define locations for energy facilities; and
9. Develop planning process for assessing the effects of and studying how to lessen beach erosion.

Through CZMA, the State has the power to administer land use and water use regulations to ensure compliance with the management program. The Coastal NPCP required by Section 6217 of the CZMA of 1990 allows this State enforcement to take place.

In January of 1993, the EPA issued its final *Guidance Specifying Management Measures For Sources of Nonpoint Pollution in Coastal Water*. Agricultural management measures included are Erosion and Sediment Control; Confined Animal Waste Control; and Nutrient, Pesticide, Grazing, and Irrigation Management.

Specific Nutrient Management Measures include the development, implementation, and periodical update of a nutrient management plan to:

1. Apply nutrients at rates necessary to achieve realistic crop yields;
2. Improve the timing of nutrient application; and
3. Use agronomic crop production technology to increase nutrient use efficiency.

When the source of the nutrients is other than commercial fertilizer, the producer should determine the nutrient value and the rate of availability of the nutrients. In addition, the producer should determine and credit the nitrogen contribution of any legume crop. Soil and plant tissue testing should be used routinely.

Nutrient management plans contain the following core components:

1. Farm and field maps showing acreage, crops, soils, and waterbodies.
2. Realistic yield expectations for the crops to be grown, based primarily on the producer's actual yield history, State Land Grant University yield expectations for the soil series, or SCS Soils-5 information for the soil series.
3. A summary of the nutrient resources available to the producer, which at a minimum include:
 - Soil test results for pH, phosphorus, nitrogen, and potassium;
 - Nutrient analysis of manure, sludge, mortality compost (birds, pigs, etc.), or effluent (if applicable); and
 - Other significant nutrient sources (e.g., irrigation water).
4. An evaluation of field limitations based on environmental hazards or concerns, such as:
 - Sinkholes, shallow soils over fractured bedrock, and soils with high leaching potential;
 - Lands near surface water;
 - Highly erodible soils; and
 - Shallow aquifers.
5. Use of the limiting nutrient concept to establish the mix of nutrient sources and requirements for the crop based on a realistic yield expectation.
6. Identification of timing and application methods for nutrients to:
 - Provide nutrients at rates necessary to achieve realistic crop yields;
 - Reduce losses to the environment; and
 - Avoid application as much as possible to frozen soil during periods of leaching or runoff.
7. Provisions for the proper calibration and operation of nutrient application equipment.

Pesticide management measures are intended to reduce contamination of surface water and groundwater from pes-

(Continued on page D12)

ticides. The basic concept of the pesticide management measure is to foster effective and safe use of pesticides without causing degradation to the environment. Specific pesticide management measures include:

1. Evaluation of pest problems, previous pest control measures, and cropping history.
2. Evaluation of soil and physical characteristics of the site including mixing, loading, and storage areas for potential leaching or runoff of pesticides. If leaching or runoff is found to occur, steps should be taken to prevent further contamination.
3. Use of integrated pest management (IPM) strategies that:
 - a. Apply pesticides only when an economic benefit to the producer will be achieved (i.e., application based on economic thresholds); and
 - b. Apply pesticides efficiently and at times when runoff losses are unlikely.
4. When pesticide applications are necessary and a choice of registered materials exists, consider the persistence, toxicity, runoff potential, and leaching potential of products in making a selection.
5. Periodically calibrate pesticide spray equipment.
6. Use anti-backflow devices on hoses used for filling tank mixtures. ■

Commercial Motor Vehicle Safety Act

- Establishes minimum national standards for commercial driver's license
- Sets federal penalties for violation. Applies to drivers in interstate, intrastate, or foreign commerce

On October 26, 1986, Congress passed the Commercial Motor Vehicle Safety Act. The goal of the Act is to improve highway safety by ensuring that drivers of large trucks and buses are qualified to operate those vehicles on the highway. The Act retained the State's right to issue a driver's license, but established minimum national standards which States must meet when licensing Commercial Motor Vehicle (CMV) drivers.

As of April 1, 1992, drivers must have the new commercial driver's license (CDL) in order to drive a CMV. The federal penalty for a driver that violates this provision is a civil penalty of up to \$2,500 or, in aggravated cases, criminal penalties of up to \$5,000 or 90 days in prison. An employer is also subject to these penalties if he or she uses a driver to operate a CMV without the proper license.

The Federal Highway Administration (FHWA) has developed and issued standards for testing and licensing CMV drivers. Among other things, the standards require that States issue CDLs to their CMV operators after the driver passes a knowledge and skills test administered by the State about the type of vehicle to be operated. Drivers need CDLs if they are in interstate, intrastate, or foreign commerce and drive a vehicle that meets one of these definitions:

- Has a gross combination weight rating of 26,001 or more pounds, inclusive of a towed unit with a gross vehicle weight rating of more than 10,000 pounds; or
- Has a gross vehicle weight rating of 26,001 or more pounds; or
- Is designed to transport 16 or more passengers, including the driver; or

- Is of any size and is transporting hazardous materials in an amount that requires placarding under the Hazardous Materials Transportation Act.

A State may decide to waive firefighters, certain farmers, and active military personnel from the CDL requirements. In addition, States may waive knowledge and skills tests and offer restricted CDLs to seasonal CMV operators employed by custom harvesting operations, retail farm supply outlets, agrichemical suppliers, and livestock feeders.

The federal standard requires States to issue a CDL to drivers according to the following vehicle classification, referred to as vehicle groups:

Group A - Any combination of vehicles with a Gross Combined Weight Rating of 26,001 or more pounds provided the Gross Vehicular Weight Rating of the vehicle(s) being towed is in excess of 10,000 pounds.

Group B - Any single vehicle with a Gross Vehicular Weight Rating of 26,001 or more pounds, or any such vehicle towing a vehicle not in excess of 10,000 pounds Gross Vehicular Weight Rating.

Group C - Any single vehicle, or combination of vehicles, that does not meet the definition of Group A or Group B, but that either is designed to transport 16 or more passengers, including driver; or is placarded for hazardous materials.

Drivers who operate special types of CMVs will also need to pass additional tests and obtain an endorsement on their CDL as follows:

- T - Double/Triple Trailers (Knowledge Test only)
- P - Passengers (Knowledge and Skills Tests)
- N - Tank Vehicle (Knowledge Test only)
- H - Hazardous Materials (Knowledge Test only)
- Would require function specific training under HM 126F for drivers after October 1, 1993.
- X - Combination of Tank Vehicle and Hazardous Materials
- Restrictions: "Air Brake" (Knowledge and Skills tests) ■

Endangered Species Act

■ To prevent harm to endangered species from use of pesticides

The objective of the Endangered Species Act (ESA) is to protect endangered and threatened species. FIFRA requires that EPA take steps to prevent harm to these species from the use of pesticides.

In 1973, ESA was enacted "to provide protection for animal and plant species that are threatened or endangered of becoming extinct and to conserve the ecosystems upon which they depend."

In 1988, ESA was amended to require that EPA work with the USDA and U.S. Department of Interior to identify appropriate alternatives for implementing a labeling program. The goal of this program was to protect endangered species from pesticides while allowing agricultural production to continue.

EPA has continued to develop a workable endangered species program with input from all concerned parties. Individual state involvement will also play an important part in the program.

On September 30, 1988, EPA requested that the U.S. Fish and Wildlife Service (FWS) revise and expand biological opinions for selected pesticides. FWS provided EPA with the document: "U.S. Fish and Wildlife Service Biological Opinion on Selected Pesticides: Dated June 14, 1989, (Revised September 14, 1989)." This document provides FWS biological opinions for both aquatic and terrestrial species for selected pesticides. It is available from the National Technical Information Service.

EPA proposed a revised Endangered Species Protection Program on July 3, 1989. The program was designed to fulfill the following:

- To achieve the best protection for listed species;
- To be responsive to the needs of the agricultural production in this country by developing a program that could be readily implemented without unnecessary burden on pesticide users.

EPA believes that the goal of protecting listed species from pesticides can best be achieved by focusing in on the listed species themselves.

Reducing the burden on pesticide users can best be met through the use of a threshold application rate approach. EPA will determine the threshold (lowest) application rate on the product label that "may affect" listed species.

EPA's efforts will begin with the most vulnerable of the listed species. Those species will be ranked according to their status, vulnerability to pesticides, and other pertinent factors. The counties in which these ranked species are located, as well as pesticide sites, will be identified.

For application rates at or above the threshold application rate, EPA will initiate a formal consultation with the U.S. Fish and Wildlife Service (FWS). EPA will provide a notification 30 days prior to its consultation with FWS. Rates below the threshold application rate will not be part of the consultation request.

EPA "MAY AFFECT" PESTICIDE LIST FOR ENDANGERED SPECIES

acephate	methyl bromide
aldicarb	naled
aluminum phosphide	parathion
azinphos methyl	permethrin
bendiocarb	phorate
brodifacoum	pival
bromadiolone	potassium nitrate
bromethalin	sodium cyanide
carbofuran	sodium fluoroacetate
chlorophacinone	sodium nitrate
chlorpyrifos	terbufos
diphacinone	trifluralin
endosulfan	vitamin D-3
fenthion	warfarin
fenvalerate (and s-fenvalerate)	zinc phosphide
magnesium phosphide	

All indoor use products are exempt from the requirements of the Endangered Species Protection Program.

On March 14, 1991, EPA published a notice in the Federal Register regarding its completed "may affect" determinations for 31 pesticides which was forwarded to the U.S. Fish and Wildlife Service. The pesticides for which determinations were made are shown above.

The EPA expected to issue the final Endangered Species rule by the end of 1992; however, that notice has been delayed due to former President Bush's moratorium on new regulations. Due to the moratorium delay and other political factors, the Endangered Species Program will continue to be a voluntary program until 1995, at which time the final Endangered Species rule is expected to become enforceable. ■

Federal Food, Drug and Cosmetic Act

- Establishes tolerances for residues of pesticides
- Negligible risk definition
- Court upholds Delaney Clause

The Food and Drug Administration (FDA) administers the Federal Food, Drug and Cosmetic Act (FDCA). However, in 1970, EPA was given responsibility for setting tolerances or granting exemption(s) for the requirements of tolerance for residues of pesticides and inert ingredients in food. A tolerance is the maximum level of pesticide residue acceptable in raw agricultural commodities, foods, and feeds. FDA maintained responsibility for monitoring residues and enforcing the tolerances set by EPA. The Food Safety Inspection Service of the USDA also inspects poultry and meats for tolerance compliance.

Raw Agricultural Commodity Tolerances: Section 408 of FDCA authorizes the setting of tolerances for residues of pesticides or inert ingredients in or on raw agricultural commodities. Section 201(r) defines a raw agricultural commodity as "any food in its raw or natural state, including fruits that are washed, colored, or otherwise treated in their unpeeled natural form prior to marketing." Section 408 requires the recognition of both benefits and risks in establishing the tolerance.

Food Additive Tolerances: Section 409 of FDCA authorizes the setting of tolerances for pesticides when used as food additives. The petitioner for tolerance must demonstrate to EPA that granting the tolerance will not cause harm to the consumer. It does not provide recognition of benefits derived from the use of the pesticide as a food additive.

Section 409 contains the Delaney Clause that prohibits the granting of a food additive tolerance to a product, including pesticides and inerts, which has been found to induce cancer in humans or animals.

Section 409 excludes from its definition of food additive, pesticide or inert residues in or on raw agricultural commodities. An exception to this exclusion is when, as a result of processing, the level of residue concentrates exceed a Section 408 tolerance. In such a situation, a Section 409 tolerance would be required.

Negligible Risk Standard: On October 19, 1988, EPA published a notice in the Federal Register detailing a change in Agency position in dealing with the regulation of pesticides in food and feed. This notice is in direct response to a detailed report commissioned by EPA and prepared by the Board of Agriculture of the National Research Council of the National Academy of Sciences (NAS) entitled "Regulating Pesticides In Food: The Delaney Paradox."

The Delaney Clause to the Food, Drug and Cosmetic Act states that a food additive shall not be permitted "if it is found to induce cancer when ingested by man or animal or if it is found, after tests which are appropriate for evaluation of the safety of food additives, to induce cancer in man or animal." The Delaney Clause permits zero residue of a carcinogen in processed foods. Under the Delaney Clause residues of pesticides found in processed foods are considered food additives.

For raw foods, EPA set maximum tolerance levels of pesticide residues, taking into account both health risks and benefits of using the pesticide. But in processed foods, the agency under the Delaney Clause could only consider health risks with zero tolerance.

The NAS provided the following four key recommendations to EPA on how to handle the Delaney paradox:

1. The registrations of pesticide in food and feed, whether from old or new pesticides, should be regulated based on consistent standards.
2. The total dietary exposure of oncogenic pesticides could be significantly reduced if a negligible risk standard for carcinogens was applied consistently.
3. EPA should focus on pesticides of "most concern" found in the most consumed crops/foods/feeds.
4. EPA should improve its methodologies to better assess the impacts of regulatory actions on health, the environment and food production.

Under a policy announced October 19, 1988, EPA can issue food additive regulations based on the *de minimus* exception to the Delaney Clause. The *de minimus* exception covers pesticides which are regulated (food or feed additives or pesticides which concentrate in food or feed as a result of processing) under Section 409 and pose negligible risks of cancer. EPA considers a negligible risk of cancer to be a maximum of 1 cancer incident in 1 million people. The *de minimus* exception has been applied to Emergency Exemptions (Section 18) and Special Local Needs (Section 24(c)) registrations, and minor uses. Under the *de minimus* exception or negligible risk standard both risks and benefits are considered.

However, a three-judge panel of the Ninth Circuit Court of Appeals ruled on July 8, 1992, that EPA must follow the Delaney Clause and that the *de minimus* exception or negligible risk standard policy is not proper.

The court indicated that the Delaney Clause clearly and mandatorily does not allow use of a food additive which causes cancer. The court indicated that EPA has no discretion, once a finding of carcinogenicity is made. The court noted that during the 30-year history since the enactment of the Delaney Clause, it has been interpreted as an absolute prohibition to all carcinogenic food additives.

On February 22, 1993, the U.S. Supreme Court decided not to accept the National Agricultural Chemicals Association (NACA) petition for Writ of Certiorari to review the decision of the U.S. Ninth Circuit Court of Appeals in *Les v. Reilly* filed on November 6, 1992. The result of the *Les v. Reilly* decision on the Delaney Policy is the review, and possible revocation, of a number of food use tolerances. Because EPA may no longer utilize a *de minimus* exception to the Delaney Clause when making tolerance decisions under FFDCA, tolerances previously granted under the exception must be reviewed to determine whether they violate a strict reading of Delaney. If tolerances are determined to violate the Delaney Clause, the tolerances will be revoked.

On March 30, 1994, the U.S. EPA issued a list of 34 pesticides, representing 100 chemical/crop combinations, which may be affected by the new interpretation of the Delaney Clause.

On October 13, 1994, the U.S. District Court for Eastern California ruled that in 1995 the EPA's pesticide program will have to act on a proposed court settlement (*California v. EPA*, DC ECalif. No 89-0752), which is based on the *Les v. Reilly* "Delaney Clause" decision. This ruling could lead to the eventual ban of dozens of pesticides known to be carcinogenic and present in processed foods. In the meantime, Congress continues to consider legislation to revise existing food safety legislation. ■

Federal Insecticide, Fungicide and Rodenticide Act

■ Regulates distribution, sale, and use of pesticides

The Federal Insecticide, Fungicide and Rodenticide Act as Amended (FIFRA) is the basis for the regulations governing the distribution, sale, and use of pesticides in the United States. On December 2, 1970, the Environmental Protection Agency (EPA) was established and given responsibility for administering the regulations governing pesticides. From 1947 until the formation of EPA, the U.S. Department of Agriculture (USDA) had this responsibility.

FIFRA grants the States significant latitude in regulating the distribution, sale, and use of pesticides. It is important to appreciate that many of the Federal laws have comparable State laws which require compliance.

A *pesticide*, as defined by FIFRA, includes "any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest, and any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant." This definition is broad and comprehensive.

EPA defines registration as the "formal listing with EPA of a new pesticide before it can be sold or distributed in intrastate or interstate commerce." An EPA registration is often referred to as a FIFRA Section 3 registration. This pre-marketing licensing by EPA is based on data "demonstrating that the pesticide will not cause unreasonable adverse effects on human health or the environment when it is used according to approved label directions." It also considers economic and social costs, and benefits. Under FIFRA, it is the responsibility of the applicant to demonstrate that the pesticide product meets all requirements for registration.

It is imperative to note that a pesticide must be registered with the appropriate state agency in each State before it can be marketed or used.

Office of Pesticide Programs

The Office of Pesticide Programs (OPP) administers the regulations governing pesticides.

A registration packet is available from OPP. This packet includes FIFRA as Amended, a listing of key contacts in OPP, various forms necessary for registering or maintaining a registration, and key PR (Pesticide Regulation) Notices which are relevant to the registration process.

Product managers in OPP are responsible for specific pesticides or groups of pesticides. The product managers and the products for which they are responsible are shown on page D21.

FIFRA Scientific Advisory Panel

The Scientific Advisory Panel (SAP) was established in 1975 to advise EPA regarding certain scientific matters pertaining to regulatory decisions. Membership is authorized at seven members from various scientific areas. The 1988 amendments to FIFRA (FIFRA Lite) made the SAP a permanent body within EPA.

Currently the SAP is composed of the following individuals: Robert B. Jaeger, FIFRA Scientific Advisory Panel, Office of Pesticide Programs, EPA; Dr. Marion W. Anders, Department of Pharmacology, University of Rochester Medical Center; Dr. Ernest E. McConnell; Dr. Harihara M. Mehandale, Division of Pharmacology, Northeast Louisiana University School of Pharmacy; Dr. Mary Anne Thrall, Department of Pathology, College of Veterinary Medicine & Biomedical Sciences, Colorado State University; Dr. Charles C. Capen, Department of Veterinary Pathobiology, School of Veterinary Medicine, The Ohio State University; and Dr. John T. Wilson, Louisiana State University Medical Center. Currently there is one vacancy on the Panel to be appointed.

FIFRA Lite - 1988 Amendments

Congress amended FIFRA in 1988 to strengthen and accelerate pesticide reregistration. The nine-year reregistration mandate requires a comprehensive reevaluation of all data supporting products containing any active ingredient registered before November 1, 1984.

The reregistration program established the following 5-phase program:

Phase 1 – Establishes active ingredient reregistration priority.

Phase 2 – Reregistrant notification and decision to commit to reregister; payment of first fee installment.

Phase 3 – Submission of study summaries and reformatted data by registrant; payment of final fee installment.

Phase 4 – Review and identification of outstanding data gaps by EPA.

Phase 5 – Comprehensive data review by EPA and reregistration.

Pesticides to be reregistered were placed into four groups.

Group A includes all pesticides for which Registration Standards have been issued. Groups B, C, and D contain active ingredients with priorities based on whether or not they:

1. Are used on or in food or feed and may result in post-harvest residues;
2. May result in residues of toxicological concern;
3. Have significant outstanding data requirements;
4. Are used in crops where worker exposure is most likely to occur.

Phases 2, 3, and 4 do not directly apply to group A.

These new amendments establish criteria which may invalidate certain data for which the registrant is unable to certify the possession of or access to raw data used in generated by the study; or data which was submitted to EPA before January 1, 1970 unless it can be demonstrated to EPA by the registrant that the study is valid.

"FIFRA 88" also established criteria for data and fees for reregistration and annual registration.

The schedule for reregistration fees is: \$150,000 payable in two installments; \$50,000 in Phase 2 and \$100,000 in Phase 3.

Minor use pesticides and antimicrobial pesticides with annual production of less than 1 million pounds which are reregistered for nonfarm uses are exempt from fees.

Qualified small businesses are required to pay a reduced portion of the reregistration fee.

By March 1 of each year, each registrant must pay registration maintenance fees to EPA.

Once all of the generic data requirements are met, EPA will publish a Reregistration Eligibility Document (RED) announcing that products containing the active ingredient are eligible for reregistration.

REDs have been issued for the following active ingredients:

Fosetyl-Al (Aliette).....	December 1990
<i>Heliothis zea</i> NPV.....	December 1990
Methoprene.....	March 1991
Sulfur.....	March 1991
Potassium Bromide.....	June 1991
Warfarin.....	June 6, 1991
Sodium and calcium hypochlorite salts.....	September 1991
Dried blood.....	September 1991
Inorganic nitrate/nitrite (sodium and potassium nitrates).....	September 1991
Carbon and carbon dioxide.....	September 1991
Silicon dioxide and silica gel.....	September 1991
Propionic acid.....	September 1991
Sodium diacetate.....	September 1991
Heptachlor.....	March 31, 1992
<i>Allium sativum</i> (garlic).....	June 1992
Egg solids.....	June 1992
Citric acid.....	June 1992
Capsaicin.....	June 1992
Alkyl amine hydrochloride.....	August 1992
Indole-3-butyric acid (IBA).....	August 1992
Zinc salts.....	August 1992
Sodium hydroxide.....	September 1992
Streptomycin and streptomycin sulfate.....	September 1992
Chlorinated isocyanurates.....	September 1992
<i>Nosema locustae</i>	September 1992
Ethylene.....	September 1992
Soap salts.....	September 1992
Oxalic acid.....	December 1992
Bone oil.....	1992
Iron salts.....	February 1993
Oxytetracycline.....	March 30, 1993
Biobor.....	June 1993
Silver compounds.....	July 1993
OBPA.....	August 1, 1993
Sulfuryl fluoride.....	September 30, 1993
Daminozide.....	October 26, 1993
Butylate.....	November 26, 1993
Bromine.....	December 1993
Mineral Acids.....	December 1993
Vegetable and flower oils.....	December 1993
Lithium hydrochloride.....	December 1993
Peroxy compounds.....	December 1993
Barium Metaborate.....	December 1993
Eugenol.....	1993
Menthol.....	1993
Glyphosate.....	1993
Cedarwood oil.....	1993



NEED HELP?

The regulations which implement FIFRA are included in Title 40 of the Code of Federal Regulations Parts 150-189. Proposed and new regulations and notices are published daily in the Federal Register. These items can be obtained from:

**Superintendent of Documents
Government Printing Office
Washington, DC 20402
202-512-1800
Fax: 202-512-2250**

Thymol.....	1993
Sodium lauryl sulfate.....	1993
Inorganic halides.....	1993
Tris nitro or hydroxymethyl 1-2-nitro.....	1993
PEP (phenyl ethyl propionate).....	1993
Boric Acid.....	February 16, 1994
Ethanolamine.....	March 1994
Hexadecadienol acetates.....	March 1994
Periplanone B.....	March 1994
Tebuthiuron.....	March 1994
Pronamide.....	March 1994
Methiocarb.....	March 1994
Maleic Hydrazide.....	June 1994
N6-Benzozyladenine.....	June 1994
Difenzoquat.....	June 1994
Metalaxyl.....	June 1994
Vendex.....	June 1994
Oryzalin.....	June 1994
Bentazon.....	June 1994
Hexazinone.....	June 1994
Mevinphos.....	June 1994
Chlorine.....	June 1994
DCDI.....	June 1994
Sodium cyanide.....	June 1994
Cresol.....	June 1994
Xylenol.....	June 1994
Mercaptobenzothiazole.....	June 1994
Muscalure.....	June 1994
Oil of citronella.....	June 1994
DBNPA.....	June 1994
Nuosept.....	June 1994
Chloron-m-xylenol.....	June 1994
Piperalin.....	June 1994
Limonene.....	June 1994

Once product-specific data and labeling requirements are met, the products will be reregistered.

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Pesticide Management and Disposal Regulations

The amendments to Section 19 of FIFRA in 1988 significantly expanded EPA's authority to regulate the storage, transportation, and disposal of pesticides, containers, rinsates, and contaminated materials. They also ended the requirement that EPA must accept suspended and canceled pesticides for disposal and directed the Agency to develop new regulations governing the recall of pesticides. Congress directed implementation of a cost and burden sharing system between the Agency and registrants for storage of recalled pesticides. Under this system, there is incentive for both the Agency and the registrant to dispose of materials in a safe, timely, and effective manner. Further, EPA was directed to develop container design and residue removal regulations that encourage safe use, safe refill, and safe disposal.

Since the passage of FIFRA 88, the EPA has broken down the task of writing pesticide management and disposal regulations into three phases. **Phase I**, expected to be completed in 1995, will establish recall plans, requirements for storage of recalled pesticide, storage and disposal plans, indemnification procedures, and transportation requirements for suspended and canceled products.

Phase II regulations, proposed on February 11, 1994, cover pesticide container and containment requirements. The proposal covers container labeling; non-refillable and refillable container standards; container design and residue removal; and standards for pesticide containment structures. The regulations are expected to become final in late 1995 or early 1996. The proposed regulations, when final, allow up to 2 years for new establishments and 10 years for old establishments to meet containment requirements. Within 2 years of the final regulation, pesticides could be sold only in containers that meet the regulations' design requirements for refillable and non-refillable containers.

Phase III regulations will cover pesticide package storage, management of excess pesticides and rinsate, mixing/loading spill control procedures, and additional transportation requirements. No date has been set for the completion of Phase III regulations.

EPA was also directed to study options to encourage or require the return, refill, or reuse of pesticide containers, the development of formulations that facilitate removal of pesticide residues from containers, and the use of bulk storage of pesticides. EPA submitted this report to Congress in May 1992.

"Me-Too" and Expedited Review

The 1988 Amendments established an expedited registration of "me-too" registrations and amendments not requiring scientific review.

EPA outlined in PR Notice 89-2 procedures which the registrant must follow to be considered for an expedited review. The 1988 Amendments to FIFRA require that EPA review and act on an application for a "me-too" end-use product or for an amendment of a currently registered product which requires no data.

The "me-too" end-use product must be identical or substantially similar to a currently registered product. It must contain the same active and inert ingredient(s), have no additional use pattern(s), and have comparable directions for use as a currently registered end-use product. EPA would require that such applications not increase the risk of ad-

GROUP A —

6-12	Captan
Acephate	Carbaryl
ADBAC	Carbofuran
Al & Mg phosphide	Carbophenothion
Alachlor	Carboxin
Aldicarb	Chloramben
Aldrin	Chlordane
Aliette	Chlordimeform HCl
Allethrin stereoisomers	Chlorinated isocyanurates
4-Aminopyridine	Chlorobenzilate
Amitraz	Chloroneb
Amitrole	Chloropicrin
Ammonium sulfamate	Chlorothalonil
Anilazine	Chlorpropham
Arsenic acid	Chlorpyrifos
Aspon	Chlorsulfuron
Asulam	Chromated arsenicals
Atrazine	Coal tar/creosote
Azinphos-methyl	Copper compounds: Group II
Barium metaborate	Copper sulfate
Bendiocarb	Coumaphos
Benomyl	Cryolite
Bentazon	Cyanazine
Bifenox	Cycloheximide
BKLF1-2	Cyhexatin
Boric acid	2,4-D
Bromacil	2,4-DB
Brominated salicylanilide	2,4-DP
BT	Dalapon
Butoxycarboxim	Daminozide
Butylate	DCNA
Captafol	DCPA

GROUP B — Active Ingredients

Acrolein	Dichlorophenylphenol, and salts
Ametryn	Diethyl ethyl
Aminocarb	Dimethyldithiocarbamate salts
Arsenates and arsenites	Dinitramine
Barban	4,6-Dinitro-o-cresol, and salts
Benfluralin	Dinitrophenol
Bensulide	Dinocap, and its components
N6-Benzyladenine	Diphacinone, and salts
o-Benzyl-p-chlorophenol, and salts	Diphenylamine
Biphenyl	Dipropyl isocinchomeronate
Bis(trichloromethyl)sulfone	Ditalimfos
Bomyl	Dodemorph, and salts
Brodifacoum	Dowacil-A40*
Bromadiolone	Duraset*
Bromethalin	EDB
Bromonitrostyrene	EDC
Bromoxynil, and esters	Endothall, and salts
Bronopol	Endrin
Butralin	Ethalfuralin
Cacodylic acid, and salts	Ethofumesate
Cadmium chloride	Ethylan
Chlorfenvinphos	Ethylene oxide
Chlorfurenonol, methyl ester	Fenvalerate
Chlorophacinone	Fluazifop butyl, isomers
Cloprop, salts and amide	Flucythrinate
4-CPA, and salts	Fluvalinate
Crotoxyphos	Fosamine ammonium
Cycloate	Fospirate
Cypermethrin	Furfural
Cythioate	Glutaraldehyde
Dazomet, and salts	Hexachlorophene, and salts
DDT	Imazalil
DEF*	indole-3-butyric acid
Desmedipham	iprodione
Diamidofos	Irgasan*
Dibromodicyanobutane	isofenphos
Dicapthon	Lead arsenate
Diclofop-methyl	MCPB, and salts
	Mefluidide, and salts

(Continued on page D20)

Pesticides With Registration Standards

DDVP	Fenthion	Metolachlor	Pronamide
Demeton	Fluchloralin	Metribuzin	Propachlor
Dialifor	Fluometuron	Mevinphos	Propanil
Diallate	Folpet	Monocrotophos	Propargite
Diazinon	Fonofos	Monuron	Propazine
Dicamba	Formaldehyde	Monuron TCA	Propham
Dichlobenil	Formetanate HCl	Na & Ca hypochlorite	Resmethrin
Dichlone	Fumarin	Nabam	Rotenone
Dicofol	Glyphosate	Naled	Simazine
Dicrotophos	Heliothis NPV	Naptalam	Sodium omadine
Difenzoquat	Heptachlor	Naphthalene	Streptomycin
Diflubenzuron	Hexazinone	Naphthaleneacetic acid	Sulfotep
Dimethoate	Isopropalin	Nitrapyrin	Sulfur
Dioxathion	Lindane	Norflurazon	Sulfuryl fluoride
Diphenamid	Linuron	OBPA	Sulprofos
Dipropetryn	Malathion	Oryzalin	Sumithrin
Diquat dibromide	Maleic hydrazide	Oxamyl	Tebuthiuron
Disulfoton	Mancozeb	Oxydemeton-methyl	Telone
Diuron	Maneb	Oxytetracycline	Temephos
Dodine	MCPA	Paraquat dichloride	Terbacil
Endosulfan	MCPP	PCNB	Terbufos
EPN	Metalaxyl	Pendimethalin	Terbutryn
EPTC	Metalddehyde	Perfluidone	Terrazole
Ethephon	Methamidophos	Phenmedipham	Tetrachlorvinphos
Ethion	Methidathion	Phorate	Thiophanate-ethyl
Ethoprop	Methiocarb	Phosalone	Thiram
Ethoxyquin	Methomyl	Phosmet	TPTH
Ethyl parathion	Methoprene	Phosphamidon	Trichlorfon
Fenaminosulf	Methoxychlor	Picloram	Trifluralin
Fenamiphos	Methyl bromide	Potassium bromide	Trimethacarb
Fenitrothion	Methyl parathion	Potassium permanganate	Vendex
Fensulfthion	Metiram	Prometryn	Warfarin & its Na salt
			Zinc phosphide

To Be Reregistered

Mepiquat chloride	Propetamphos
2-Mercaptobenzothiazole, and salts	Propoxur
Merphos	n-Propyl isome
Methyldithiocarbamate, and salts	Propylene oxide
Methanearsonic acid, and salts	Pyrazon
Methazole	Pyrethrin, and derivatives
Methyl isothiocyanate	Pyrimidinone
Methylene bis(thiocyanate)	Ronnel
Mexacarbate	Ryanodine, and derivatives
MGK-264*	Sethoxydim
Molinate	Sodium acifluorfen
MV-678*	Starlicide*
(b-Naphthoxy)acetic acid	TBT-containing compounds
Napropamide	TCMB
Niclosamide	TCNB
Nicotine, and derivatives	Terbucarb
4-Nitrophenol	Terbutylazine
Octhilinone	Tetradifon
Omadine salts	Tetramethrin
Oxadiazon	Thiobencarb
Oxyfluorfen	Thiabendazole, and salts
Oxythioquinox	Thiodicarb
Pebulate	Thiophanate-methyl
Pentachlorophenol, salts and esters	Toxaphene
Permethrin	TPTF
Phenothiazine	Triadimefon
Phenthoate	Triallate
Phenylmercury salts	2,4,5-Trichlorophenol, and salts
2-Phenylphenol, and salts	Triclopyr, salts and esters
Phosacetim	Triforine
Piperonyl butoxide	Troysan CMP Acetate*
Pirimiphos-ethyl	Troysan KK-108A*
Pirimiphos-methyl	Valone*, and salts
Pival*, and salts	Vernolate
Profenofos	Vinclozolin
Prometon	Zineb

*Trademark

GROUP C —
Active Ingredients To Be Reregistered

Accel*
Aliphatic alkyl quaternaries
Aliphatic solvents
Alkyl amino betaine
Alkyl dichlorobenzyl quaternaries
Alkyl diethanolamides
Alkyl diethanolamines, and salts
Alkyl dipropoxyamines
Alkyl imidazolines, and imidazolium quaternaries
Alkyl isoquinolinium quaternaries
Alkyl morpholinium quaternaries
Alkyl pyridines, and pyridinium quaternaries
Alkyl trimethylenediamines, and derivatives
Allantoin, and derivatives
4-t-Amylphenol, and salts
Ancymidol
Animal oils
Aromatic solvents
Arsenal*
Azacosterol HCl
Azadioxabicyclooctane derivatives
Benax 2-A-1*
Benzaldehyde
Benzisothiazol in-3-one
Benzyl bromoacetate
beta-Naphthol
Biobor*
Biopan P-1487*
Bis(bromoacetoxyl)butene
Bis(propylsulfonyl)ethene
Bromohydroxyacetophenone
Busan 74*
Busan 77*
4-t-Butylphenol, and salts
Cellosolve esters
Chloramine B
Chlorhexidine derivatives

(Continued on page D20)

verse effects to the environment. A "me-too" registration generally requires only product chemistry and acute toxicity, and in some cases efficacy data.

Examples of amendments which would be considered for expedited review include a change of product name, minor changes in use directions, etc.

Timing: Within 45 days of receipt of the application, EPA will notify the registrant whether or not the application is complete. If it is not complete, EPA will reject the application. Within 90 days of receipt of application, EPA will notify the registrant if the application is granted or denied. If denied, EPA must provide the specific reasons for denial.

Procedure: In order for a registrant to receive an expedited review, the word "EXPEDITE" must be printed at the top

of the application above the words "Application for Pesticide." The registrant must use the new EPA form 8570-1 which includes a unique red identification number in the upper right hand corner. If it is an application for a "me-too" registration the applicant must reference the product name and registration number of the product to which it is substantially similar. The applicant must also include with the submission two self-addressed, stick-on labels for EPA's response.

Reduced-Risk Pesticides Initiative

On July 21, 1993, EPA issued PR Notice 93-9 entitled "Voluntary Reduced-Risk Pesticides Initiative." The purpose of this notice is to encourage the registration of lower risk pesticide products containing new active ingredients

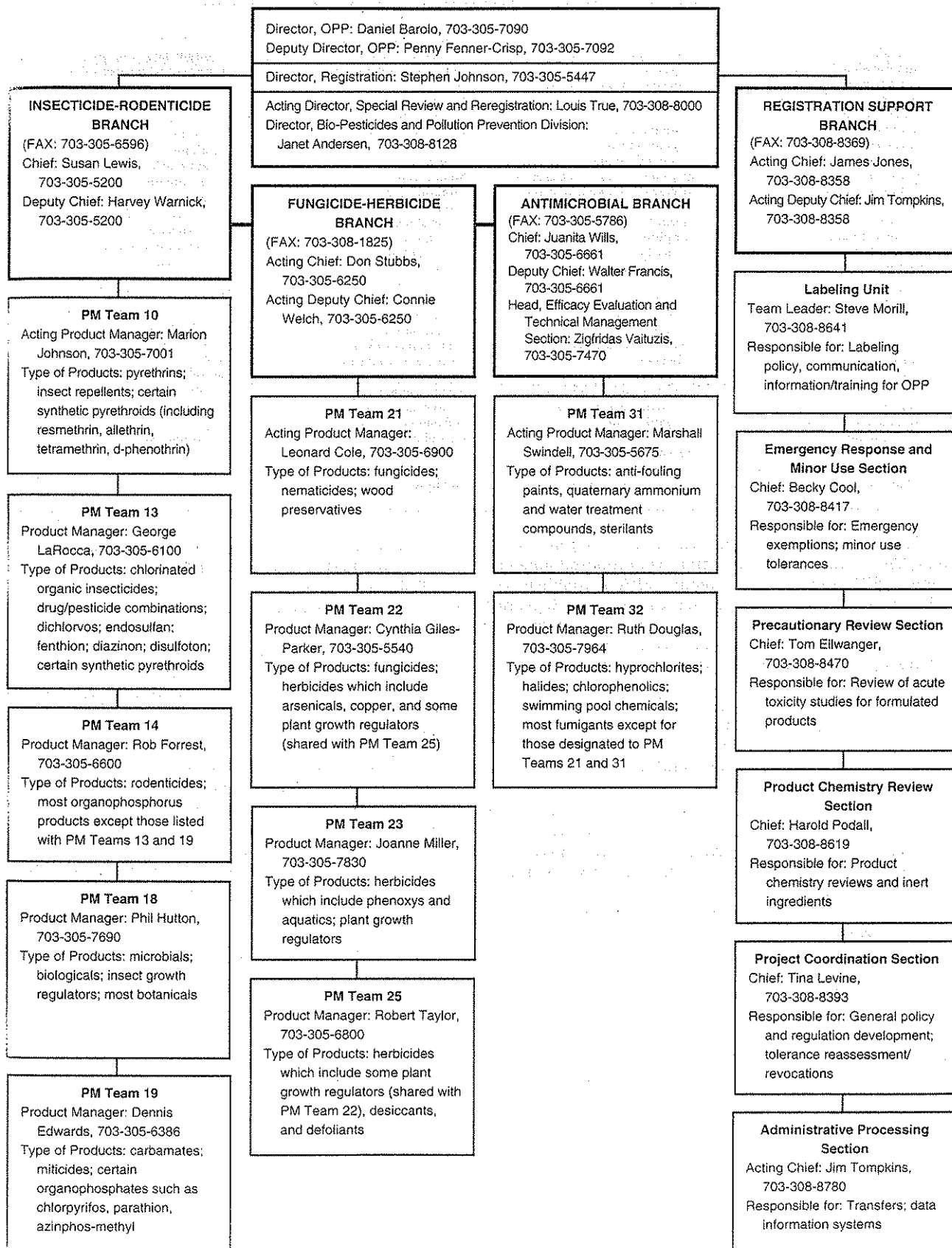
(Continued on page D22)

GROUP C — Active Ingredients To Be Reregistered (Continued)

Chlorinated glycoluril	MON-4620*
Chlorocyclopentylphenol, and salts	Naphthenate salts
Chloro(hydroxymethyl)acetamide	Neomycin sulfate
2-Chloro-4-phenylphenol, and salts	NEPD*
4-Chloro-2-phenylphenol, and salts	2-(Octylthio)ethanol
6-Chloro-2-phenylphenol, and salts	Oil of camphor, and camphor
Chlorosalicylanilide	Oil of citronella
Cinnamaldehyde	Oil of pennyroyal
Cinoxate	Oleyl polyamine
Coal tar chemicals: uses other than wood preserving	p-Anethole
(Coco alkyl)amine salts	Paraclor
Cosan 145*	p-Chloro-m-cresol
Cyanodithioimidocarbonate	p-Chloro-m-xylene
Cyclohexanone	Perchloroethylene
Cycloprate	Phenethyl propionate
DBPNA	Phosphorus
o-Dichlorobenzene	Phthalate esters
p-Dichlorobenzene	Pine oils
Dichlorophene, and salts	Piperalin
Dienochlor	Piprotal
Dihalodialkylhydantoin	Polybromide quat resin
Dikegulac sodium	Polyethoxylated abietylamine
Dimethametryn	Polyethoxylated aliphatic alcohols
Dimethepin	Polyethoxylated aliphatic amines
Dimethoxane	Polyethoxylated alkylphenols
Diphenylstibine octanoate	Polyethoxylated sorbitol, derivatives
DMPA	Poly(hexamethylene biguanide) HCL
Dowicil S-13*	Polypropylene glycol, and ether derivatives
Dowicil 100*	Propamocarb
Ethanolamine, 2 hydroxymethyl derivatives	Propiconazole
Ethylene	Propylene glycol, and dipropylene glycol
Fenuron trichloroacetate	Repellent R-11*
Fluoroacetic acid derivatives	Sabadilla alkaloids
Grotan*	Scilliroside
Hexylene glycol	Siduron
Hydroxymethyl methylthiocarbamate	Sodium dodecyl diphenyl oxide sulfonate
Hylon*	Sodium fluoride
Imazapyr	Strychnine
Indalone	Sulfacetamide
Inorganic cyanide	Sulfoquinoxaline
Iodine, KI, and iodine complexes	Sulfometuron methyl
Isobornyl acetate	Sulfoxide
Lamprecide*	Tanol derivatives
Limonene	Terpineols, and turpentine
Lithium hypochlorite	tetracaine hydrochloride
Mercury chlorides	Thanite*
Metasol J-26*	Thiocyanoethyl derivatives
Methyl chloroform	Thymo!
Methyl ethyl ketone	Trichloromelamine
Methyl nonyl ketone	Triethanolamine, and fatty acid salts
Methylated naphthalenes	Triethylene glycol
Methylene chloride	Triethylhexahydrotriazine
Methylisothiazolinone and derivatives	Trimethoxysilyl quats
(Methylnaphthyl)maleimide	Tris(hydroxymethyl) nitromethane
Methyloxazolines	Wood oils and gums
Metronidazole	
Miltin FF*	

*Trademark

OFFICE OF PESTICIDE PROGRAMS Registration Division



GROUP D — Active Ingredients To Be Reregistered

Acetone	Dextrin	Inorganic polysulfides	Polyethylene
Agrobacterium radiobacter	Diocylsulfosuccinates	Inorganic sulfates	Propionic acid and salts
Aliphatic alcohols, C1-C16	Disparlure	Inorganic thiosulfates	Putrescent whole egg solids
Aliphatic esters	Dodecanyl acetate Isomers	Iron salts	Salicylic acid and derivatives
Alkylbenzene sulfonates	Dried blood	Isobutyl ketones	Silica and silicates
Allium sativum	2-EEEBC	Lanolin and derivatives	Silver and compounds
Aluminum and salts	Ethanolamine	Lauryl sulfate salts	Soap salts
Amical 48*	Ethylene glycol	Malic acid	Sulfallate
Aquashade*	Ethylenediamine	Menthol	Sulfamic acid
Bacillus lentimorbus	Ethylenediaminediacetates	Meta-cresol	Sulfur dioxide
Bacillus popilliae	Ethylenediaminetetraacetate	Mineral acids	Tartar emetic
Basic green 4	Ethylenediaminetriacetates	Mineral bases, strong	2,3,6-TBA and salts
Benzocaine	Eugenol	Mineral bases, weak	TCA and salts
Benzoic acid and derivatives	Famphur	Muscalure	Tetraiodofluorescein
Bis(oxyalkyl)glycine derivatives	Fentichlor	Nickel sulfate	Thidiazuron
Bromine	Fluorosalan	Norea	Toluene/xylene sulfonates
Butylene glycol	Freons	Nosema locustae	Tridecanyl acetates
Calcium cyanamide	Gibberellic acid and salts	NPV inclusion bodies	Trimethyldodecadienoates
Capsaicin	Gluconic acid	Nuranone	Turkey red oil
Carbon and CO ₂	Glycerol	Octadecadieneol acetates	Undecylenic acid
Chlorfenac and salts	Glycolic acid and salts	Oleic acid sulfonates	Urea
Chlorinated TSP	Halazone*	Oxalic acid and salts	Vegetable and flower oils
Chlorine	Hexadecadienol acetates	Paraben esters	Virelure*
Chlorine dioxide and sodium chloride	8-Hydroxyquinoline and salts	Periplanone B	Xylenol
Citric acid and salts	Inorganic bicarbonates	Peroxy compounds	Zinc salts
Colletotrichum	Inorganic chlorates	Petroleum sulfonates	Zirconium oxide
Copper and oxides	Inorganic fluosilicates	Phenol and salts	
Copper salts and complexes	Inorganic halides	Phytophthora citrophthora	
Cytokinin	Inorganic nitrate/nitrite	Polyacrylate resins	*Trademark
	Inorganic phosphates	Polybutene resins	

in order to lessen the human health and environmental risks. The Clinton Administration has proposed amendments to FIFRA which would require EPA to establish criteria for designation of reduced-risk pesticides. Registrations that appear to meet the criteria would qualify for priority review, and, if approved, would be accorded 2 additional years of exclusive data use, beyond the 10 years now provided.

EPA has developed long-term and short-term strategies to implement the policy. The long-term strategy will address the following four (4) areas:

1. Development of criteria for identification of lower risk pesticides and use of these criteria as a factor(s) in scheduling reviews.
2. Streamlining of the overall registration process.
3. Improved and increased information availability to users and others to permit more informed choices in the marketplace.
4. Possibility of rewarding those who develop reduced-risk pesticides.

For the short-term, EPA is encouraging registrants who believe that they have developed a new reduced-risk pesticide product to submit rationales to EPA to have their products considered under the "Voluntary Reduced-Risk Pesticides Initiative." If the product qualifies, it may be given special consideration when EPA sets priorities regarding its registration actions.

Rationales for consideration under the "Voluntary Reduced-Risk Pesticides Initiative" should address the following:

1. Human health
2. Environmental fate and effects
3. Other hazards
 - Potential to deplete stratospheric ozone

- Potential to present hazard through storage, transportation, mixing, use, or disposal

4. Risk discussion

- Reduced-risk product
- Alternative product(s)

5. Pest resistance and management

The EPA has held a workshop to further define reduced-risk pesticides and establish a procedure by which they can streamline the current registration process without first amending FIFRA.

FIFRA Good Laboratory Practices

The FIFRA Good Laboratory Practice (GLP) standards specify the minimum practices and procedures which must be followed in order to ensure the quality and integrity of data submitted to EPA in support of a permit or registration. These requirements are detailed in 40 CFR 160. GLP regulations were initially promulgated in the Federal Register on November 29, 1983 and were revised on August 17, 1989.

Any data developed to support a registration must be conducted under Good Laboratory Practice (GLP). Compliance of the GLP standards are monitored through a program of laboratory inspections and study audits coordinated between EPA and the Food and Drug Administration.

Label Percentage for Ingredients Statement

Pesticide Regulation (PR) Notice 91-2 requires that the "amount (percentage by weight) of ingredient(s) specified in the ingredient statement on the label must be stated as nominal concentration." The nominal concentration is a representative percentage between the upper and lower limits. It is based on certified limits obtained from representative sample analysis of five or more typical manufacturing batches.

At the time that nominal concentration is proposed to EPA, the registrant must provide EPA with analyses (including raw analytical data) from at least five representative samples and certified limits for each active, inert ingredient, and impurities of toxicological significance.

The timetable for compliance with the nominal concentration requirement is as follows:

- All new product registrations - Beginning July 1, 1991;
- Products subject to reregistration - When products are called in under Phase 5 of reregistration;
- All other products/applications (applications should indicate "Conversion to Nominal Concentration") - Until July 1, 1997.

Inerts

OPP issued a Policy Statement regarding inert ingredients in pesticide products in the Federal Register on April 22, 1987. This policy statement was revised on November 22, 1989. A list of pesticide product inert ingredients was published January 15, 1992, and revised in October 1993. The 1992 EPA list classified inerts currently used in pesticide formulations into four categories based on the degree of toxicological concern. Product containing List 1 inert ingredients must include the following statement on its labeling: "This product contains the toxic inert (name of inert)." However EPA strongly encourages registrants to substitute or remove from their products any List 1 or List 2 inert ingredients. This modification must be done by submitting a

(Continued on page D24)

LIST 1 Inerts of Toxicological Concern

Aniline
Asbestos fiber
1,4-Benzenediol
Cadmium compounds
Carbon tetrachloride
Chloroform
p-Dichlorobenzene
Di-ethyl hexyl phthalate (DEHP)
Di-(2-ethyl hexyl) adipate
Dimethyl formamide
Dioxane
Epichlorhydrin
Ethanol, 2-ethoxy (cellusolve)
Ethanol ethoxy acetate
Ethylene dichloride
Ethylene glycol monomethyl ether; methyl cellusolve
Ethyl acrylate
n-Hexane
Hydrazine
Isophorone
Lead compounds
Malachite green
Methyl n-butyl ketone
Methyl chloride
Methylene chloride
Nonylphenol
Perchlorethylene (PERC)
Phenol
o-Phenylphenol
Propylene dichloride (1,2-Dichloropropane)
Propylene oxide
Pyrethrins
Rhodamine B
Sodium dichromate
Toluene disocyanate
1,1,2-Trichloroethane
Tributyl tin oxide
Trichloroethylene
Tri-orthocresylphosphate (TOCP)

LIST 2 Potentially Toxic Inerts/ High Priority for Testing

Acetonitrile
1,2,3-Benzotriazole
2-Benzyl 4-chlorophenol
1-Butoxy-2-propanol
2-Butoxy-1-ethanol
1-Butoxyethoxy-2-propanol

Butyl benzyl phthalate
Butyl methacrylate
Butylene oxide
Chlorobenzene
1-Chloro-1, 1-difluoroethane
Chlorodifluoromethane
Chloroethane
p-Chloro-m-xylene
2-Chlorotoluene
Cresols
m-Cresol
o-Cresol
p-Cresol
Cyclohexanone
Dibutyl phthalate
2,3-Dichloroaniline
2,4-Dichloroaniline
2,5-Dichloroaniline
2,6-Dichloroaniline
3,4-Dichloroaniline
3,5-Dichloroaniline
o-Dichlorobenzene
Dichlorodifluoromethane
Dichloromonofluoromethane
Dichlorophene
Dichlorotetrafluoroethane
Diethanolamine
Diethyl phthalate
Diethylene glycol monobutyl ether (butyl carbitol)
Diethylene glycol monoethyl ether (carbitol)
Diethylene glycol monomethyl ether (methyl carbitol)
1,1-Difluoroethane
Dimethyl phthalate
Diocetyl phthalate
Diphenyl ether
Dipropylene glycol monomethyl ether
Ethylbenzene
Isopropyl phenols
Mercaptobenzothiazole
Mesityl oxide
Methyl bromide
Methyl ethyl ketoxime
Methyl isobutyl ketone
Methyl methacrylate
1-Methoxy-2-propanol
Nitroethane
Nitromethane
p-Nitrophenol
Petroleum hydrocarbons
Propylene glycol monobutyl ether
Toluene
Tolyl triazole
1,1,1-Trichloroethane
Trichlorofluoromethane
Trichlorotrifluoroethane
Triethanolamine
Tripropylene glycol monomethyl ether
Xylene

revised "Confidential Statement of Formula" to EPA for approval.

List 3 includes approximately 800 inert ingredients that have no basis for being on Lists 1, 2, and 4. List 4 contains inerts which are Generally Regarded As Safe (GRAS). Approximately 300 inert ingredients are included in this category. It includes such inert ingredients as cookie crumbs, corn cobs, and other GRAS substances (21 CFR 182).

The toxic inerts listed by EPA in 1992 are shown on page D23. A revised list is available from EPA at 703-305-5805.

Worker Protection

On August 13, 1992, EPA announced its final rule revising its regulations regarding protection of workers from agricultural pesticides. It became effective October 20, 1992. (Retail dealers may continue to market products in their inventories that do not have revised Worker Protection Standard labeling until October 23, 1995. After October 23, 1995, all products distributed or sold by any person must bear labeling statements in compliance with the new subpart K.)

The "Worker Protection Standard" is directed toward the working conditions of the following two types of employees:

1. Those who handle agricultural pesticides (mix, load, apply, clean or repair equipment, act as flaggers, etc.)
2. Those who perform tasks related to cultivation and harvesting. EPA estimates that the new rule will affect about 3.9 million people nationwide.

The provisions are intended to accomplish the following:

1. Eliminate or reduce exposure to pesticides.

Exposure is limited by establishing restricted entry intervals (REIs) for all pesticide products used in the production of agricultural plants and for which REIs have not been set according to current standards.

- a. **48-hour REI** — is established for any product that is highly toxic because of dermal toxicity or skin or eye irritation (Toxicity Category I products). (The REI is extended to 72 hours in arid areas if the product is an organophosphate and is applied outdoors.)
- b. **24-hour REI** — is established for any product that is moderately toxic because of dermal toxicity of skin or eye irritation (Toxicity Category II products).
- c. **12-hour REI** — is established for all other products.

2. Mitigate exposures that occur.

3. Inform employees about the hazards of pesticides.

The rule affects both Part 156 (Labeling Requirements for Pesticides and Devices) and Part 170 (Worker Protection Standards for Agricultural Pesticides) of Title 40 of the Code of Federal Regulations. There are different implementation dates for each. Key dates include:

On or after April 21, 1993 — First amended labeling available under Part 156. As amended labeling is used, EPA will begin enforcement under provisions of Part 170 related to new specific labeling requirements regarding restricted entry intervals, personal protection equipment, and notification about treated areas.

After April 15, 1994 — EPA will begin to enforce all provisions of Part 170.

After April 21, 1994 — All products covered by this rule must have amended labeling when distributed or sold by registrants. On this date, EPA will revoke PR Notice 83-2. Registrants of products subject to PR Notice 83-2 must



For more information on the Worker Protection Standard, contact:

EPA Occupational Safety Branch

Phone: 703-305-7666

Fax: 703-305-5558

modify their labeling according to Subpart K of Part 156 (Worker Protection Standards). Not all products included within the scope of Subpart K were included in PR Notice 83-2.

Implementation and enforcement of the revised "Worker Protection Standard" will utilize the misuse provision of FIFRA Section 12(a)(2)(G). This provision states that it is unlawful "to use any registered product in a manner inconsistent with its labeling." For the standard to be enforceable, its provisions or reference to them must be incorporated in labeling. Provisions which will not vary among affected products will be referenced in labeling and will not be repeated in the labeling of every product. Provisions which are product specific must be included in the labeling.

Products affected by the revised "Worker Protection Standard" are, with some exceptions, those products registered for use in the production of agricultural plants. It includes any product registered for use in the production of agricultural plants on farms, or in forests, nurseries, or greenhouses which may be applied directly to agricultural plants or to growing areas. It specifically does not include the following uses:

1. Research uses of unregistered pesticides.
2. Attractants or repellents in traps.
3. On harvested portions of agricultural plants or on harvested timber.
4. In a manner not related to production of agricultural plants, including, but not limited to structural pest control, control of vegetation along rights-of-way and in other noncrop areas, and pasture and rangeland use.
5. On plants grown for other than commercial or research purposes.
6. On livestock or other animals, or in or about animal premises.
7. Mosquito abatement.
8. Control of vertebrate pests.
9. On plants that are in ornamental gardens, parks, and public or private lawns and grounds intended only for aesthetic purposes.

If a product has exempted uses and covered uses, the required statements must appear on the label.

Registrants of products affected by the standard will be required to specify the following product specific provisions:

1. A prohibition from applying the pesticide in a manner that contacts anyone except appropriately trained and equipped handlers.

2. Personal protective equipment (PPE) for handling and early-entry intervals.
3. Restricted entry interval (REI).
4. If appropriate, that workers be notified orally and by posting of signs at the treated areas.

These provisions will be effective as soon as they appear on the label.

Provisions which apply to all pesticide products used in the production of agricultural plants include the following requirements:

1. Training handlers and agricultural workers.
2. Providing pesticide-specific information to employees.
3. Providing decontamination water and emergency assistance for handlers and workers.

On April 6, 1994, President Clinton signed into law the following revisions to the WPS:

- The bill delays the date to comply with the general requirements of the WPS until January 1, 1995. These general requirements include training, decontamination, monitoring of handlers, notification, and emergency assistance. The legislation does not delay specific requirements appearing on labels covering PPE and REI.
- Exempts commercial crop advisors from WPS requirements until January 1, 1995.

In addition, EPA has issued a 2-year exception for cut-use workers in complying with WPS early-entry restrictions, but only with the following conditions:

- Treated area may be entered only 4 or more hours after application;
- Protective clothing and equipment must be worn, and proper training on use of this equipment must be given;
- Label and exception information must be made available to workers;
- Measures must be taken to mitigate heat stress;
- Soap, clean towels, and water must be provided to workers for washing; and
- Workers are limited to 3 hours of early entry per 24 hours.

Advertising of Unregistered Pesticides

The distribution, sale, and offer for sale of pesticides are regulated by EPA.



NEED HELP?

Consult 40 CFR 169 and/or the National Archives and Records Administration "Guide to Record Retention Requirements in the Code of Federal Regulations" for requirements regarding retention of records.

EPA regards it unlawful to place or sponsor advertisements which suggest or recommend the sale or use of any pesticides for authorized use under:

1. Section 5 - Experimental Use Permit.
2. Section 18 - Emergency Exemption, except for advertisements that:
 - Are media specific to geographical area of exemption;
 - Contain name and address of one or more retail stores selling product, and
 - Prominently identify limitations of use under exemption.
3. Section 24(c) Special Local Need, unless advertisement contains prominent notice indicating limitations of the Special Local Need.
4. Advertisement of any unregistered pesticide or unregistered uses of a registered pesticide is unlawful unless it is allowed and limited under a Section 18 Emergency Exemption or Section 24(c) Special Local Need.

Registration and Reporting of Pesticide Producing Establishments

The regulations governing the registration and reporting of pesticide producing establishments are contained in 40 CFR 167.

These regulations require "any producer who has actual constructive knowledge that a substance he produces is used or intended for use as an active ingredient in the manufacture of a pesticide" to register his establishment. This rule covers any active ingredient, pesticide, including biotechnology pesticide products, or device producing establishment. Custom blenders are not included under this rule.

Those establishments covered under this rule are required to report, using EPA forms, the name and address of the establishment, and amount of each pesticidal product produced. Also to be included is the amount of product produced during the past year, estimated amount to be produced during the current year, as well as product sold or distributed during the past year. Foreign producing establishments are required to report production only on those products exported to the United States.

Recordkeeping and Retention

Producers of any pesticide, device, or active ingredient used in the production of pesticides that are or will be offered in commerce, including those offered for export, must keep and retain records. Also required to maintain such records are any distributor, carrier, dealer, or other person who sells or offers for sale, delivers or offers for delivery any pesticide, device, or active ingredient used in producing a pesticide.

Required records include, but may not be limited to the following:

1. Product name, registration or experimental use permit number, and production information, including quantity and batch information, of all pesticides produced.
2. Information regarding receipt of pesticides, devices, or active ingredients used in the production of pesticides.
3. Shipping information regarding the pesticides, devices, or active ingredients used in the production of pesticides.

(Continued on page D26)

Minor Use Crops/Commodities

Acerola	Cidra	Kale (Kaailan)	Pimentos
Allspice	Cinnamon	Kiwi	Pine nuts
Amaranth, Chinese	Citron	Kohlrabi	Pinon
Anise	Cloves	Kumquats	Pistachios
Anon	Coconut	Langsat	Pitanga cherries
Arracacha	Collards	Leeks	Plantains
Arragula	Corazon	Lentils	Poke greens
Arrowroot	Coriander	Logan fruit	Pomegranates
Artichokes, globe	Crabapples	Loganberries	Poppy
Artichokes, Jerusalem	Crenshaws	Loquat	Prickly pear fruit
Asparagus	Cress	Lotus root	Quince
Atemoya	Cumin	Lychee	Radicchio
Barbados cherry	Currants	Macadamia nuts	Rapini
Basil	Curry leaf	Mace	Raspberries
Bay	Dandelions	Maianga	Rhubarb
Beechnuts	Daikon	Maney	Rosehips
Blackberries	Dasheen	Mangoes	Rosemary
Bok choy	Dates	Marjoram	Rutabagas
Boysenberries	Dates, Chinese	Mint	Sage
Brazil nuts	Dewberries	Mizuma	Salsify
Breadfruit	Dill	Mulberries	Sapodilla
Broccoli, Chinese	Eggplant	Mustard, Chinese	Sapote, white/green/black
Broccoli Raab	Elderberries	Napa	Savory
Brussels sprouts	Endive	Naranjilla	Shallots
Buckwheat	Escarole	Nasturtium	Soursop
Burdock	Feijoa	Nutmeg	Sweetsop
Butternuts(nuts)	Fennel	Okra	Swiss chard
Cabbage, Chinese	Figs	Olallieberry	Tamarind
Cabbage, sui	Filberts	Onions, green	Tanier
Cactus fruit	Garlic	Oregano	Taro
Cactus pads	Genip	Oyster plant	Tarragon
Canistel calamondin	Ginger	Pak choy	Thyme
Carambola	Gingko	Pak toy	Towelgourd
Caraway	Ginseng	Pakchoi	Tumeric
Cardoon	Gooseberries	Papayas	Turnip, roots and tops
Carob	Groundcherries	Paprika	Water chestnut
Casabas	Guanabana	Parsley	Watercress
Cashews	Guava	Parsley, Chinese	Yambean, tuber
Cassavas	Hazelnuts	Parsley root	Yautia
Cassias	Hickory nuts	Parsnip	Yautier
Celeriac	Hops	Passion fruit	Youngberries
Ceriman	Horseradish	Pawpaws	Yucca
Cherimoya	Huckleberry	Pe tsai	Yuquilla
Chestnuts	Jicama	Pepino dulce	Zapote
Chicory	Jujube	Peppers, chili	
Chinquapins	Juneberries	Peppers, non-bell	
Chives	Kai choy	Persimmons	

- Inventory information with regard to types and quantities of pesticides, devices, or active ingredients which have been produced.
- Copies of all domestic advertising for restricted use pesticides which the producer caused to be prepared.
- Copies of all guarantees of the product produced.
- Information regarding all pesticides, devices, or active ingredients intended for export.
- Information regarding disposal of pesticides or pesticide active ingredients, including method, date, and location of disposal and amounts of material disposed.
- Information of any tests conducted on humans.
- Information containing research data, including raw data and interpretation, relating to pesticides, whether on premises or conducted by third party on behalf of producer.

EPA, or any State or designated political subdivision may inspect and copy any of the aforementioned records with reasonable notice to the producer.

Existing Stocks - EPA Policy

On June 26, 1991, EPA published "Existing Stocks of Pesticide Products; Statement of Policy" as a notice in the Federal Register formalizing its policy, which in the past had been handled on a case-by-case basis. "Existing stocks" are registered products currently in the United States which have been labeled and released before the effective date of an action.

This policy applies to existing stocks of products which have been amended, canceled, or suspended pursuant to FIFRA Sections 3, 4, or 6, or sold under a supplemental contributor agreement.

The policy focuses on whether or not the "existing stocks" pose a "significant risk." If no significant risk is associated with the "existing stocks," EPA will generally allow:

- Unlimited use;
- Unlimited sale by persons other than the registrant;
- Sale by registrant for 1 year after date of cancellation or after date of noncompliance, whichever is sooner.



NEED HELP?

A quarterly abstract bulletin, "EPA Publications Bibliography," is available from:

National Technical Information Service
5285 Port Royal Rd
Springfield, VA 22161
703-487-4650
Fax: 703-321-8547

If significant risk exists regarding the "existing stocks," EPA will make its decision on a case-by-case basis. EPA will allow continued sale, distribution, or use of "existing stocks" only if the benefits of such action exceeds the risks.

Pesticide Export Policy

On February 18, 1993, EPA published the "Final" Export Policy in the Federal Register. It generally became effective on April 19, 1993. It supersedes the existing export policies that were published in the Federal Register on May 14, 1975 and July 28, 1980. The new policy simplifies compliance with export requirements and increases the utility of the information regarding exported U.S. pesticides sent to other countries.

Export Labeling

Every exported pesticide, device, and active ingredient used in producing a pesticide (whether registered or unregistered) must bear a label or labeling which meets the requirements of FIFRA Section 17(a)(1). Section 17(a)(1) requires that all producers of pesticides, devices, and active ingredients used in producing pesticides intended solely for export be subject to certain label requirements, misbranding provisions, establishment registration and production reporting requirements, and recordkeeping and inspection requirements. This requirement applies to all such products regardless of whether the export is for commercial or research use. In addition, required language must appear in English and in the appropriate foreign languages, on the label or labeling. The required label and labeling statements may be met through either immediate container labels, accompanying supplemental labeling, or a combination. The required labels and labeling must meet the requirements regarding content, correct representation, and understandability.

Purchaser Acknowledgement — Unregistered Pesticides

Section 17(a)(2) provides that any person exporting a pesticide other than a pesticide registered for use under FIFRA Section 3 or sold under FIFRA Section 6(a)(1) shall obtain a statement signed by the foreign purchaser prior to export, acknowledging that the purchaser understands that such pesticide is not registered for use in the U.S. and cannot be sold in the U.S. The exporter must submit to EPA the acknowledgement statement signed by the foreign purchaser. The exporter must also include a certification signed by



NEED HELP?

The National Pesticide Information Retrieval System (NPIRS) is a collection of online computer databases containing Pesticide Product and Tolerance data, Pesticide Document Indexes, Fact Sheets, Material Safety Data Sheets (MSDSs), and the daily Federal Register. For more information contact:

CERIS/NPIRS Project
1231 Cumberland — Suite A
West Lafayette, IN 47906-1317
317-494-6616
Fax: 317-494-9727

the exporter affirming that the export did not occur until the statement signed by the foreign purchaser was obtained by the exporter with the submission of the purchaser acknowledgement statement to EPA. Any pesticide product produced for export that cannot be sold for use in the U.S. in the form in which it is produced for export is considered unregistered. This includes pesticides that are of a different formulation, including composition (except for variation within certified limits), or type of formulation, and pesticides that are packaged for use patterns for which they are not registered. Pesticides that are under development as pesticidal products and which are being exported for research testing are also included as unregistered.

Research and Development — Unregistered Pesticides

An unregistered pesticide product exported only for research and development purposes is subject to notification requirements under the policy, unless its use falls within the following:

- Would not involve land use of more than 10 acres or be used on or affect food or feed crops that are intended for consumption.
- Would not involve aquatic uses of more than 1 acre, or any aquatic uses that involve water used for irrigation, drinking, or recreation, or used on or affecting plants or animals taken for food or feed from such waters.
- Would not involve tests on animals intended for food or feed.

Shipments to different purchasers, to different countries of final destination, or which occur more than one calendar year apart will be evaluated separately. An exporter bears the burden of demonstrating that the product meets these criteria before the research product is shipped.

Exporters of pesticides, devices, and active ingredients must keep records and permit inspections of these records in accordance with 40 CFR Part 169.

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Minor Use Crops/Commodities

FIFRA Section 3(c)(2)(A) requires that the EPA Administrator "in establishing standards for data requirements for the registration of pesticides with respect to minor uses, shall make such standards commensurate with the anticipated extent of use, pattern of use, and the level and degree of potential exposure of man and the environment to the pesticide. In the development of these standards, the Administrator shall consider the economic factors of potential national volume of use, extent of distribution, and the impact of the cost of meeting the requirements on the incentives for any potential registrant to undertake the development of the required data."

The Council for Agricultural Science and Technology (CAST) published "Pesticides: Minor Uses/Major Issues" in June 1992. This document covers the matter very well.

OPP considers the list on page D25 to be minor use crops/commodities.

Minor Uses Or Crops - Third Party Registrations

The need for third party registrations has become important because of the need to retain or obtain labeling for needed pesticides in minor uses or crops.

Third party registrations are registrations held by registrants other than the basic registrant. Generally, third party registrants are growers' groups. The primary, but not only, mechanism for third party registration is Section 24(c) or Special Local Need registrations.

Liability and data generation are two major obstacles to third party generation. Indemnification agreements between the third party registrant and the basic registrant and between the grower and the third party registrant will generally solve the liability problem. If the proposed use is a nonfood use, additional data generation may not be required. However, for food uses, residue data will likely be required. It may be developed by the third party registrant,

IR-4, and/or the basic registrant. It should be noted that a tolerance or exemption from the requirement of tolerance is required for all food uses.

Pesticide Assessment Guidelines

The Pesticide Assessment Guidelines (PAG) and Standard Evaluation Procedures (SEP) provide the details for the 40 CFR 158 requirements. Specifically, a PAG provides detail regarding when the study is required, purpose, definitions, principle of the test method, test substance, test procedures, and data and reporting. An SEP is a guidance document intended to clarify the evaluation of data from studies.

Fact Sheets

The OPP develops Fact Sheets for pesticides as part of the Registration Standard process. The objective of a Fact Sheet is to provide a current information source for specific active ingredients. Fact Sheets are currently developed when a registration standard is issued, a new active ingredient registered, a currently registered product has a changed use pattern, or a controversy arises regarding a specific active ingredient.

Each Fact Sheet contains information on the following:

- Description of chemical or biopesticide.
- Scientific findings including chemical, toxicological, physiological, biochemical, environmental, and ecological characteristics.
- Tolerance assessment.
- Summary science statement.
- Summary of regulatory position and rationale.
- Contact person at EPA.

Eventually, Fact Sheets will be issued for all active ingredients.

Data Call-In

The purpose of the Data Call-In (DCI) process was initially to assure that key required test data, especially on the long-term effects, is developed in advance of scheduled Registration Standard reviews. However, EPA has recently expanded the use of the DCI process for general data gathering purposes.

DCI is part of the Registration Standards program and is intended to expedite reregistration by "calling-in" data from the registrants. The DCI considers whether the database is complete, but does not consider if the studies meet current EPA test standards.

Carcinogenicity Categorization

EPA uses the following "weight of the evidence" categorization for carcinogen risk assessment:

Group A - Human carcinogen.

Group B1 - Probable human carcinogen based on laboratory animal and epidemiologic studies.

Group B2 - Probable human carcinogen based on laboratory animal studies.

Group C - Possible human carcinogen.

Group D - Not classifiable as to human carcinogenicity.

Group E - Evidence of noncarcinogenicity for humans.

Reference: Guidelines for Carcinogen Risk Assessment. Federal Register 51(185):33992-34003, September 24, 1986.



NEED HELP?

EPA will use the FIFRA Enforcement Response Policy (ERP) to determine the appropriate enforcement action, such as a civil penalty, in response to violations of FIFRA. The document is available from:

FIFRA ERP

**Pesticide Enforcement Policy Branch
Office of Compliance Monitoring
(EN-342)**

**Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460**

Determination Of Dietary Risk

Dietary oncogenic risk is the product of exposure and the Q^* . The Q^* is a quantitative expression of the oncogenic potency of a pesticide. A high Q^* indicates that a compound has a strong oncogenic potential. It is an estimate of the expected tumor (malignant and benign) incidence expected to occur from low levels of pesticides contained in the human diet. It is considered a conservative approach, but EPA routinely uses it in its dietary risk assessments. The Q^* is used in conjunction with the above carcinogen classification system. The dietary risk of a pesticide is calculated by EPA as follows:

$$\text{Exposure} \times Q^* = \text{Dietary Oncogenic Risk}$$

Special Review Process

A Special Review Process (formerly the Rebuttable Presumption Against Registration or the RPAR process) may be initiated when EPA determines that criteria for determination(s) of unreasonable adverse effects to man and/or the environment established under 40 CFR Section 154.7 have been met or exceeded. The following risk criteria will be reviewed if the active ingredient:

- A. May pose a risk of serious acute injury to humans or domestic animals.
- B. May pose a risk of inducing an oncogenic, heritable genetic, teratogenic, fetotoxic, reproductive effect or a chronic or delayed toxic effect in humans.
- C. May result in residues in the environment of nontarget organisms at levels which equal or exceed concentrations acutely or chronically toxic to such organisms, or at levels which produce adverse reproductive effects in such organisms, as determined from tests conducted on representative species or from other appropriate data.
- D. May pose a risk to the continued existence of any endangered or threatened species.
- E. May result in the destruction or other adverse modification of any habitat critical for any endangered or threatened species.

- F. May otherwise pose a risk to humans or to the environment which is of sufficient magnitude to merit a determination whether the use of the pesticide product offers offsetting social, economic, and environmental benefits that justify initial or continued use.

Pre-Special Review: A Pre-Special Review is usually triggered by review of laboratory data. It involves intensive review and validation of scientific studies of the chemical in question. Public discussions are held after the review. If risk is reduced to an acceptable level, or the criteria have been met or exceeded, Position Document 1 (PD-1) or the Notice of Special Review is issued describing the determination.

The initial stage of the issuance of a Special Review is PD-1. After its issuance, a 45-day comment period is allowed. A 60-day extension is usually granted.

Special Reviews may be rebutted if:

- Study(ies) on which action is based is proven to be scientifically invalid.
- Proof is provided that actual exposure to the compound does not cause the described effects.

If all risk criteria have been successfully rebutted, the pesticide is returned to the registration process and the Special Review Process is terminated for all or some of the uses. PD-2 is issued if the rebuttal is successful.

If the rebuttal is not successful, PD-2/3 is issued. PD-2/3 includes: Risk analysis of each currently registered use; risk/benefit of each regulatory option under consideration; and benefits as determined in conjunction with USDA.

PD-2/3 recommends a regulatory position which may include restrictions or cancellation of some or all uses. It will be submitted to the EPA Scientific Advisory Panel and to the Secretary of Agriculture for comment.

PD-4 will contain an assessment of all comments and include the final decision of EPA (e.g. clearance, cancellation, restriction, or label changes). ■

Hazardous Materials Transportation Act (amended by: Hazardous Materials Transportation Uniform Safety Act (HMTUSA) of 1990)

- Makes employers responsible for hazardous material employee training
- Requires registration and fee assessment of certain hazardous materials shippers
- Regulates shipment of hazardous materials
- Sets requirements for liquid ammonia nurse tanks
- Sweeping changes attempt to harmonize U.S. regulations with international systems

The Department of Transportation (DOT) is authorized under the Hazardous Materials Transportation Act (as amended by the Hazardous Materials Transportation Uniform Safety Act of 1990) to regulate the shipment of hazardous materials in commerce, whether shipments are made by motor vehicle, rail car, aircraft, or vessel. The Research and Special Programs Administration (RSPA) is responsible for promulgating, administering, enforcing, and interpreting hazardous materials regulations. The Office of Hazardous Materials Safety (OHMS) within RSPA is in charge of writing regulations, granting exemptions, providing interpretations, and enforcement. The hazardous materials transportation regulations issued by RSPA are found in 49 CFR 100-199 and apply *only* to hazardous materials — materials which, when offered for transportation, can pose an unreasonable risk to health, safety, and property.

The Department of Transportation published its final rule (55 FR 52403, December 21, 1990) titled "Performance-Oriented Packaging Standard" (HM-181), revised 56 FR 47158, September 18, 1991 and extensively revised in 56 FR 66124, December 20, 1991. This rule was initially intended to bring about change from the U.S. DOT specification packaging to the United Nations (UN) "performance-oriented" packaging system. It evolved, instead, over several years into a comprehensive revision of 49 CFR 100-178, and conversion to the basic UN shipping scheme. With the adoption of HM-181, DOT has effected major changes in the U.S. hazardous materials classification, packaging, and hazard communications systems. The new regulations are based upon the Recommendations of the UN Committee of Experts on the Transport of Dangerous Goods. Most significantly, HM-181 changes the packaging standards from the current DOT specification packaging, to UN performance-oriented packaging. Some of the significant changes affecting hazard communication, classification, and packaging requirements, which were introduced by the 1991 revisions included:

1. Requiring permanent thickness markings (in millimeters) for all new drums intended for reuse;
2. Allowing lower test pressure in the leakproofness test

for packagings requiring Packing Group II and III performance levels;

3. Clarifying the classification criteria for gases and liquids poisonous by inhalation, as well as restructuring the bulk packaging authorizations;
4. Making it optional to use the letters "PG" in the description of hazardous materials on shipping papers;
5. Allowing combustible liquids to be described, in domestic transport, by their Class 3 proper shipping names;
6. Permitting generic proper shipping names to be used for mixtures or solutions of hazardous materials and non-hazardous materials, e.g., compounds, tree or weed killing, liquid, under certain circumstances.
7. Modifying the "Precedence of Hazards" Table for pesticide formulations which are both flammable, Class 3, PG III and toxic, Division 6.1., PG III.

The UN system is based primarily upon a series of packaging performance tests. A package has to pass specific tests such as the hydrostatic pressure test, the stacking test, the drop test, the leakproofness test, etc., depending on the hazard class and on the packing group assigned. All packages must be **capable of passing** a vibration test. Adoption of a UN-based system will cause domestic transportation regulations to become better aligned with those in use by most other nations.

The effective date of the rule was October 1, 1991; however, transitional provisions allow phasing in certain new requirements over a period of 5 years. All of the hazard communication regulations were in effect for gases (and liquids) poisonous by inhalation (PIH), e.g., anhydrous ammonia, on October 1, 1992; except for placarding, the same date held for new explosives; infectious substances become subject to classification and hazard communication requirements on April 1, 1993. All other hazardous materials became subject to all of the new hazard communication requirements (except for placarding) on October 1, 1993 (all remaining placarding changes were to be completed by October 1, 1994). The UN packaging provisions are extended for all but PIH materials (packaging required on April 1, 1993), until as late as 1996. "Mix and match" provisions are built into the new regulations whereby DOT specification packagings may be used with HM-181 marked and labeled packages and vice versa, during the transition period. If the proper shipping name or the identification number is the same, then shipping papers may carry the "old" DOT description, and the package can be marked and labeled under the HM-181 requirements and vice versa. Either the "old" or the "new" placards are allowed during the placarding transition periods (which extend until 1994 for all but PIH materials) regardless of the shipping descriptions or markings used.

In appearance and content, the HM-181 "Hazardous Materials Table," 172.101, has been completely revised. The table now consists of 10 columns (not seven) and provides,

in addition to shipping name, class or division number, label(s), and identification number, such information as applicability of the entry to specific modes of transport, whether the entry applies to just domestic, or to both domestic and international transport, packing group assignment, special provisions (includes packaging provisions, prohibitions, mode specific requirements, etc.), packaging authorizations, quantity limitations for various modes, and vessel stowage requirements.

Proper shipping names are more consistent with those in the UN Recommendations; many names in the "old" table either have been changed or eliminated. Some shipping names from the "old" table have been retained for domestic use only, e.g., combustible liquid, N.O.S. (Not Otherwise Specified); hazard class names have been replaced by class or division numbers; most NA Identification numbers have been eliminated; packing groups are assigned, except for N.O.S. entries, gases, infectious substances, and radioactive materials. Pesticide proper shipping names generally correspond to those used by the UN.

The new system utilizes nine hazard classes, some with divisions, instead of the former 22 DOT hazard classes. Tests and criteria for many of the hazard classes are different from those of the previous DOT system. Three packing groups represent the degree of danger within most classes or divisions: Packing Group (PG) I, great danger; PG II, moderate danger; PG III, minor danger. A precedence of hazard table §173.2a taken from the UN Recommendations provides for a more accurate differentiation between primary and subsidiary hazards, using packing groups to refine the distinctions.

Class 1, explosives, is separated into six divisions. The HM-181 regulations establish three divisions within **Class 2**, gases, i.e., Division 2.1., flammable gases; Division 2.2., non-flammable, non-poisonous gases; and Division 2.3, gases poisonous by inhalation. In **Class 3**, the definition of flammable liquid extends the flash point range from 100° F to 141° F causing more formulations to become subject to regulation. There are options to reclassify some flammables to combustible liquid. **Class 4**, flammable solids, is divided into three divisions, i.e., 4.1, flammable solid; 4.2, spontaneously combustible; and 4.3, dangerous when wet. All divisions within this class have quantitative tests and criteria based upon the UN Recommendations. **Class 5** is composed of two divisions, namely Division 5.1, oxidizers, and Division 5.2., organic peroxides.

Class 6 is composed of Division 6.1, poisons, and Division 6.2, infectious substances. The definition of infectious substance is expanded to include additional disease-causing organisms which pose hazards to humans or animals. Division 6.1, poisons, includes volatile liquids which are so toxic by inhalation as to pose special problems in transportation. These materials, the so-called Poison-Inhalation Hazard or PIH liquids, are in Packing Group I, and require further differentiation of their "Hazard Zone," whether A or B, within this packing group.

Radioactive materials, **Class 7**, remain essentially unchanged. **Class 8**, corrosive materials, require packing group determinations based upon the length of the exposure period required for animals to show visible destruction or irreversible alteration of the skin tissue. Materials which are corrosive to steel or to aluminum also fall within **Class 8**, and are assigned PG III. **Class 9**, miscellaneous haz-

ardous materials, includes environmentally hazardous substances, hazardous wastes, several specifically listed materials which pose unique hazards in transportation, but which are not included in any other hazard class, and "N.O.S." material, which meet the old DOT definition of ORM-A (materials which, if spilled, would cause irritation or annoyance to airplane passengers or crew members).

More conservative toxicology test criteria for **Class 6.1** cause materials that were previously not regulated to be considered poisons. More pesticides become regulated as **Class 6.1**, PG III. In addition, combustible, non-toxic pesticide formulations which have flash points between 100° F and 141° F that are not regulated in less than bulk quantities, will be regulated as flammable liquids when exported or when shipped by water or air domestically (the combustible liquid exception is still retained for surface domestic shipments).

There are several "old" labels which have been eliminated under HM-181, and several new labels which have been introduced such as the "Harmful Stow Away From Foods" label for **Class 6.1**, PG III, the "Infectious Substance" label for Division 6.2, and the **Class 9** label. The new regulations require subsidiary risk labeling whether or not the subsidiary labels are provided in the Hazardous Materials Table, when a material poses a subsidiary risk. The assignment of these subsidiary labels depends on the hazard class and packing group for the subsidiary hazard; the requirement to utilize additional subsidiary hazard labeling is sometimes related to the mode of transport.

Shipping paper descriptions are changed under HM-181. The basic description consists of a proper shipping name, hazard class or division number, and UN/NA identification number, but a Packing Group (I, II or III) must also be included. Hazard class or division numbers **must** be provided; division name and subsidiary hazard class or division number may also be optionally shown. The packing group must be included following the UN Number as, for example, PG III or just "III." PIH materials must have the words "Poison-Inhalation Hazard" as part of the shipping description; the (Hazard) Zone A or B as required for PIH liquids or Zone A, B, C or D for PIH gases must also be included as part of the basic description.

Marking remains for the most part unchanged, except for gases poisonous by inhalation which must be marked "Inhalation Hazard" in association with the required label or placard. Performance-oriented packagings must also have a UN symbol and a detailed packaging identification code which provides information on the type of container, material of construction, minimum thickness, performance standard code, etc. Non-bulk plastic outer packagings used for materials in Division 6.1 must be permanently marked with the word "Poison" in letters at least 0.25 inch high within 6 inches of the closure of the packaging.

Since major segments of the new HM-181 regulations take effect over a 5-year transition period, many domestic shippers are still preparing to implement some provisions. The discussion below of the "old" DOT regulations (i.e., those in effect as of September 30, 1991) is included here because a substantial portion of these regulations will be retained in HM-181 except, for example, package sizes, quantity limits, units of measure, etc.

Before a material is shipped domestically, it must be classified to determine whether it meets one or more of the

(Continued on page D32)

DOT hazard class definitions. Pesticides are frequently subject to DOT regulations since the active ingredients or other components in the formulation may cause the products to meet one or more of the DOT hazard class definitions. If the pesticide or other material is determined to be hazardous, it must be properly packaged, described, and certified on shipping papers. The package must be marked with a DOT proper shipping name and UN/NA identification number (from 49 CFR Section 172.101) and other package markings, as required, and labeled with DOT diamond(s), if specified.

Hazardous materials include:

1. Materials listed by name in 49 CFR Section 172.101, the Hazardous Materials Table.
2. Materials that are not specifically listed by name in the Table, but meet one or more of the following DOT hazard class definitions (listed alphabetically): Blasting agent; combustible liquid; corrosive material; etiologic agent; explosive (Class A, B, and C); flammable gas; flammable liquid; flammable solid; irritating material; non-flammable gas; organic peroxide; ORM (Other Regulated Material) -A, -B, -C, -D, -E; oxidizer; poison A; poison B; and radioactive material.
3. Hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). These substances (as listed in the Appendix to 49 CFR Table 172.101) are hazardous materials when a designated weight, the reportable quantity (RQ), is present in one package as a pure substance, or as part of a mixture or solution at or above certain specific concentrations.
4. Hazardous wastes that are subject to U.S. EPA's Hazardous Waste Manifest requirements.

Less-than-case-lot quantities of formulated agricultural chemicals, or such quantities when repackaged, are not subject to marking requirements and the outside specification packaging requirements of 49 CFR when four criteria are met:

1. Inside packaging is enclosed in strong outside packaging and inside liquid packaging is cushioned;
2. Each inside packaging does not exceed 2½ gallons (liquids) or 25 pounds (solids);
3. Gross weight of less-than-case, or repackaged lots, is not over 100 pounds in each vehicle; and
4. Transportation is *only* by private motor vehicle between a final distribution point and the point of application which cannot be over 100 miles.

In addition, formulated liquid agricultural chemicals in specification packaging of 55 gallons or less may be transported by a private motor carrier between a final distribution point and the ultimate point of application if closures are manifolded to a closed mixing system and equipped with positive dry disconnect devices (49 CFR 173.5).

Since October 1, 1991, certain mandatory elements of HM-181 which related only to classification and hazard communication were phased-in for the hazard classes mentioned earlier. PIH gases, when shipped in any quantity, were to be identified on shipping papers as "Poison-Inhalation Hazard" or "Inhalation Hazard." One year later, non-bulk packages containing PIH materials had to be marked ("Poison-Inhalation Hazard"), documented, and labeled with the "Poison" label, in addition to any other required

label(s). Shipments of inhalation poisons in transport vehicles, freight containers, and portable tanks were required to be placarded "Poison," in addition to other required placards, by October 1, 1992.

On or before October 1, 1992, liquid ammonia containers were required to have the words "Inhalation Hazard" (but **not** "Poison") on shipping papers (when required) and on each non-bulk and bulk package.



For help with Federal transportation (DOT) regulations relating to surface, water, or air shipments, contact:

U.S. Department of Transportation
202-366-4488
Fax: 202-366-3753

For help with water shipments, contact:

U.S. Coast Guard - GMTH - 1
Hazardous Materials Branch
202-267-1577
Fax: 202-267-4816

For additional help with shipments by air, contact:

International Air Transport Association
Montreal, Canada
514-844-6311
Fax: 514-844-5286
OR
International Civil Aviation
Organization (OPS/Air Section)
Montreal, Canada
514-285-8099
Fax: 514-285-6759

Nurse tanks containing liquid ammonia are considered to be implements of husbandry when operated by a private carrier, e.g., a farmer, exclusively for agricultural purposes. Such tanks do not have to meet all shipping container specifications when they have a capacity of 3000 gallons or less. They must, however, meet certain minimum design pressure requirements, be equipped with specific types of safety relief valves, be loaded to a filling density no greater than 56%, and be painted white or aluminum. They must also be securely mounted on a farm wagon and meet the other requirements of 49 CFR except for shipping papers. Placarding and marking on only one end is permitted when valves, fittings, etc. obstruct the other end (49 CFR 173.315 (m)).

Bulk shipments of hazardous materials require placarding. Placarding requirements are found in 49 CFR 172, Subpart F, and apply to all hazard classes except etiologic agents and ORM-A, B, C, D and E. Air, water and rail modes have some specific provisions which are also found in Subpart F but which will not be enumerated here.

Generally, placarding of road-transport vehicles is required on each end and side when *any quantity* of certain hazard classes (Class A and Class B explosives, poison A's, flammable solids and certain radioactives) is carried in a vehicle or in a freight container. Transport vehicles or freight containers of 640 cubic feet or more, or those that contain more than 1000 pounds aggregate gross weight of hazardous materials classed as the following, also require placarding on each side and end: Class C explosives, blasting agents, non-flammable gas, combustible liquid, flammable liquid, flammable solid, oxidizer, organic peroxide, poison B, corrosive material, or irritating material. Portable tanks having a rated capacity of less than 1000 gallons may be labeled instead of placarded, but if placarded, they need to be placarded on only two opposite sides. Transport vehicles, portable tanks, and freight containers that contain materials subject to the "Poison-Inhalation Hazard" shipping paper requirement (described above) must be placarded "Poison" on each side and end in addition to any other placards required because of additional hazards.

The DOT requires that "N.O.S." (Not Otherwise Specified) materials shipped by any mode of transport, specified under "N.O.S." proper shipping names and several generic names, must include the technical name of the hazardous component on shipping papers. Technical names must also appear as part of the non-bulk package markings. A technical name means a recognized chemical name currently used in scientific and technical journals, handbooks, and texts; however, generic descriptions can be used as technical names if they identify the general chemical group. Names such as tertiary amine, organic phosphate compound, petroleum aliphatic hydrocarbon, etc., are acceptable as technical names. Trade names cannot be used as technical names unless they appear in the hazardous materials table. Mixtures or solutions of hazardous materials require the technical names of at least two components contributing to the hazards to be identified on both shipping papers and non-bulk package markings.

DOT has provided exceptions from the requirements for certain "N.O.S." hazardous wastes when the hazardous constituents are unknown; in these cases EPA hazardous waste codes can replace the technical names.

Shippers must provide a 24-hour emergency response telephone number on shipping papers. This number must be monitored during the time the material is in transportation and during storage incidental to transportation. The person monitoring the 24-hour number can either be one who is knowledgeable about the hazard characteristics of the material being shipped and has comprehensive accident mitigation and emergency response information, or he must have immediate access to a person who can provide such information. This telephone number can be that of the Chemical Manufacturers Association's Chemical Transportation Emergency Center (CHEMTREC) or other such service but only if the shipper has contracted with and provided such organization with current and detailed information concerning the hazardous material, and if the organization

accepts the responsibility for providing the necessary emergency response information. The 24-hour CHEMTREC telephone number is 800-424-9300.

This rule also requires that specific emergency response information needed for mitigation of an accident be available for use during transportation. This emergency response information must be separate from the hazardous materials package, can be printed on a shipping paper, or can be in a separate document other than a shipping paper (e.g., a Material Safety Data Sheet or an emergency response guidebook) that includes the technical name and the basic description along with emergency response information for the hazardous material. Emergency response information must be readily accessible to drivers, crew, personnel, etc.; carriers are required to maintain this information in the same manner as for shipping papers. Facility operators must maintain the information in a location that is immediately accessible to personnel whenever the hazardous material is present.

By Federal Register notices (57 FR 20944, May 15, 1992, corrected by 57 FR 22181, May 27, 1992) DOT issued its HM-126F "Training for Safe Transportation of Hazardous Materials" final rule. This rule, mandated by the HMTUSA, expanded and clarified the requirements with respect to training and testing to be given by all hazardous material (hazmat) employers to their hazmat employees regarding the safe transportation of hazardous materials, including emergency response. There are four categories of training required, some depending upon the job function: 1) General Awareness/Familiarization Training; 2) Function-specific Training; 3) Safety Training; and 4) Driver Training. The diversity of hazmat job functions covered by the final rule made it impossible for DOT to establish exact training requirements. The specific responsibilities were left to the hazmat employer as were the certification, recordkeeping, and testing requirements. The DOT has stated that some of the training requirements may be fulfilled by other regulatory training mandated by OSHA or EPA or can be incorporated into other regulatory training programs. Commercial Drivers License (CDL) training with a hazardous materials endorsement may fulfill some or all of the "Driver Training" portion.

The original training deadlines required that all hazmat employees hired on or before November 15, 1992 must be trained by April 1, 1993. The training deadline for current employees was later amended to October 1, 1993, (58 CFR 5850, January 22, 1993). Employees employed after November 15, 1992 or employees who change hazmat job functions must be trained within 90 days of hire or job change. All employees must undergo recurrent training within two years of their last training. There are petitions from various parties to make the training deadlines coincide with the mandatory hazard communication requirements of HM-181, i.e., on October 1, 1993.

Another recent DOT rule required by HMTUSA is the "Hazardous Materials Transportation; Registration and Fee Assessment Program (57 FR 30620, July 9, 1992; corrected 57 FR 33416, July 28, 1992). This rule requires that certain shippers and carriers of hazardous materials must register with the DOT and pay a \$300 fee. The shippers and carriers required to register are those engaged in inter- or intrastate commerce, or foreign commerce (these shippers have until 1994 to comply). The registration and fee requirements ap-

(Continued on page D34)

ply to shippers who fall into various categories, namely, those who ship:

1. A highway route controlled quantity of a radioactive (Class 7) material;
2. More than 55 pounds of certain explosives in a freight container, rail car, or motor vehicle;
3. More than 1-liter per package of a PIH material;
4. A hazardous material in a bulk packaging, freight container, or tank with a 3500 gallon (or greater) capacity; or
5. A shipment of 5000 pounds or more (gross weight) of

a hazardous material which requires placarding of the vehicle, rail car, or tank.

Bulk packaging having capacities less than 3500 gallons (or 468 cubic feet), even when 5000 pounds or more of one hazard class are offered for transportation or transported, are exempt from the Registration and Fee Assessment Program. RSPA's intent was that the requirement to register and pay a fee by August 31, 1992, relating to the weight/volume requirement (No. 5), was only meant to apply to non-bulk packagings, i.e., drums, bags, barrels, etc. loaded at one facility that totaled more than the specified quantities. ■

National Environmental Policy Act

- **Makes it necessary for Federal agencies to file environmental impact statement**

The National Environmental Policy Act (NEPA) requires that all Federal agencies file an environmental impact statement for any actions which significantly affect the quality of the environment. EPA is not obligated by NEPA since its primary function is the examination of environmental issues. FIFRA is considered an adequate substitute for NEPA. The courts have generally supported this position. ■

Occupational Safety And Health Act

- Mandates safe working conditions
- "Right-to-Know" Law
- MSDS — Material Safety Data Sheets
- Confined space entry
- Bloodborne pathogens

The Occupational Safety and Health Act was established "... to assure as far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources..." The Act is administered and enforced by the Occupational Safety and Health Administration (OSHA). It imposes upon employers the obligation to provide employees with workplaces that are free from recognized health and safety hazards, and to maintain compliance with specific OSHA standards. EPA has authority under FIFRA relating to the safety of farmworkers in fields treated with pesticides, and OSHA has authority over manufacturing, formulating, and distribution operations involving worker safety in the pesticide industry.

Note that many states and territories have their own state plans that have been approved by OSHA and are in effect. These state regulations may be more stringent than the federal OSHA requirements.

Hazard Communication Standard

The OSHA Hazard Communication Standard (29 CFR Section 1910.1200) ensures that the hazards of all chemicals produced or imported are evaluated and that information concerning their hazards is transmitted to employers and employees. This so-called "Right-To-Know" law requires employers with employees exposed to hazardous chemicals to provide information to their employees on the hazards by means of hazard communication programs including labels, Material Safety Data Sheets (MSDSs), training, and access to written records.

Chemical manufacturers (including formulators) and importers are required to assess the hazards of chemicals produced or imported via a "hazard determination." Chemicals including elements, chemical compounds, and mixtures (e.g., formulations) may be hazardous because of their physical properties — for example, combustible liquids, compressed gases, explosives, flammables, organic peroxides, oxidizers, pyrophorics, unstable materials or water reactives. They may also be hazardous based upon health hazards, either immediate (acute) or delayed (chronic). Some of these acute and chronic health effects might result from exposure to chemicals which are carcinogens (cancer causing), toxic or highly toxic agents, corrosives, sensitizers, reproductive toxins, etc. as referenced in the Hazard Communication Standard (HCS). Chemical manufacturers and importers are required to prepare MSDSs for all hazardous chemicals which they produce, and to label con-

tainers of hazardous chemicals they ship. Manufacturers, importers, and distributors must pass MSDSs on to their customers with the initial shipment.

Manufacturers and importers are required to evaluate the physical and chemical hazards of the chemicals they produce or import, but not necessarily to test these chemicals. The Standard defines the methodology for performing hazard determinations on compounds and mixtures. The hazard determination can be based upon the manufacturer's own data or upon available scientific literature. A non-tested mixture must be considered to have the same health hazards as those hazardous components present in excess of 1% by weight or, for carcinogens, present in excess of 0.1%. If a component present in a mixture can be released in a concentration exceeding its Permissible Exposure Limit (PEL) or its Threshold Limit Value (TLV) or at any level that could endanger the health of employees, it must be identified on the MSDS and label.



NEED HELP?

For help with OSHA HCS requirements, obtain the phone number of your regional OSHA office and the name of the Hazard Communication Coordinator. Contact:

**OSHA Office of Information and
Consumer Affairs**
202-219-8151
Fax: 202-219-5896

An OSHA rule issued in March 1989 reduced the PELs for many substances and set new PELs for many others not previously regulated by OSHA. Short Term Exposure Limits (STEL) complement eight-hour Time Weighted Averages (TWA), and where appropriate, skin designations and/or ceiling limits are given. The new standard appears in 29 CFR Section 1910.1000 as Tables Z-1-A, Z-2, and Z-3. Currently, the PELs are under revision after being contested in court. State OSHA programs may choose to enforce the revised standards until a final revision has been made.

The following sources must be checked by chemical importers or manufacturers to establish whether their chemicals are hazardous:

1. 29 CFR 1910, Subpart Z, Toxic and Hazardous Substances.
2. Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment (American Conference of Governmental Industrial Hygienists, latest edition).

(Continued on page D36)

For establishing carcinogenicity or potential carcinogenicity, the following sources must be reviewed:

1. National Toxicology Program, Annual Report on Carcinogens (latest edition).
2. International Agency for Research on Cancer Monographs (latest edition).
3. 29 CFR 1910, Subpart Z, Toxic and Hazardous Substances.

Once a material is determined to be hazardous, there is specific information that is required to be on the MSDS. An example of a short-form MSDS is presented on pages D36-37 with an explanation of the required information items.

Under the Hazard Communication Standard, all containers of hazardous chemicals in, or leaving, the workplace (unless the container is used for temporary transfer purposes) must be labeled, tagged, or marked with appropriate hazard warnings and with an identity permitting it to be cross-referenced to the MSDS. All employers must assure that employees are adequately trained relative to the hazardous chemicals, in detection and protection methods, and in the labeling and MSDS system used in their workplace.

It is important to realize that this Standard does not apply to labeling of pesticides covered under FIFRA. Inert ingredients and intermediates which are not pesticides under FIFRA are covered. Drugs and veterinary devices whose labeling is covered by FDA are also exempt from OSHA labeling, as are consumer products labeled under requirements of the Consumer Product Safety Commission. However, none of these products or chemicals is exempt from the OSHA MSDS requirement. Hazardous wastes as defined in 40 CFR 261 are exempt from all of the OSHA requirements.

The EPA issued final rules on August 21, 1992, for occupational exposure to agricultural pesticides (40 CFR 156 and 170). Part 156 covers labeling requirements for pesticides and devices. Part 170 is a worker protection standard. Amended labeling must be accomplished by April 21, 1994.

On January 31, 1990 OSHA issued a final rule (55 FR 3300) effective on May 1, 1990 which applies to the use of hazardous chemicals in laboratories. The final standard provides for employee training and information, medical consultation and examinations, hazard identification, respirator use, and recordkeeping. Specifically the standard requires that laboratories maintain employee exposure at or below the Permissible Exposure Limits (PELs) specified in 29 CFR 1910, Subpart Z. Each employer has the obligation to formulate a written Chemical Hygiene Plan (CHP) which includes the necessary work practices, procedures, and policies to ensure that employees are protected from all potentially hazardous chemicals in the laboratory workplace.

The standard maintains the OSHA HCS requirement for retention of labels and MSDSs accompanying incoming shipments of hazardous chemicals but does not require label and MSDS development for chemical substances produced in a laboratory for a laboratory's own exclusive use. OSHA does require that available hazard information be provided to employees who may be exposed to a hazardous substance. Chemical by-products whose composition is unknown must be treated as if hazardous by employers, and handled according to the CHP. When a chemical is produced in a laboratory and shipped to another user outside

the laboratory, the producing laboratory becomes a manufacturer and is subject to all relevant provisions of the HCS. For the pesticide industry this would include preparation of labels for non-registered pesticides, and preparation and dissemination of MSDSs for all experimental chemicals or formulations.

On June 3, 1993, the American National Standards Institute, Inc. (ANSI) issued a new standard for Material Safety Data Sheet (MSDS) preparation. The new standard is intended to help preparers of MSDSs to continue developing consistent, understandable MSDSs that provide useful information to the general public.

The new MSDS standard provides 16 sections that should be included in MSDSs. These sections include:

- Section 1. Chemical Product and Company Identification
- Section 2. Composition, Information and Ingredients
- Section 3. Hazard Identification
- Section 4. First Aid Measures
- Section 5. Fire Fighting Measures
- Section 6. Accidental Release Measures
- Section 7. Handling and Storage
- Section 8. Exposure Controls, Personal Protection
- Section 9. Physical and Chemical Properties
- Section 10. Stability and Reactivity
- Section 11. Toxicological Information
- Section 12. Ecological Information
- Section 13. Disposal Considerations
- Section 14. Transport Information
- Section 15. Regulatory Information
- Section 16. Other Information

Confined Space Entry

Entry into confined spaces is now regulated by the OSHA rule 29 CFR 1910.146, which became final on April 15, 1993. The rule requires employers to identify confined spaces in the workplace which pose health or safety hazards, prevent unauthorized entry in spaces, and protect authorized entrants from space hazards through a permit entry program.

General industries (including retail dealers) must issue a permit for entry into a space which has the following characteristics:

- Limited openings for entry and exit (e.g., bins, silos, tanks);
- Unfavorable natural ventilation;
- Not intended for continuous worker occupancy; or
- Subject to accumulation of an actual or potentially hazardous atmosphere or engulfment hazard.

Specific confined space hazards include:

- Atmospheric conditions (e.g., toxic — gases, vapors, or fumes containing poison; asphyxiating — oxygen less than 19.5% or above 23.5%; flammable or explosive);
- Entrapment (configuration causing asphyxiation);
- Engulfment (dry bulk materials); and
- Mechanical (exposure to electrical or mechanical sources).

Preventive measures including ventilation and purging of the space, lockout of energy sources, atmospheric testing and monitoring, and emergency equipment are mandated by the rule. The employer has the responsibility of identifying confined spaces and implementing the permit entry program.

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Reading and Understanding Material Safety Data Sheets

There is a specific list of items required to be on a Material Safety Data Sheet (MSDS). Each item, with an explanation of its meaning, follows:

Chemical Name - Usually the IUPAC (International Union of Pure and Applied Chemistry) or Chemical Abstracts Service chemical name is given, but it also may be a common name for the chemical (e.g., ethylene glycol is acceptable instead of 1,2-ethanediol). Trade names may be supplied but the chemical name is also required unless it is considered to be a trade secret.

CAS Registry Number - This number is not required by OSHA but most state Right-to-Know laws require it. This number is assigned to each chemical by Chemical Abstracts Service. There are a few instances where a chemical has several different numbers. A few chemicals have no assigned number, and most mixtures do not have assigned numbers.

Date Prepared - OSHA requires that the date of preparation or latest update be on the MSDS.

Composition of Mixtures - This includes all hazardous materials over 1%, and all carcinogens over 0.1%. Trade names can be used but chemical names must also be included unless this information is considered a trade secret.

OSHA PEL - This is either a time-weighted average limit for an 8-hour day or a maximum concentration exposure limit for those items on the OSHA list. The figures may be in parts per million (ppm) or mg per cubic meter (mg/m³).

ACGIH TLV (Threshold Limit Value) - An exposure limit, similar to the permissible exposure limit, recommended by the American Conference of Governmental Industrial Hygienists. The measuring units specified in the OSHA PEL are applicable. The ACGIH TLV list is updated each year.

Health Effects - Identification of target organs or systems adversely affected by overexposure. Also, chronic effects and any existing condition that would be aggravated by exposure.

Physical/Chemical Characteristics - This usually includes the following items where applicable:

- **Boiling point** - The value may be at reduced pressure and either in degrees Celsius or Fahrenheit
- **Melting point**
- **Vapor density** - relative to air
- **Vapor pressure** - Usually in mm Hg; the temperature

must be specified (usually in the range of normal room temperature)

- **Specific gravity** - Density with respect to water at a specified temperature
- **Solubility in water** - Approximate values are acceptable
- **Appearance and odor**
- **Evaporation rate** - Usually relative to butyl acetate

Fire and Explosion Hazard Data - This usually includes the following items:

- **Flashpoint** - The flashpoint of the chemical is the temperature at which its vapor can be ignited. Open or closed cup should be specified.

- **Flammability limits** - Most volatile chemicals have lower and upper concentrations in air below and above which they cannot be ignited.

- **Auto ignition temperature** - The temperature at which a chemical ignites spontaneously in the air.

- **Recommended extinguishing media**

- **Unusual fire and explosion hazards**

Reactivity Hazard Data - Information should include whether the material is unstable and under what conditions instability and incompatibilities exist, and whether hazardous decomposition products can be produced.

Health Hazard Data - This topic includes one or more of the following:

LD₅₀ (lethal dose 50) - This is the lethal single dose (usually oral) in mg/kg (milligrams of animal body weight) of a chemical that is expected to kill

50% of a test animal population. The animal should be specified. Because some animals react differently to some chemicals, this is not necessarily an indication of the hazard of the chemical to humans.

LC₅₀ (lethal concentration 50) - This is a concentration dose expressed as ppm for gases and vapors or as micrograms of material per liter of air for dusts and mists expected to kill 50% of a test animal population in one exposure.

In the Health Hazard Data Section, MSDSs often use words or phrases such as "avoid contact," "flammable," and others. Generalized descriptions of many of these phrases and the precautions to be practiced follow:

"Allergic Reaction": Some individuals may develop severe allergic reactions to even undetectable quantities of certain types of chemicals. An example is amines.

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MATERIAL SAFETY DATA SHEET		NOMATE® PBW MEC	
SECTION I - IDENTIFICATION OF PRODUCT			
MANUFACTURER'S NAME: Sentry, Inc. 610 Central Ave. Garage 147 55102	City, State, Zip: Phoenix, AZ 85026	EMERGENCY TELEPHONE NO.: (602) 248-5656, (800) 368-6737, (303) 336-4100 or CHEMTREC (800) 424-9300	
TRADE NAME AND SYNONYMS: NOMATE® PBW MEC			
CHEMICAL NAME AND SYNONYMS: Insect pheromone mixture (Z,Z) and (Z,E)-7,11-Hexadecadien-1-yl acetate.			
CHEMICAL FAMILY: Insect pheromone mixture			
GARA TITLE IN HAZARD CATEGORY: IMMEDIATE DELAYED <input type="checkbox"/> <input type="checkbox"/> FIRE REACTIVE <input type="checkbox"/> <input type="checkbox"/> SUDDEN RELEASE OF PRESSURE <input type="checkbox"/> <input type="checkbox"/>			
SECTION II - HAZARDOUS INGREDIENTS OF MIXTURES			
COMPONENTS:		%	THRESHOLD LIMIT VALUE (TLV):
(Z,Z)-7,11-Hexadecadien-1-yl acetate		10.0	None established
(Z,E)-7,11-Hexadecadien-1-yl acetate		10.0	None established
Other ingredients		80.0	
THIS PRODUCT CONTAINS THE FOLLOWING SUBSTANCES WHICH ARE REGULATED UNDER GARA TITLE 29, SEC. 311: None			
SECTION III - PHYSICAL CHARACTERISTICS			
APPEARANCE AND ODOR: Colorless to light brown, faint odor	SPECIFIC GRAVITY (WATER = 1): 1.01		
BOILING POINT (°F): 215°F	VAPOR PRESSURE (MM. OF MERCURY): Not available		
DENSITY: 8.41 lbs/gal	VAPOR DENSITY (AIR = 1): Not available		
PERCENT VOLATILE BY VOLUME: 100%	SOLUBILITY IN WATER: Liquid suspension, disperses in water		
EVAPORATION RATE: Not available	VISCOSITY: 500-600 cps @ R.T.		
PH: 7.5-8.5			
SECTION IV - FIRE AND EXPLOSION HAZARD DATA			
FLASH POINT (SPECIFY METHOD): Does not flash; not applicable			
FLAMMABLE LIMITS (PERCENT BY VOLUME): Not applicable			
FIRE EXTINGUISHING MEDIA: Considered non-combustible; use medium appropriate to surrounding fire. Dry Chemical, CO ₂ , Foam, Water Spray or Fog.			
SPECIAL FIRE FIGHTING PROCEDURES: Smokes and fumes from fire may contain hazardous components. Use self-contained breathing apparatus and full protective clothing.			
UNUSUAL FIRE AND EXPLOSION HAZARDS: If used to fight fire or spill, contain run-off by plugging to prevent contamination of water supplies.			
SECTION V - REACTIVITY DATA			
STABILITY: Stable.			
INCOMPATIBILITY (Materials to avoid): Strong oxidizers.			
HAZARDOUS DECOMPOSITION PRODUCTS: Not known. Unknown hazardous materials may be formed in a fire situation. Incomplete combustion may lead to formation of carbon monoxide and/or other byproducts.			
HAZARDOUS POLYMERIZATION: Will not occur.			
CONDITIONS TO AVOID: Excessive heat.			
CONDITIONS TO AVOID: None known.			

Precautions: For the susceptible individual, virtual total isolation from the chemical is necessary. Allergic studies by a qualified physician may be necessary.

"Avoid Contact": General rule for all chemicals, even if they are considered non-hazardous.

Precautions: Do not breathe vapors and avoid contact with skin, eyes, and clothing for all chemicals handled.

"Carcinogen": Substances which may possibly, are suspected to, or are known to cause cancer. Some may have threshold limits of exposure.

Precautions: Exercise extreme care when handling. Do not breathe vapors and avoid all contact with skin, eyes, and clothing by wearing suitable protective equipment and using appropriate confining apparatus. OSHA has specific rules for handling "known" carcinogens. Refer to 29 CFR 1910 Subpart Z.

"Corrosive": Living tissue as well as equipment is destroyed on contact with these chemicals.

Precautions: Do not breathe vapors and avoid contact with skin, eyes, and clothing. Use suitable protective equipment.

"Danger": Applies to substances that have known harmful effects. Also applies to substances whose properties are unknown, but which may have harmful effects, based on their similarity to compounds which have known harmful effects.

Precautions: Treat as if these were the most dangerous chemicals that exist. There may or may not be serious hazards associated with these chemicals.

"Explosive": Substances known to explode under some conditions.

Precautions: Avoid shock (dropping), friction, sparks, and heat. Isolate from other chemicals which become hazardous when spilled.

"Flammable": Substances which give off vapors that readily ignite under usual working conditions.

Precautions: Keep away from heat, sparks, or flame. Be aware that materials with a high vapor density tend to creep along the floor or ground until an ignition source is found.

"Highly Reactive": Substances which react very vigorously with water, air, or any other substance to which they may be exposed in the working environment.

Precautions: Use extreme care in opening and handling of the substance. Examine the reactivity section of the MSDS for additional details.

"Irritant": Substances that have an irritant effect on skin, eyes, or respiratory tract.

Precautions: Do not breathe vapors, and avoid contact with skin and eyes. The effect may be evident at extremely low concentration.

"Lachrymator": Substances that have an irritant or burning effect on skin, eye, or respiratory tract. Dangerous in very small quantities (opening the cap has an immediate effect on eyes).

Precautions: Open only in an operating, fully tested fume hood. Do not breathe vapors. Avoid heating. Avoid contact with skin, eyes, and clothes.

"Mutagen": Chemical or physical agents that cause genetic alterations.

Precautions: Handle with extreme care. Do not breathe vapors and avoid contact with skin, eyes, and clothing.

"Oxidizer": A substance capable of supplying its own source of oxygen or other highly reactive material to a reaction.

Precautions: Do not open or handle the material without thoroughly understanding the potential reactions that the substance can undergo. This information should be in the reactivity section of the MSDS.

"Peroxide Former": Substances which form peroxides or hydroperoxides upon standing or when in contact with air.

Precautions: Many peroxides are explosive. Do not open bottle if a residue is present on the outside of the cap or inside of the bottle.

"Poison": Substances that have very serious and often irreversible effects on the body. Hazardous when breathed, swallowed, or in contact with the skin, and in sufficient quantity lead to death. The Department of Transportation regulations classify many poisons for transportation.

Precautions: Avoid all contact with the body. When handling use suitable protective equipment.

"Stench": Substances which have or generate bad smelling odors.

Precautions: Open only in a properly operating fume hood equipped with an adequate absorbing system.

"Teratogen": Substances that cause the production of physical defects in a developing fetus or embryo.

Precautions: Handle with extreme care. Do not breathe vapors, and avoid contact with skin, eyes, and clothing. Use suitable protective equipment when handling.

"Toxic": Substances which are hazardous to health when breathed, swallowed, or are in contact with the skin. Danger of serious damage to health by prolonged exposure.

Precautions: Avoid all contact with the body. When handling use suitable protective equipment.

First Aid - Appropriate procedures for emergency first aid should be given in the MSDS, identifying antidotes, if known.

Precautions for Spills and Cleanup - Appropriate steps for safe cleanup of a spill or release should be given. An appropriate waste disposal method, including whether the material can be put in a landfill or other EPA approved disposal facility, should be supplied.

Control Measures - Types of protective clothing, gloves, and respiratory protection should be listed. If the material should always be handled in a hood, glovebox, or with extra ventilation, it should be listed under this heading.

Storage - This section should indicate whether refrigeration or special storage conditions are necessary. It should also indicate incompatibilities in storage conditions. ■

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The employer will be required to issue an entry permit to an employee who will be entering the space. The permit must include the identity of the space, the purpose of entry, the date and duration of entry, a list of individuals authorized to enter, the attendant, the hazards of the space, and acceptable entry conditions. Employers will be required to retain canceled permits for at least one year to facilitate review of the permit program.

If an employee enters a "permit required confined space," an employer will need to train the employee to be certain he/she has the knowledge and skills necessary for safe performance of the duties assigned. There are related OSHA rules such as 1910.134, which covers the use of respirators and must be incorporated into the program. Regional OSHA offices can provide copies of the rule and give assistance in developing the program.

Monitoring the individual while in the "permit required confined space" is also necessary. The attendant can monitor by TV monitors, videos, or electronic surveillance. The attendant can monitor more than one permit space at a time. Supervisors on duty must be aware of the hazards of the space, symptoms of exposure, and consequences of exposure. It is not necessary to have an in-house rescue team.

However, the employer must develop and implement procedures for summoning rescue and emergency services.

If a "permit required confined space" is never entered by employees, no permit program is required. However, the

space will need to be identified as dangerous with warning signs and be equipped with locks and/or other means to prevent employees from entering.

Bloodborne Pathogens

OSHA promulgated a Bloodborne Pathogen Standard (29 CFR 1910.1030) on December 6, 1991. This rule limits occupational exposure to blood and other potentially infectious materials since any exposure could result in transmission of bloodborne pathogens that could lead to disease or death. The regulation covers all employees who are reasonably anticipated as the result of performing their job duties to come into contact with blood and other potentially infectious materials.

The rule includes specific requirements:

- A written exposure control plan;
- Training of employees on the hazards with annual update;
- Personal protective equipment to be provided by employer;
- Medical recordkeeping for the duration of the employment plus 30 years; and
- Hepatitis B vaccination paid for by employer.

Full implementation of the rule became mandatory July 6, 1992. Specific details of the bloodborne pathogen rule can be obtained from regional OSHA offices. ■

Resource Conservation And Recovery Act

- **Generation-to-disposal system for managing hazardous wastes**
- **Regulates residues or rinsate from containers**
- **Provides exemption for farmers discarding pesticide residues**
- **Bans land disposal of most untreated hazardous waste**

The Resource Conservation and Recovery Act (RCRA) of 1976 (as amended) regulates the generation, treatment, storage, transportation, and disposal of solid wastes. The EPA definition of "solid waste" is found in 40 CFR 261, and includes solids, liquids, and contained gases that are discarded, when they are not excluded based on a variance from the EPA or based on one of several recycle/reuse provisions.

Solid wastes are defined as hazardous under RCRA (if they are not subject to any of several exclusions) when they are included in one of the following lists:

F-List - Hazardous wastes from nonspecific sources (40 CFR 261.31). Five wastes from pesticide manufacturing or use, and three from wood preserving processes are included.

K-List - Hazardous wastes from specific sources (40 CFR 261.32). One waste from wood preservation and 22 from pesticide manufacture are listed.

P-List - Acutely hazardous commercial chemical products (40 CFR 261.33[e])

U-List - Toxic and other commercial chemical products (40 CFR 261.33[f]).

Both the P-List and the U-List contain several commercial pesticides.

Solid wastes are also hazardous when they meet one of the following defined characteristics (40 CFR 261.21 through 261.24):

- **Ignitability** (waste code D001) - Based upon the flash point of a liquid waste; for a solid, the capability to cause fire through friction or absorption of moisture, and to burn vigorously and persistently; solids that meet the 49 CFR (DOT) definition of oxidizer; and, compressed gases that are ignitable under the DOT definition.

- **Corrosivity** (waste code D002) - **Liquid wastes** that have a pH of ≤ 2 or ≥ 12.5 , or that corrode steel at a rate of greater than 0.25 inch per year.

- **Reactivity** (waste code D003) - Wastes that are unstable and readily undergo violent change; that react violently with water or when mixed with water generate toxic vapors or fumes; that are cyanide or sulfide bearing and can generate toxic gases, vapors, or fumes at pH conditions between 2 and 12.5; that are readily capable of detonation or explosion at standard temperature and pressure if subjected to a strong initiating force or if heated under confinement; or DOT forbidden explosives, Class A or B explosives.

- **Toxicity** (waste codes D004-D043) - Liquid wastes or the extract from waste solids that fail the Toxicity Characteristic Leaching Procedure (TCLP) analytical test because they contain certain designated metals, pesticides, or organic chemicals at concentrations equal to or, in excess of, specified regulatory limits.

The following are examples of pesticide wastes which can be regulated under RCRA:

- Discarded, unused pesticides, either as technicals or formulations, that are listed or that meet one or more of the characteristics of hazardous waste. Formulated pesticides that contain **more than one** listed active ingredient do not currently have to be classified as hazardous waste when disposed unless the formulation (including inert ingredients) meets a characteristic of hazardous waste. This loophole in the regulations is expected to be closed by EPA in the future;

- Discarded residue or rinsate from drums, tanks, or containers depending on the RCRA classification of the pesticide/rinsate;

- Non-empty pesticide containers which held a listed pesticide or held a pesticide exhibiting a hazardous waste characteristic. In the case of pesticides that are acutely hazardous (P-List), containers or inner liners from containers are also acutely hazardous wastes when disposed unless they have been triple rinsed with an appropriate solvent;

- Pesticide residue consisting of contaminated soil, water, or other debris resulting from the cleanup of a spilled pesticide.

Fertilizer wastes can also be regulated in similar ways. A significant exclusion from the RCRA regulations exists for two process wastes generated during the manufacture of phosphoric acid by the wet acid process: phosphogypsum and process wastewater. Thus, neither of these wastes is considered hazardous under RCRA even though they usually exhibit one or more of the characteristics. EPA acknowledges that phosphoric acid production processes and associated wastes pose risks to human health and the environment, and intends to use its TSCA authority to design a specific regulatory program to manage these wastes.

In order to know how such regulated pesticide wastes must be managed, a generator must first determine into which of three classes he falls. (Be aware of the fact that not all states recognize small quantity generators.) The three classes are:

- Generators of **no more than 100 kilograms (kg)** of hazardous waste or 1 kg of acutely hazardous waste (P-listed commercial chemical products) per month (including no more than 100 kg of clean-up debris from cleaning up a spill of an acutely hazardous waste). This class is also known as "Conditionally Exempt" Small Quantity Generator.

- Generators of 100 to 1000 kg of hazardous waste per month who do not generate more than 1 kg of acutely hazardous waste (or 100 kg of spill clean-up debris) during the same month, and who never accumulate more than 6000 kg on-site.

• Generators of 1000 or more kg of hazardous waste or more than 1 kg of acutely hazardous waste per month.

"Conditionally Exempt" Small Quantity Generator. As discussed above, this category encompasses generators of less than 100 kg of hazardous waste, and less than 1 kg of acutely hazardous waste in any given month. "Conditionally Exempt" Small Quantity Generators must do the following:

1. Identify all hazardous waste generated.
2. Send this waste to a hazardous waste facility, or to a landfill or other type of facility approved by a state for industrial or municipal wastes.
3. Never accumulate more than 1000 kg of hazardous waste. If this amount is exceeded at any one time, a generator becomes subject to all of the requirements for the 100-1000 kg Small Quantity Generator.
4. Never accumulate more than 1 kg of acutely hazardous waste or 100 kg of spill clean-up of an acutely hazardous waste. If either of these quantities is exceeded, a generator must follow all of the regulations of the third category of generator - a Large Quantity Generator.

Other Generators. Both the second and third categories of generator are subject to full regulation, although the requirements for the 100 to 1000 kg generator are somewhat reduced. Thus, they must notify EPA that they are a generator, and must obtain an EPA Identification Number. Hazardous waste cannot be stored without an RCRA permit. However, EPA regulations allow storage in containers or tanks without a permit for specified times (see below) under certain conditions. (See 40 CFR 262.34.)

When wastes are stored in containers, the containers must be labeled with the words, "HAZARDOUS WASTE," and must be marked with the date on which wastes began

to accumulate in that container. The containers must be kept closed, must be in good condition, and must be inspected weekly for signs of corrosion, leaks, bulges, etc. When storing hazardous wastes which are classified as either ignitable or reactive, a buffer zone must be maintained from the property line and the containers must be kept away from sources of ignition. Furthermore, care must be taken to prevent mixing of wastes that are incompatible, or that will react to generate extreme heat or pressure, fire, explosion, or that will produce flammable or toxic mists, fumes, dusts, or gases.

As stated above, wastes can also be stored in tanks without a permit under certain conditions. Although similar to the rules for containers, the regulations for storing in tanks are more extensive, and will not be dealt with here.

Small Quantity Generators, i.e., 100-1000 kg/month, must either transport wastes off-site, or treat them on-site, within 180 days. If the waste must be shipped to a Treatment, Storage, or Disposal (TSD) facility that is located more than 200 miles away, then an additional 90 days (270 days total) may be allowed. Large Quantity Generators must either transport wastes off-site, or treat them on-site within 90 days.

Transportation Requirements. Hazardous waste which is to be shipped must be packaged according to U.S. DOT regulations, and each container (drum, portable tank, tank truck, or tank car) used for shipping a hazardous waste must be labeled, marked, and placarded in accordance with these same rules. In addition to any required DOT markings, each container of 110 gallons or less must bear the following legend:

HAZARDOUS WASTE — Federal Law Prohibits Improper Disposal. If found, contact the nearest police or

NEED HELP?

The regulations which implement RCRA are found in Title 40 of the Code of Federal Regulations, Parts 260-272.

For help on RCRA questions, contact:

**RCRA/Superfund Hotline
800-424-9346**

(Continued on page D42)

public safety authority or the U.S. Environmental Protection Agency.

**Generator's Name and Address
Manifest Document Number**

The discarding of pesticides, residues, and rinsates is usually regulated under RCRA. However, disposal requirements for empty containers are mandated by EPA under FIFRA. These requirements are found in the container disposal instructions on the product label. Note, however, that farmers disposing of waste pesticides from their own use are exempt from RCRA if they triple rinse each container and dispose of the pesticide residues on their own farms in accordance with the FIFRA label instructions.

Once a pesticide, manufacturing process waste, rinsate, or non-empty container is determined to be an RCRA hazardous waste, the waste must be managed in accordance with RCRA requirements.

It is important to realize that some States have RCRA requirements that are more stringent than those of Federal RCRA. Some States also have DOT requirements that are in addition to those of Federal DOT.

The EPA's first rules establishing a schedule and implementing the first of the Land Disposal Restrictions (LDRs) were published on November 7, 1986. EPA defined land disposal to include, but not be limited to, any placement of hazardous waste in:

- Landfills;
- Waste piles;
- Injection wells;
- Land treatment facilities;
- Salt domes or salt bed formations;
- Underground mines or caves; or
- Concrete vaults or bunkers, intended for disposal purposes.

The LDR rules were issued in segments over a 5-year period, and the first covered solvents and dioxins, then "California List Wastes," i.e., halogenated wastes, certain metal-bearing wastes, PCBs, cyanides, and corrosive wastes. The restricted wastes were further expanded during this period to include "F," "K," "P," and "U" hazardous waste codes, and finally certain characteristic "D" wastes.

Most listed hazardous wastes have been assigned specific treatment standards by EPA and are restricted from land disposal unless the designated treatment standards are met. Characteristic wastes D001, D002, etc., including the characteristic metal- or pesticide-containing wastes that are hazardous based upon process knowledge and/or the TCLP test data, are subject to the LDRs and must be treated. The treated waste, if it passes the TCLP test, can be land disposed. Some hazardous waste streams, however, are exempt because they become regulated (newly regulated streams) after the LDR rule was passed. These will become regulated in the future.

The LDRs require that the generator know which bans and which treatment standards apply to his waste and also notify the treatment or disposal facility, in writing, that specific LDR treatment standards apply to his wastes. The generator must certify that land disposal of the waste is allowed when the treatment standards are already met. Typically, a disposal facility will provide the waste generator with an "LDR" or "Land Ban" form to complete and sign to fulfill the notification requirement. The generator should keep a copy of this form with the manifest copy.

For some pesticides on the "P" and "U" lists, treatment standards have not yet been developed by EPA. These wastes must be stored at a permitted hazardous waste storage facility until a treatment standard is finalized. ■

See the SARA Title III Consolidated List beginning on page D 46 for RCRA hazardous wastes that are subject to reporting requirements under Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA).

Safe Drinking Water Act

- Sets national standards for levels of contamination found in drinking water.
- Creates a program for states to regulate underground injection wells.
- Provides for the protection of sole-source aquifers.

Enacted in 1974, then amended in 1986, the Safe Drinking Water Act covers regulation of drinking water systems by EPA.

With the 1974 act, Congress recognized information suggesting that organic chemicals were contaminating major surface and underground supplies of drinking water, that underground injection wells were one of the major threats to our aquifers, and that public water supply systems were antiquated and increasingly becoming a threat to public health.

In 1986, Congress amended the Safe Drinking Water Act to quicken EPA's response in issuing standards and implementing the act.

These amendments did the following:

- Mandated issuance of standards for 83 specified contaminants by 1989 with new standards on 25 more contaminants to be issued every three years thereafter.

(Of the currently issued standards, 15 to 20 are pesticides.)

- Regulated lead in drinking water.
- Increased EPA's regulatory powers.
- Provided for increased protection of sole-source aquifers.
- Required each state to prepare a Wellhead Protection Program.

Even though the Safe Drinking Water Act has moved along since 1986, the EPA has fallen behind on the schedule of deadlines for promulgating the remaining drinking water standards.

Currently promulgated Safe Drinking Water Act standards take on importance outside the Safe Drinking Water Act as they make up health based goals, which are the standards for cleaning up groundwater at Superfund sites. Some states are adopting the Safe Drinking Water Act's drinking water standards for groundwater quality protection in other contexts.

At presstime, Congress was very close to passage of a comprehensive revision to the Safe Drinking Water Act. The proposed law would change the definition of contaminant, allow for small system monitoring relief from regulated contaminants, establish an occurrence data base for contaminant detects, revise standard setting procedures and prioritize standards, and establish a source water protection assessment and petition program.

Emergency Planning and Community Right-To-Know (SARA Title III)

- Mandates emergency planning and response capabilities
- Requires reporting of releases of listed "hazardous substances" to state and local emergency authorities
- Requires notification of inventoried hazardous chemicals
- Dictates reporting of all environmental releases and disposals for listed "toxic chemicals"

The Superfund Amendments and Reauthorization Act of 1986 (SARA) amended CERCLA. One part of the new SARA provisions is Title III, the Emergency Planning and Community Right-to-Know Act of 1986. This act established new lists of "Extremely Hazardous Substances" and "Toxic Chemicals" for new notification and reporting requirements. It also added new reporting requirements for the CERCLA list of "Hazardous Substances" and the OSHA definition of "Hazardous Material."

SARA Title III has four major sections:

1. Emergency planning (Sections 301-303, Regulations in 40 CFR 355);
2. Emergency notification (Section 304, Regulations in 40 CFR 355);
3. Community right-to-know reporting requirements (Sections 311-312, Regulations in 40 CFR 370); and
4. Toxic chemicals release reporting (Section 313, Regulations in 40 CFR 372).

Emergency Planning

The emergency planning sections of SARA require the Governor of each State to appoint a State Emergency Response Commission (SERC). This State commission must designate Local Emergency Planning Committees (LEPC) and emergency planning districts so that local emergency plans can be developed for utilization by government agencies in the event of a chemical emergency.

A facility that uses, produces, or stores an Extremely Hazardous Substance (EHS) in an amount equal to or in excess of the Threshold Planning Quantity (TPQ) has reporting and notification obligations under Section 302 of SARA Title III (40 CFR Part 355). The emergency planning provisions in this section stipulate that a facility which handles any EHS at or in excess of the TPQ must notify the State by letter that it is subject to the emergency planning provisions, and that an emergency response coordinator has been designated for the facility, who will participate in the local emergency planning process.

Emergency Notification

In addition to the reporting requirements under CERCLA, Section 304 of SARA Title III requires owners and op-

erators of most business facilities to report releases of CERCLA hazardous substances as well as EHSs to State and local authorities. Many pesticide active ingredients and inerts are included both on the extremely hazardous substance list and the CERCLA list (40 CFR 302).

The Section 304 notification must be given immediately (by telephone) after the release of an RQ (1 pound, or more if a formal RQ has been set by regulation) to the community emergency response coordinator for each LEPC in any area likely to be affected by the release, and to the State emergency response commission of any State likely to be affected by the release. These notification requirements apply only to releases that have potential for off-site exposure and that are from facilities required to prepare Material Safety Data Sheets (MSDSs) or to have MSDSs available for their employees. This impacts all farm chemical-using businesses.

This information must include:

- Chemical name and identity of the released substance.
- Whether the released substance is extremely hazardous.
- Estimation of quantity release.
- Time and duration of release.
- Medium or media into which the release occurred.
- Known or anticipated acute or chronic health risks.
- Medical advice for exposed individuals.
- Precautions regarding the release, including evacuation provisions, if necessary.
- Contact names and phone numbers.
- Written follow-up.

Releases which are "transportation-related" also require notification as above; transportation-related means a release during transportation, or storage incident to transportation if the stored substance is moving under active shipping papers and has not reached the ultimate consignee. The notification can be made by either the owner or operator of the transport vehicle; the person may report the release as indicated above, or may provide the required information to the 911 operator, or the local operator in the absence of a 911 operator.

Community Right-to-Know

SARA Title III requires facilities which produce, use, or store hazardous chemicals or extremely hazardous substances in excess of designated thresholds (10,000 lbs. for hazardous chemicals and 500 lbs. or the TPQ, whichever is lower, for EHSs) to do the following:

- Submit MSDS or lists of hazardous chemicals stored at or in excess of the designated threshold quantities to the State and local EPCs and to the local fire department.
- Submit, by March 1, annual inventory report forms (Tier I) for all hazardous chemicals and extremely hazardous substances in excess of designated threshold quantities to the State and local EPCs and to the local fire department.

Additional reporting (Tier II) is not initially necessary but may be required if requested by the State or the local planning commission or local fire department.

Several substances, particularly agricultural chemicals used in routine agricultural operations or fertilizers held for sale by a retailer to the ultimate consumer, are exempted from the Tier I and Tier II reporting requirements under Section 311(e) of Title III.

Toxic Chemicals Release

Section 313 of SARA (40 CFR 372) requires owners and operators of specific facilities, including grain mills, food product manufacturers, and pesticide and fertilizer manufacturers, that manufacture, process, or otherwise use specific listed "toxic chemicals" in excess of specified threshold levels to report annually to the EPA on all releases to the environment from their facility by completing "Toxic Chemical Release Inventories (Form Rs)." The threshold is 25,000 lbs. for chemicals which are manufactured, processed, or imported, and 10,000 lbs. for those which are otherwise used at a facility. The purpose of this release reporting is to inform government officials and the community about the quantities of toxic chemicals introduced into the environment via releases to air, water, or land (including fugitive air sources, stack or point air sources, water sources, solid slurries, and nonaqueous sources). All sources of wastes must be included as well as accidental or non-routine releases. This information allows EPA to develop a data base upon which modeling can be performed to assess future needs for regulatory controls.

It is important to note that many retail agricultural facilities are exempt from filing Section 313 Form R because their Standard Industrial Classification (SIC) code falls outside SIC codes 20 through 39 (manufacturing facilities). According to the Standard Industrial Classification Manual published by the Office of Management and Budget, retail



NEED HELP?

For assistance with the Federal SARA Title III, Emergency Planning and Community Right-to-Know regulations, contact:

**The Emergency Planning and
Community Right-to-Know
Information Hotline
800-535-0202**

dealers who are not involved in manufacturing activities as defined by the manual would be assigned an SIC code of 5191, which exempts them from Form R reporting.

Under Section 313, suppliers of mixtures or trade name products containing listed toxic chemicals above 1% (or 0.1% for carcinogens) must **annually** notify customers of the presence and concentrations of these chemicals in products, including pesticides. If the mixture or trade name product is required to have a Material Safety Data Sheet (MSDS) under the OSHA Hazard Communication Standard (29 CFR 1910.1200), the manufacturer, importer, or processor is required to either attach the required information to the MSDS or to incorporate it into the MSDS. ■

***The SARA Title III Consolidated
List of Chemicals subject to re-
porting requirements under Title III
of the Superfund Amendments
and Reauthorization Act of 1986
begins on page D 46.***

SARA TITLE III Consolidated List

This consolidated chemical list includes chemicals subject to reporting requirements under Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). The list includes chemicals referenced under five federal statutory provisions, as follows:

1. SARA Section 302 Extremely Hazardous Substances (EHS), the presence of any of which, in sufficient quantities, requires certain emergency planning activities to be conducted. Releases of these substances are also subject to reporting under Section 304 of Title III. The Threshold Planning Quantity (TPQ) is shown under Column 302.

EHS RQ or the reportable quantities of Extremely Hazardous Substances are subject to reporting under Section 304 of Title III. If a final RQ has not been assigned under CERCLA to a chemical listed under Section 302, a statutory RQ of 1 pound applies for Section 304 reporting. The EHS RQ column lists the 1 pound statutory RQ for EHSs not listed under CERCLA.

2. CERCLA Hazardous Substances (RQ Chemicals), releases of which are subject to reporting under the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA or "Superfund"). Such releases are also subject to reporting under Section 304 of Title III.

3. SARA Section 313 Toxic Chemicals, emissions or releases of which must be reported annually as part of SARA Title III's community right-to-know provisions. Inerts and pesticides subject to Section 313 are indicated with an "X."

4. RCRA Hazardous Wastes from the P and U lists only (40 CFR 261.33), which consist of lists of specific chemicals. RCRA hazardous wastes consisting of waste streams of the F and K lists are not included here; such waste streams are also CERCLA hazardous substances. The listing is provided as an indicator to companies that they may already have data on a specific chemical that can be used for Title III reporting purposes. Appropriate codes are indicated in the RCRA column. For more information, see the RCRA section on page D 40.

5. CAA Section 112(r) List of Substances for Accidental Release Prevention was published in the Federal Register on January 31, 1994 (40 CFR Part 68). Threshold Quantities (TQ) for chemicals subject to the accident prevention provisions of the Clean Air Act are listed in the CAA column.

There are six columns in the consolidated list corresponding to these five statutory provisions.

If a chemical is listed as an extremely hazardous substance under Section 302, its TPQ (Threshold Planning Quantity) is given for those chemicals that are CERCLA hazardous substances.

A "313" in the column for Section 313 indicates that the chemical is subject to reporting under Section 313 under the name listed. An "X" in this column indicates that the same chemical with the same CAS number appears on another list with a different chemical name.

The complete list is available from EPA, Office of Pesticides and Toxic Substances. ■

Chemical Name	CAS Number	Section 302 TPQ (lbs) *	Sect. 304 EHS RQ (lbs)**	Sect. 304 CERCLA RQ (lbs)	CAA (112r) TQ	Section 313	RCRA Code
Acenaphthylene	208-96-8			5000			
Acetonitrile	75-05-8			5000		313	U003
Acrolein	107-02-8	500		1	5000	313	P003
Acrylonitrile	107-13-1	10,000		100	20,000	313	U009,D001
Aldicarb	116-06-3	100/10,000		1			P070
Aldrin	309-00-2	500/10,000		1		313	P004
Allyl alcohol	107-18-6	1000		100	15,000	313	P005
Aluminum phosphide	20859-73-8	500		100			P006
4-Aminopyridine	504-24-5	500/10,000		1000			P008
Amiton	78-53-5	500	1				
Amiton oxalate	3734-97-2	100/10,000	1				
Amitrole	61-82-5			10		313	U011
Ammonia (anhydrous)	7664-41-7	500		100	10,000	X	
Ammonium chloride	12125-02-9			5000			
Ammonium nitrate (solution)	6484-52-2					313	

* = Threshold Planning Quantity

** = Reportable Quantity

¹ = Possible Reactivity Characteristic

+ Listed as hazardous air pollutant under section 112 (b) of the Clean Air Act; statutory RQ of 1 pound applies until RQs are adjusted.

Source: EPA 500-B-94-002 June 1994. (Some long chemical names have been truncated.)

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Chemical Name	CAS Number	Section 302 TPQ (lbs) *	Sect. 304 EHS RQ (lbs)**	Sect. 304 CERCLA RQ (lbs)	CAA (112r) TQ	Section 313	RCRA Code
Ammonium sulfamate	7773-06-0			5000			
Ammonium thiocyanate	1762-95-4			5000			
Antimony potassium tartrate	28300-74-5			100			
Antu	86-88-4	500/10,000		100			P072
Arsenic acid	7778-39-4		1				P010
Arsenic trioxide	1327-53-3	100/10,000		1			P012
Arsenous oxide	1327-53-3	100/10,000		1			P012
Azinphos-ethyl	2642-71-9	100/10,000	1				
Azinphos-methyl	86-50-0	10/10,000	1				
Benzene	71-43-2			10		313	U019,D001,D018
Benzene, pentachloronitro (quintozene)	82-68-8			100		X	U185
alpha-BHC	319-84-6			10			
beta-BHC	319-85-7			1			
delta-BHC	319-86-8		1	1			
Biphenyl	92-52-4		1+			313	
Bis(2-chloro-1-methylethyl)ether	108-60-1			1000		313	U027
Bromadiolone	28772-56-7	100/10,000	1				
Butyl benzyl phthalate	85-68-7			100		313	
sec-Butylamine	13952-84-6			1000			D001
1,2-Butylene oxide	106-88-7			1+		313	
Cacodylic acid	75-60-5			1			U136, D004
Cadmium	7440-43-9			10†		313	
Cadmium chloride	10108-64-2			10			
Calcium arsenate	7778-44-1	500/10,000		1			D004
Calcium cyanamide	156-62-7			1+		313	
Calcium cyanide	592-01-8			10			P021
Calcium hypochlorite	7778-54-3			10			
Captan	133-06-2			10		313	
Carbamic acid, methyl-,O-(((2,4- dimethyl-	26419-73-8	100/10,000	1				
Carbaryl	63-25-2			100		313	
Carbofuran	1563-66-2	10/10,000		10			
Carbon disulfide	75-15-0	10,000		100	20,000	313	P022,D001
Carbon tetrachloride	56-23-5			10		313	U211, D019
Carbophenothion	786-19-6	500	1				
Chloramben	133-90-4			1+		313	
Chlordane	57-74-9	1000		1		313	U036, D020
Chlorfenvinfos	470-90-6	500	1				
Chlorflurazole	3615-21-2	500/10,000	1				
Chlormephos	24934-91-6	500	1				
Chlormequat chloride	999-81-5	100/10,000	1				
Chloroacetic acid	79-11-8	100/10,000	1+			313	
Chlorobenzene	108-90-7			100		313	U037
Chlorobenzilate	510-15-6			10		313	U038
Chloroethane	75-00-3			100	10,000	313	
Chloroform	67-66-3	10,000		10	20,000	313	U044, D022
Chloromethane	74-87-3			100	10,000	313	U045
Chlorophacinone	3691-35-8	100/10,000	1				
Chlorothalonil	1897-45-6					313	

† No reporting of releases is required if the diameter of the pieces of the solid metal released is \geq 100 micrometers (0.004 inches).

* = Threshold Planning Quantity

** = Reportable Quantity

† = Possible Reactivity Characteristic

+ Listed as hazardous air pollutant under section 112 (b) of the Clean Air Act; statutory RQ of 1 pound applies until RQs are adjusted.

Source: EPA 500-B-94-002 June 1994. (Some long chemical names have been truncated.)

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REGULATORY FILE

Chemical Name	CAS Number	Section 302 TPQ (lbs) *	Sect. 304 EHS RQ (lbs)**	Sect. 304 CERCLA RQ (lbs)	CAA (112r) TQ	Section 313	RCRA Code
Chloroxuron	1982-47-4	500/10,000	1				
Chlorpyrifos	2921-88-2			1			
Chlorthiophos	21923-23-9	500	1				
Coumaphos	56-72-4	100/10,000		10			
Coumatetralyl	5836-29-3	500/10,000	1				
Creosote	8001-58-9			1		313	U051
m-Cresol	108-39-4			1000		313	U052,D024
o-Cresol	95-48-7	1000/10,000		1000		313	U052, D023
Crimidine	535-89-7	100/10,000	1				
Cupric sulfate	7758-98-7			10			
Cyanogen chloride	506-77-4			10	10,000		P033
Cyanophos	2636-26-2	1000	1				
Cyclohexanone	108-94-1			5000			U057, D001
Cycloheximide	66-81-9	100/10,000	1				
2-Cyclohexyl-4,6-Dinitrophenol	131-89-5			100			P034
2,4-D Acid	94-75-7			100		X	U240, D016
2,4-D Esters	94-11-1			100			
2,4-D Esters	94-79-1			100			
2,4-D Esters	1320-18-9			100			D016
2,4-D Esters	1928-38-7			100			
2,4-D Esters	1928-61-6			100			
2,4-D Esters	1929-73-3			100			
2,4-D Esters	2971-38-2			100			
2,4-D Esters	25168-26-7			100			D016
2,4-D Esters	53467-11-1			100			
DDD	72-54-8		1				U060
DDE	72-55-9			1			
DDT	50-29-3			1			U061
Demeton	8065-48-3	500	1				
Demeton-S-methyl	919-86-8	500	1				
Dialifor	10311-84-9	100/10,000	1				
Diallate	2303-16-4			100		313	U062
Diazinon	333-41-5			1			
1,2 Dibromo-3-chloropropane (DBCP)	96-12-8			1		X	U066
Dibutyl phthalate	84-74-2			10		313	U069
Dicamba	1918-00-9			1000			
Dichlobenil	1194-65-6			100			
Dichlone	117-80-6			1			
1,2-Dichlorobenzene	95-50-1			100		313	U070
1,4-Dichlorobenzene	106-46-7			100		313	U072,D027
o-Dichlorobenzene	95-50-1			100		X	U070
Dichlorodifluoromethane (CFC-12)	75-71-8			5000		313	U075
1,2-Dichloroethane	107-06-2			100		313	U077,D028
Dichloroethyl Ether	111-44-4	10,000		10		X	U025
Dichloromethane	75-09-2			1000		313	U080
3,5-Dichloro-N-(1,1-dimethyl 2- p)benzamide	23950-58-5			5000		X	U192
1,2-Dichloropropane	78-87-5			1000		313	U083

* = Threshold Planning Quantity

** = Reportable Quantity

¹ = Possible Reactivity Characteristic

+ Listed as hazardous air pollutant under section 112 (b) of the Clean Air Act; statutory RQ of 1 pound applies until RQs are adjusted.

Source: EPA 500-B-94-002 June 1994. (Some long chemical names have been truncated.)

REGULATORY FILE

SARA

Chemical Name	CAS Number	Section 302 TPQ (lbs) *	Sect. 304 EHS RQ (lbs)**	Sect. 304 CERCLA RQ (lbs)	CAA (112r) TQ	Section 313	RCRA Code
Dichloropropane-Dichloropropene (mixture)	8003-19-8			100			
Dichloropropene	26952-23-8			100			
1,3-Dichloropropene	542-75-6			100		X	U084
2,2-Dichloropropionic acid	75-99-0			5000			
Dichlorvos	62-73-7	1000		10		313	
Dicofol	115-32-2			10		313	
Dicrotophos	141-66-2	100	1				
Dieldrin	60-57-1		1				P037
Diethanolamine	111-42-2			1+		313	
Diethyl phthalate	84-66-2			1000		313	U088
Dimefox	115-26-4	500	1				
Dimethoate	60-51-5	500/10,000		10			P044
Dimethyl phthalate	131-11-3			5000		313	U102
1,1-Dimethylhydrazine	57-14-7	1000		10	15,000	X	U098
1,2-Dimethylhydrazine	540-73-8			1			U099
Dimetilan	644-64-4	500/10,000	1				
Dinitrocresol	534-52-1	10/10,000		10		X	P047
Dinoseb	88-85-7	100/10,000		1000			P020
Dinoterb	1420-07-1	500/10,000	1				
n-Dioctylphthalate	117-84-0			5000			U107
1,4-Dioxane	123-91-1			100		313	U108
Dioxathion	78-34-2	500	1				
Diphacinone	82-66-6	10/10,000	1				
Diquat	85-00-7			1000			
Disulfoton	298-04-4	500		1			P039
Diuron	330-54-1			100			
EBDC (ethylene bisdithio-carbamic acid, salts, and esters)	111-54-6			5000		X	U114
Endosulfan	115-29-7	10/10,000		1			P050
alpha - Endosulfan	959-98-8			1			
beta - Endosulfan	33213-65-9			1			
Endothall	145-73-3			1000			P088
Endothion	2778-04-3	500/10,000	1				
Endrin	72-20-8	500/10,000		1			P051, D012
Epichlorohydrin	106-89-8	1000		100	20,000	313	U041
EPN	2104-64-5	100/10,000	1				
Ergocalciferol	50-14-6	1000/10,000	1				
Ethion	563-12-2	1000		10			
Ethoprophos	13194-48-4	1000	1				
2-Ethoxyethanol	110-80-5			1000		313	U359
Ethyl acrylate	140-88-5			1000		313	U113, D001
Ethylbenzene	100-41-4			1000		313	
Ethylene	74-85-1				10,000	313	
Ethylene dibromide	106-93-4			1		X	U067
Ethylene dichloride	107-06-2			100		X	U077
Ethylene oxide	75-21-8	1000		10	10,000	313	U115
Ethylene thiourea	96-45-7			10		313	U116
Famphur	52-85-7			1000			P097
Fenamiphos	22224-92-6	10/10,000	1				

* = Threshold Planning Quantity

** = Reportable Quantity

¹ = Possible Reactivity Characteristic

+ Listed as hazardous air pollutant under section 112 (b) of the Clean Air Act; statutory RQ of 1 pound applies until RQs are adjusted.

Source: EPA 500-B-94-002 June 1994. (Some long chemical names have been truncated.)

Chemical Name	CAS Number	Section 302 TPQ (lbs) *	Sect. 304 EHS RQ (lbs)**	Sect. 304 CERCLA RQ (lbs)	CAA (112r) TQ	Section 313	RCRA Code
Fenitrothion	122-14-5	500	1				
Fenulfosfotion	115-90-2	500	1				
Ferric sulfate	10028-22-5			1000			
Ferrous sulfate (anhydrous)	7720-78-7			1000			
Ferrous sulfate (heptahydrate)	7782-63-0			1000			
Fluometil	4301-50-2	100/10,000	1				
Fluometuron	2164-17-2					313	
Fluoroacetamide	640-19-7	100/10,000		100			P057
Fonofos	944-22-9	500	1				
Formaldehyde	50-00-0	500		100	15,000	313	U122
Formetanate hydrochloride	23422-53-9	500/10,000	1				
Formothion	2540-82-1	100	1				
Formparanate	17702-57-7	100/10,000	1				
Fosthietan	21548-32-3	500	1				
Freon 113	76-13-1					313	
Fuberidazole	3878-19-1	100/10,000	1				
Furfural	98-01-1			5000			U125
Heptachlor	76-44-8			1		313	P059, D031
Hexachlorobenzene	118-74-1			10		313	U127, D032
Hexachlorophene	70-30-4			100		313	U132
Hydrazine	302-01-2	1000		1	15,000	313	U133, D003 ¹
Hydrocyanic Acid	74-90-8	100		10	2500	X	P063, D003 ¹
Isobenzan	297-78-9	100/10,000	1				
Isobutyric acid	79-31-2			5000			
Isodrin	465-73-6	100/10,000		1			P060
Isophorone	78-59-1			5000			
Isopropylmethylpyrazolyl dimethylcarbamate	119-38-0	500	1				
Kelthane (dicofol)	115-32-2			10		313	
Kepone	143-50-0			1			U142
Lead acetate	301-04-2			10			U144, D008
Leptophos	21609-90-5	500/10,000	1				
Lindane	58-89-9	1000/10,000		1		313	U129, D013
Malathion	121-75-5			100			
Maleic anhydride	108-31-6			5000		313	U147
Maleic hydrazide	123-33-1			5000			U148
Maneb	12427-38-2					313	
Mephosfolan	950-10-7	500	1				
Mercuric chloride	7487-94-7	500/10,000	1				D009
Mercuric oxide	21908-53-2	500/10,000	1				
Methamidophos	10265-92-6	100/10,000	1				
Methanesulfonyl fluoride	558-25-8	1000	1				
Methidathion	950-37-8	500/10,000	1				
Methiocarb	2032-65-7	500/10,000		10			
Methomyl	16752-77-5	500/10,000		100			P066
Methoxychlor	72-43-5			1		313	U247, D014
2-Methoxyethanol	109-86-4					313	
Methoxyethylmercuric acetate	151-38-2	500/10,000	1				
Methyl bromide	74-83-9	1000		1000		X	U029
Methyl chloride	74-87-3			100	10,000	X	U045

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Source: EPA 500-B-94-002 June 1994. (Some long chemical names have been truncated.)

REGULATORY FILE

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Chemical Name	CAS Number	Section 302 TPQ (lbs) *	Sect. 304 EHS RQ (lbs)**	Sect. 304 CERCLA RQ (lbs)	CAA (112r) TQ	Section 313	RCRA Code
Methyl chloroform	71-55-6			1000		X	U226
Methyl isobutyl ketone	108-10-1			5000		313	U161, D001
Methyl isothiocyanate	556-61-6	500	1				
Methyl methacrylate	80-62-6			1000		313	U162, D001, D003 ¹
Methyl parathion	298-00-0	100/10,000		100			P071
Methyl phenkapton	3735-23-7	500	1				
Methylene chloride	75-09-2			1000		X	U080
Methylmercuric dicyanamide	502-39-6	500/10,000	1				
Metolcarb	1129-41-5	100/10,000	1				
Mevinphos	7786-34-7	500		10			
Mexacarbate	315-18-4	500/10,000		1000			
Monocrotophos	6923-22-4	10/10,000	1				
Naled	300-76-5			10			
Naphthalene	91-20-3			100		313	U165
Nicotine	54-11-5	100		100			P075
Nitrofen	1836-75-5					313	
p-Nitrophenol	100-02-7			100		X	U170
2-Nitropropane	79-46-9			10		313	U171
Norbormide	991-42-4	100/10,000	1				
Octomethyl diphosphoramidate	152-16-9	100		100			P085
Oxamyl	23135-22-0	100/10,000	1				
Paraformaldehyde	30525-89-4			1000			
Paraquat	1910-42-5	10/10,000	1				
Parathion	56-38-2	100		10		313	P089
Paris green	12002-03-8	500/10,000		1			
PCNB (pentachloronitrobenzene)	82-68-8			100		X	U185
Pentachlorobenzene	608-93-5			10			U183
Pentachlorophenol	87-86-5			10		313	D037
Perchloroethylene	127-18-4			100		X	U210
Phenol	108-95-2	500/10,000		1000		313	U188
Phenol, 3-(1-methylethyl)-, methylcarbamate	64-00-6	500/10,000	1				
Phenylmercury acetate	62-38-4	500/10,000		100			P092, D009
2-Phenylphenol	90-43-7					313	
Phorate	298-02-2	10		10			P094
Phosacetim	4104-14-7	100/10,000	1				
Phosfolan	947-02-4	100/10,000	1				
Phosmet	732-11-6	10/10,000	1				
Phosphamidon	13171-21-6	100	1				
Phosphine	7803-51-2	500		100	5000		P096
Phosphoric acid	7664-38-2			5000		313	D002
Phosphorothioic acid, 0,0-dimethyl-5-(2-(m	2587-90-8	500	1				
Pirimiphos-ethyl	23505-41-1	1000	1				
Potassium chromate	7789-00-6			10			
Potassium permanganate	7722-64-7			100			
Promecarb	2631-37-0	500/10,000	1				
Pronamide	23950-58-5			5000		313	U192
Propargite	2312-35-8			10			
Propargyl bromide	106-96-7	10	1				

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Chemical Name	CAS Number	Section 302 TPQ (lbs) *	Sect. 304 EHS RQ (lbs)**:	Sect. 304 CERCLA RQ (lbs)	CAA (112r) TQ	Section 313	RCRA Code
Propionaldehyde	123-38-6			1+		313	
Propionic acid	79-09-4			5000			
Propoxur	114-26-1		1+			313	
Propylene oxide	75-56-9	10,000		100	10,000	313	
Prothoate	2275-18-5	100/10,000	1				
Pyrethrins	121-21-1			1			
Pyrethrins	121-29-9			1			
Pyrethrins	8003-34-7			1			
Pyriminil	53558-25-1	100/10,000	1				
Quintozene	82-68-8			100		X	U185
Sarin	107-44-8	10	1				
Silvex (2,4,5-TP)	93-72-1			100			F027, D017
Sodium arsenite	7784-46-5	500/10,000		1			
Sodium azide	26628-22-8	500		1000			P105
Sodium bichromate	10588-01-9			10			
Sodium bisulfite	7631-90-5			5000			
Sodium cacodylate	124-65-2	100/10,000	1				
Sodium cyanide (Na(CN))	143-33-9	100		10			P106
Sodium fluoride	7681-49-4			1000			
Sodium fluoroacetate	62-74-8	10/10,000		10			P058
Sodium hydroxide	1310-73-2			1000			
Sodium phosphate, dibasic	7558-79-4			5000			
Sodium selenate	13410-01-0	100/10,000					
Stannane, acetoxytriphenyl	900-95-8	500/10,000	1				
Strychnine	57-24-9	100/10,000		10			P108
Sulfotep	3689-24-5	500		100			P109
Sulfur dioxide	7446-09-5	500	1				
Sulfuric acid	7664-93-9	1000		1000		313	
2,4,5-T Acid	93-76-5			1000			U232, F027
2,4,5-T Amines	1319-72-8			5000			F027
2,4,5-T Amines	2008-46-0			5000			F027
2,4,5-T Amines	3813-14-7			5000			F027
2,4,5-T Amines	6369-96-6			5000			F027
2,4,5-T Amines	6369-97-7			5000			F027
2,4,5-T Esters	93-79-8			1000			F027
2,4,5-T Esters	1928-47-8			1000			F027
2,4,5-T Esters	2545-59-7			1000			F027
2,4,5-T Esters	25168-15-4			1000			F027
2,4,5-T Esters	61792-07-2			1000			F027
2,4,5-T Salts	13560-99-1			1000			F027
TEPP	107-49-3	100		10			P111
Terbufos	13071-79-9	100	1				
Tetrachlorvinphos	961-11-5					313	
Thallosulfate	7446-18-6	100/10,000		100			P115
Thiofanox	39196-18-4	100/10,000		100			P045
Thionazin	297-97-2	500		100			P040
Thiourea	62-56-6			10		313	U219
Thiram	137-26-8			10		313	U244
Toluene	108-88-3			1000		313	U220, D001 ¹
Toluenediisocyanate	26471-62-5			100	10,000	313	U223, D003

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REGULATORY FILE

Chemical Name	CAS Number	Section 302 TPQ (lbs) *	Sect. 304 EHS RQ (lbs)**	Sect. 304 CERCLA RQ (lbs)	CAA (112r) TQ	Section 313	RCRA Code
Toxaphene (Camphechlor)	8001-35-2	500/10,000		1		313	P123, D015
2,4,5-TP esters	32534-95-5			100			
Triamphos	1031-47-6	500/10,000	1				
Triazofos	24017-47-8	500	1				
Trichlorfon	52-68-6			100		313	
1,1,1-Trichloroethane	71-55-6			1000		313	U226
1,1,2-Trichloroethane	79-00-5			100		313	U227
Trichloroethylene	79-01-6			100		313	U228, D040
Trichloronate	327-98-0	500	1				
Trichlorophenol	25167-82-2			10			
Trifluralin	1582-09-8			1+		313	
Triphenyltin chloride	639-58-7	500/10,000	1				
Warfarin (conc. > 0.3%)	81-81-2			100			P001
Warfarin (conc. < 0.3%)	81-81-2	500/10,000		100			P001
Warfarin, sodium	129-06-6	100/10,000	1				
Xylene (mixed isomers)	1330-20-7			1000		313	U239, D001
Zinc chloride	7646-85-7			1000			
Zinc phosphide (conc. > 10%)	1314-84-7	500		100			P122, D003
Zinc phosphide (conc. ≤ 10%)	1314-84-7	500		100			U249
Zinc silicofluoride	16871-71-9			5000			
Zinc sulfate	7733-02-0			1000			
Zineb	12122-67-7					313	

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Toxic Substances Control Act

- **Regulates production, distribution, use, and disposal of chemicals which pose unreasonable risks**
- **Pesticides excluded (regulated under FIFRA)**
- **Fertilizers covered**

The Toxic Substances Control Act (TSCA) was enacted in 1976 to:

- Ensure that adequate data are developed on the effects of chemical substances on health and the environment;
- Regulate the production, distribution, use, and disposal of those chemicals deemed to present an unreasonable risk of injury to health or the environment; and,
- Provide authority to EPA to take action on those chemicals which present an "imminent hazard."

The regulations promulgated to implement TSCA are found in 40 CFR 700-799, and are administered by the Office of Toxic Substances (OTS).

Pesticides are specifically excluded from TSCA's definition of a chemical substance, when manufactured, processed, or distributed as a pesticide. EPA generally considers a product to be a pesticide once it requires a FIFRA Section 5 Experimental Use Permit. It is important to note that inerts and raw materials are not considered pesticides until they become part of a pesticide product. Intermediates used in the manufacture of a pesticide are **not** excluded from regulation under TSCA, unless they are pesticides themselves and are being used in a mixture for their pesticidal properties, or are not isolated during the manufacturing process.

While pesticides are exempted from TSCA, fertilizers and other substances used in the growing of crops are **not** exempted. Thus, any chemical to be used for such purposes must be listed on the TSCA Inventory.

As mentioned above, a product becomes a pesticide once it has received an Experimental Use Permit. This interpretation means that chemicals that are being tested in the laboratory or in small field trials are regulated by TSCA. However, current OTS policy is to exempt such activities from submission of risk information, notification, and record-keeping, provided the requirements in 40 CFR 720.36 are met.

Under Section 8(b) of TSCA, EPA is responsible for compiling and publishing an Inventory of Existing Chemical Substances. No one may manufacture or import a "new" chemical (i.e., one which is not included on the Inventory) unless a Premanufacture Notification (PMN) is submitted to EPA at least 90 days before manufacture or import commences. During this 90-day period EPA will review data on the chemical to determine whether specific requirements must be established for its handling, use, or disposal. If EPA does not take any specific action with regard to the chemical by the end of the review period, manufacture or import

may begin. A Notice of Commencement of Manufacture or Import (NOC) **must** be filed with EPA no later than 30 days after either occurs. When the NOC is received, the chemical is added to the Inventory.



For more information, the regulations which implement TSCA are found in Title 40 of the Code of Federal Regulations, Parts 700 - 799. For help on TSCA questions, contact:

TSCA Information Assistance Service
202-554-1404
Fax: 202-554-5603

As part of its premanufacture review, EPA can, under Section 5(e), require the submitter to develop data to ascertain hazards which the "new" chemical may pose, and/or can impose controls or restrictions on its use. These requirements apply only to the company which submitted the PMN. Once a chemical is added to the Inventory, anyone may manufacture or use it without notifying EPA, and without the same restrictions or controls.

However, EPA can use its authority under Section 5(a) of TSCA to issue Significant New Use Rules (SNURs) which extend the limitations in Section 5(e) orders to other manufacturers, importers, and processors. This ensures that everyone is treated in essentially the same manner, and that the original PMN submitter is not put at a disadvantage compared to subsequent manufacturers, importers, and processors.

These SNURs are framed so that non-compliance with the control measures or other restrictions in the Section 5(e) consent orders is defined as a "significant new use." Thus, other manufacturers, importers, and processors of the substances must either observe the SNUR restrictions or submit a Significant New Use Notice (SNUN) to EPA at least 90 days before initiating activities that deviate from these restrictions. As in the case of PMNs, no activity may commence before the review period expires. During this time, EPA can either permit the new use to occur, or regulate the new submitter's activities under Section 5(e) or 5(f). EPA utilizes a "generic" SNUR in regulating substances; this system allows it to efficiently prepare SNURs. Over 260 substances are so regulated and are found in 40 CFR 721.

Under Section 8 of TSCA, EPA has the authority to obtain data (Section 8[a]) or unpublished health and safety studies (Section 8[d]) on existing chemical substances. EPA has is-

sued two information gathering rules: Preliminary Assessment Information Rule (PAIR) and Comprehensive Assessment Information Rule (CAIR). The PAIR rule, found in 40 CFR 712, covers manufacturers and importers of specific, listed chemicals published in 40 CFR 712.30, which include several pesticides. If a chemical is manufactured or imported for both pesticidal and non-pesticidal purposes, it is subject to reporting under the PAIR rule.

The CAIR rule, found in 40 CFR 704, Subparts C and D, applies to manufacturers, importers, and processors; as with the PAIR rule, pesticides are included if there are non-pesticidal uses for the chemicals. Currently only 19 chemicals are covered under this rule.

If EPA is unable to obtain sufficient extant information through its Section 8 authority, it can, under Section 4, require manufacturers, importers, and/or processors to conduct testing to fill data gaps; testing requirements are found in 40 CFR 799. To date EPA has listed 29 specific chemical test rules under Subpart B; 33 substances and mixtures which are subject to consent orders, under Subpart C; and 23 chemicals found as constituents of hazardous waste, under Subpart D.

Under Section 8(e), persons who obtain new information that reasonably supports the conclusion that a substance or mixture which they manufacture, import, process, or distribute presents substantial risk of injury to human health or the environment **must** notify EPA within 15 working days. These notices are reviewed and an initial evaluation is prepared containing, if appropriate, follow-up questions to the submitter, referrals to other agencies, and recommended EPA follow-up. EPA has fined several companies for failure to submit timely notifications. It is important to note that EPA considers that the Agency, **and not the submitter**, has the obligation to determine whether the information "reasonably supports the conclusion that a substance or mixture....presents a substantial risk...." The 8(e) notices represent a company's first review of a situation, and should be made in light of the agency's interpretation. EPA has not promulgated regulations implementing Section 8(e); however, it has published "Environmental Protection Agency Policy Statement on Interpretation and Enforcement on Substantial Risk Notification under the Toxic Substances Control Act" (43 FR 11110, March 16, 1978) and "TSCA Section 8(e) Reporting Guide" (June 1991). The latter, which incorporates the cited Policy Statement is available through the TSCA Information Assistance Service.

In addition to the above requirement which relates to new information, Section 8(c) requires manufacturers, processors and distributors to keep records of **allegations** that



You can obtain TSCA documents or forms by faxing your request to:

TSCA Information Assistance Service
Fax: 202-554-5603

Include the following in your request:

1. Name and telephone number of a contact person.
2. Name and address of person to whom the information will be mailed.
3. Document or form number, and any other information which will assist in identifying what is being requested.

a chemical substance or mixture has caused a significant adverse reaction to health or the environment. The allegations can be made by several sources, including employees, customers, neighbors, trade associations, etc. Employee allegations must be retained for 30 years, while those from other sources must be kept for 5 years. The TSCA 8(c) regulations are found in 40 CFR 717.

Importers of pesticides must also be aware of their obligations under Section 13 of TSCA, which requires that each time a chemical is imported a certification be signed. As stated above, chemicals which are imported as pesticides are not subject to TSCA. Thus, such imports must be certified with a negative statement, as follows: "I certify that all chemicals in this shipment are not subject to TSCA." This certification must be employed, even if the pesticide is found on the TSCA Inventory. If the chemical is not being imported for pesticidal uses or if a sample is being imported for R&D purposes, then a positive certification is required: "I certify that all chemical substances in this shipment comply with all applicable rules or orders under TSCA and that I am not offering a chemical substance for entry in violation of TSCA or any other applicable rule or order under TSCA." ■

U.S. Department of Agriculture 1990 Farm Bill

■ Sets recordkeeping requirements for Restricted Use Pesticides

The Food, Agriculture, Conservation and Trade Act of 1990, commonly known as the 1990 Farm Bill, finds its roots back in the late 1890s and its legislative history beginning with the Agricultural Adjustment Acts of the 1930s. The Act's original intent was to provide price support for producers of agricultural commodities and to level the international playing field for U.S. agricultural exports and imports.

Over the six decades since the Farm Bill was originally adopted, it has gradually become more of an environmental protection statute than one of price supports for producers. With these environmental initiatives, many of the Farm Bill's provisions directly impact the use of pesticides and fertilizers on the farm. In no other reauthorization of the Farm Bill have environmental initiatives been as prolific as in 1990. Specifically, Title XIV, XVI, and XXI covering Conservation, Research, and Organic Certification, respectively, impact agricultural use directly.

For the first time, farm legislation requires direct action by dealer/applicators. The 1990 Farm Bill requires certified applicators, including farmers, to maintain records on the use of restricted pesticides. These records, which must be maintained for two years, can be requested by Federal and State agencies, as well as health care personnel. Violator fines of \$500 to \$1000 for each instance are authorized. Records are to be kept confidential.

Title XIV, Subtitle C – Conservation

Chapter 1 – Agricultural Conservation Acreage Reserve Program (ACARP)

The 1990 Farm Bill amended the 1985 Farm Bill by implementing a host of changes to the Conservation Title. The first major amendment was to change the name of the Conservation Reserve Program, commonly known as CRP, to the Agricultural Conservation Acreage Reserve Program (ACARP) and expand the number of acres that can be placed in the program from 40 million to 45 million acres. The two main components of the ACARP program are the Conservation Reserve and the Wetlands Reserve. Acreage enrolled under the Wetlands or Conservation programs will count toward the 40- to 45-million-acre target.

Conservation Reserve

Since many acres had already been enrolled in the existing CRP program since its establishment in 1985, Congress set a target of enrolling at least 1 million acres for each calendar year 1991-1995 in the Conservation Reserve. Lands eligible to be enrolled in the program are highly erodible land, marginal pasture lands, lands subject to water quality problems, and other lands eligible at the discretion of the Secretary of Agriculture.

Wetlands Reserve

The 1990 Farm Bill also establishes the Wetlands Reserve Program with a goal of enrolling 1 million acres in the program from 1991-1995. Lands eligible for the program are

farmed or converted wetlands. Lands that were converted before December 23, 1985, are not eligible for the program. The Secretary may enter into permanent easements to take wetlands out of production.

Chapter 2 - Agricultural Water Quality Incentives; Agricultural Water Quality Protection Program

Congress created several voluntary programs outside of the existing Conservation Reserve Program to better target specific environmentally sensitive land. Through the Agricultural Water Quality Protection Program, the Secretary will work with farmers enrolled in the program to develop three-to-five-year plans which will require changes in the way that they use pesticides and nutrients, among other things. The two options that are available under the program include the Wetland or Wildlife Option. In order to meet the 10-million-acre enrollment goal for 1991-1995, the Secretary will provide cost share assistance of up to 50%, which will not exceed \$3500 per person per year for incentives and \$1500 for cost share.

Chapter 3 - Environmental Easements Program

The Environmental Easements Program gives the Secretary the guidelines by which he may enter into easements on certain lands from 1991-1995. Lands eligible under this program include lands placed under the conservation reserve or cropland that contains riparian corridors, critical wildlife habitat, and environmentally sensitive land.

Subtitle D – Other Conservation Measures

Integrated Farm Management Program Option

The 1990 Farm Bill established the voluntary Integrated Farm Management Program Option which is designed to assist producers of agricultural commodities in adopting integrated, multi-year, site-specific farm management plans. Participation in the program requires producers to use resource conserving crops, crop rotations, integrated pest management, and other methods to reduce pesticide and fertilizer use. Contracts can be entered into for three to five years with a total acreage target of 3 to 5 million acres for crop years 1991-1995.

Subtitle F – Administration of Environmental Programs

As part of the environmental initiatives of the 1990 Farm Bill, Congress mandated that the Secretary establish the Agricultural Council for Environmental Quality and the Office of Environmental Quality. The primary reason for the council and the office is to oversee all of the new environmental programs established by the 1990 Farm Bill. Further, the Act establishes a Water Quality and Nutrient Research Program directly aimed at reducing the use of fertilizers through the adoption of alternative production practices.

Subtitle G – Water Quality Research, Education, and Coordination

The purpose of this title is to ensure that the Department of Agriculture develops, implements, and sustains a coor-

minated, integrated, and comprehensive intra-agency program to protect waters from contamination by agricultural chemicals and production practices. In addition, the Subtitle directs the Department to place more emphasis on finding the relation between agricultural production and water quality.

Subtitle H - Pesticides

1. Farm Bill Pesticide Recordkeeping

The pesticide recordkeeping program of the 1990 Farm Bill became a final rule on April 9, 1993. The rule affects both private and commercial applicators who use pesticides classified for restricted use under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The regulations became effective on May 10, 1993.

Unless records are currently prescribed by the State (retail dealers who commercially apply restricted use pesticides (RUPs) may use the records they already keep under FIFRA to comply with the Farm Bill recordkeeping requirements and distribute these to their customers), the applicator shall maintain the following data elements for each RUP application:

- a. The brand or product name, and the EPA registration number of the RUP that was applied.
- b. The total amount of the RUP applied. Total amount refers to the total quantity of pesticide product used, with each RUP being listed separately. Amount does not refer to percent of active ingredient, nor does it include the amount of water used as a carrying agent.
- c. The location of the application, size of area treated, and the crop, commodity, stored product, or site to which an RUP was applied.
 - i. Location of the pesticide application shall be recorded as actual location where the application of RUP was made.
 - ii. Size of area treated should reflect label language, which is provided in the label's direction of use section. Examples of "size of area treated" are acres for field crops, linear feet for fence-rows, square feet for greenhouses and nurseries, or other applicable designations. When recording size of area treated for livestock and poultry, enter the number of animals treated.
 - iii. Crop, commodity, stored product, or site shall include general references such as corn, cotton, or wheat, and not specific scientific or variety names.
- d. The month, day, and year when the RUP application occurred.
- e. The name and certification number (if applicable) of the certified applicator who applied or who supervised the application of the RUP.

Certified commercial applicators can hold the records of RUP applications for their clients as long as they have a signed statement from the client which recognizes the commercial applicator as the holder of the record for the client. Commercial applicators should provide their clients with a copy of the signed agreement. Commercial applicators must make these records available to their clients upon request in a timely manner if they are to maintain the clients' records. Records must also be maintained by non-agricultural commercial and private applicators.

The law stipulates that violations of Federal pesticide recordkeeping requirements will require the imposition of a fine not to exceed \$500 for the first violation and a fine of not less than \$1000 for the second violation unless it is determined that a good faith effort to comply was made.

2. Reduction of Waiver of Fees for Pesticides Registered for Minor Agricultural Uses

The 1990 Farm Bill also amended FIFRA to allow the Administrator of the Environmental Protection Agency (EPA) to reduce or waive the payment of fees for a pesticide that is registered for a minor agricultural use if it is determined that the fee would significantly reduce the availability of the pesticide for the use.

3. Voluntary Cancellation

The Farm Bill also amended FIFRA to allow a registrant to request that a pesticide registration be canceled or amended to terminate one or more uses. In the case of a minor use pesticide, if the Administrator determines that the cancellation of termination of uses would adversely affect the availability of the pesticide for use, 90 days must be given for affected parties to comment on the proposal. During the 90-day comment period, the registrant may enter into a transfer of registration agreement with a third party that would allow the continued registration of the minor use.

4. Pest Control

Establishes a study to allow USDA and EPA to identify available methods of pest control and pest control problems. It also directs the Secretary to develop Integrated Pest Management (IPM) methods.

5. IR-4 Program

The Inter-Regional Research Project Number 4 (IR-4) program was established to assist in the collection of residue and efficacy data in support of the registration and reregistration of minor use pesticides and tolerances for residues under FIFRA.

6. Water Policy With Respect to Agrichemicals

This policy places USDA with principal responsibility and accountability for the development and delivery of educational programs, technical assistance, and research programs for the users and dealers of agrichemicals to ensure that the use, storage, and disposal of agrichemicals by users is prudent, economical, and environmentally sound, and that users, dealers, and the general public understand the implications of their actions and potential effects on water. However, the USDA responsibility does not affect the EPA's authority under FIFRA.

Title XVI - Research

The 1990 Farm Bill establishes several research programs aimed at sustainable agricultural research and education, integrated management systems, sustainable agricultural technology, development, and transfer, along with alternative agricultural research and commercialization.

Title XVI - Organic Certification

Because of the moderate increase in organic farming (using no man-made pesticides and fertilizers), Congress established national standards governing the marketing of organically produced farm products. ■

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Quick Reference to State Regulations

STATE	Pesticide Registration Fee \$	Pesticide Special Taxes \$	Pesticide Comments
Alabama	\$100/product	N	-
Alaska	N	N	-
Arizona	\$100/product*	N/A	*\$75 to ADEQ groundwater program
Arkansas	\$150	-	-
California	\$200/product/yr.	\$.22/\$ sales	-
Colorado	\$70/product application*	\$20/product application	*\$20 CO Groundwater
Connecticut	\$60*	N/A	*Pesticide registration is multi-year
Delaware	\$25	N	-
Florida	\$225, \$100 EUPs & SLNs	N/A	-
Georgia	\$10/product	N	-
Hawaii	*	N	*Non RUP \$45/3 yrs., RUP \$90/3 yrs.
Idaho	\$100/product	N	-
Illinois	\$250/company, \$50/product	N/A	-
Indiana	\$75	N	-
Iowa	\$250-\$3000 maximum	\$.1% retail sales	-
Kansas	\$130/product/year*	N	*\$100 goes to State Water Plan
Kentucky	\$125	N	-
Louisiana	\$300/product	N/A	-
Maine	\$105/product	N	-
Maryland	\$160	*	*Required 2 year terminal registration on discontinued pesticides at same fee
Massachusetts	\$100	N	-
Michigan	\$20/product	N	-
Minnesota	.4% of one percent of annual gross sales in MN, \$250 minimum	.2% of one percent of annual gross sales in MN*	*Discontinued pesticides require 2 years of terminal registration
Mississippi	\$100/product	N	-
Missouri	\$15/product	N/A	-
Montana	\$70/product	\$80/product	-
Nebraska	\$100/product	N	-
Nevada	\$40/product	N	-
New Hampshire	\$33/product	N	-
New Jersey	\$200	N	-
New Mexico	\$35/product	N	-
New York	\$300/product*	N	*\$100/product when gross sales are less than \$3.5 million
North Carolina	\$30/grade or brand/yr.	*	*Less than \$50/brand if gross sales for year greater than \$5000, \$25/brand if less than \$5000
North Dakota	\$25	\$125	-
Ohio	\$50/product	N	-
Oklahoma	\$50/product	N	-
Oregon	1-10 prod. \$95 each, 11-40 prod. \$85 each, 41+ prod. \$75 each	N	-
Pennsylvania	\$100	N	-
Rhode Island	\$80/product*	N	N
South Carolina	GEN, \$60; RUP, \$100	N	-
South Dakota	\$200	N/A	-
Tennessee	\$20/product	N	-
Texas	\$100/product	N	-
Utah	\$50	N	-
Vermont	\$40/product	N/A	-
Virginia	\$50 less than \$5000, \$125 greater than \$5000	N	-
Washington	1-25th product \$111, 26-100th product \$106, 101-150th product \$81, 151+ \$56	\$10 surcharge for home and garden use	-
West Virginia	\$25	\$15/product*	*Groundwater protection fee
Wisconsin	Household pesticides \$265 under \$25,000, \$750 \$25,000-\$74,999, \$1500 greater than \$75,000 *	N	*Non household pesticides \$325 under \$25,000, \$1060 \$25,000-\$74,999, \$3060 + 1.3% of sales greater than \$75,000
Wyoming	\$75	N	-

STATE	Fertilizer Registration Fee \$	Fertilizer Special Taxes \$	Fertilizer Comment
Alabama	\$25-\$400 (tonnage sold)	N	-
Alaska	N	N	-
Arizona	\$125 license*, \$50 specialty	\$.25/ton	*\$100 of the license fee to ADEQ groundwater program
Arkansas	\$1.20/ton*	*	*\$50/year custom blending/storage facility license
California	\$100/2yr.	0.001/\$1	-
Colorado	\$25	\$.75/ton	-
Connecticut	\$15/element, maximum \$90 per product	N/A	-
Delaware	\$28.75 less than 10#, \$1.15 over 10#	\$.10/ton semi-annual less than 10#	-
Florida	\$100, 6th & up brand & grade \$25	\$.75/ton, \$.30/ton lime	-
Georgia	\$50 less than 10#	\$.30/ton greater than 10#	-
Hawaii	N	N	-
Idaho	\$25/brand less than 25#	\$.15/ton	-
Illinois	\$5/product greater than 5#, \$30/product less than 5#, \$25 custom mix	\$.20/ton	-
Indiana	\$10 greater than 5#, \$40 less than 5#	\$.35/ton inspection fee	-
Iowa	\$100/less than 25#, NC/more than 25#	\$.75/ton	-
Kansas	\$5/grade	\$1.70/ton*	-
Kentucky	\$50/specialty,	\$.50/ton ag fertilizer	-
Louisiana	\$100/specialty product*	\$.75/ton	*Paid by specialty fert. manufacturers in lieu of \$.75 per ton inspection fee.
Maine	\$14/element	\$.12/ton	-
Maryland	\$30 less than 10#, \$15 greater than 10#	\$.25/ton greater than 10#	-
Massachusetts	\$50/product,	\$.15/ton (\$5 minimum)	-
Michigan	\$100/facility, \$125/specialty product	\$.10/ton	-
Minnesota	\$100 license/location*, \$100 specialty	\$.15/ton plus \$.20/ton surcharge	*\$150 surcharge per license
Mississippi	\$50 less than 10#, \$10 greater than 10#	\$.25/ton	-
Missouri	\$.50/ton inspection fee	N/A	-
Montana	\$20 commercial, \$35 specialty	\$.60/ton, NH ₃ \$1/ton	-
Nebraska	N	\$.10/ton	-
Nevada	\$25/grade	\$.25/lb., \$.05/bulk per #	-
New Hampshire	\$15/element, \$75 maximum/grade, liming materials-\$25/product	\$.20/ton, \$5 minimum	-
New Jersey	\$125 in state, \$250 out of state	\$.15/ton	-
New Mexico	\$5	\$.35/ton	-
New York	\$150	\$.10/ton	-
North Carolina	\$5*	\$.25/ton	*\$30 for packages weighing 5 lbs. or less
North Dakota	\$25/product	\$.20/ton	-
Ohio	\$5/commercial, \$50/grade for specialty fertilizers	\$.12/ton	-
Oklahoma	N	\$.65/ton	-
Oregon	\$25/brand	\$.40/ton	-
Pennsylvania	\$25/product (specialty only)	\$.13/ton, \$25 less than 15#	-
Rhode Island	\$72/product	\$.15/ton annual	-
South Carolina	\$50-200*	\$.25/ton	*Depends on tonnage
South Dakota	\$25/product*	\$.52/ton inspection fee, \$.30 groundwater, \$.22 regulatory fund	*Specialty fertilizer (lawn & garden)
Tennessee	N	\$.20/ton	-
Texas	\$.32/ton, \$100 minimum	\$.50/product less than 5#	-
Utah	\$15/product	N	-
Vermont	\$13/nutrient, \$78 maximum	\$.25/ton, \$25 minimum	-
Virginia	\$50/\$2*	\$.25/ton	*\$50 specialty less than 10#, \$2 registration fee less than 10#
Washington	\$25 for 1st product, \$10 each additional*	\$.18/ton Bulk fertilizers \$25 license fee for each distributor	*This applies to packaged fertilizers only.
West Virginia	\$2 per brand over 10#, \$15 10# and under	\$.30/ton, \$15 inspection fee	-
Wisconsin	\$25-\$50 per location	\$1/ton	-
Wyoming	\$75	N	-

STATE	Groundwater Law (Y-N)	State Health Advisory Levels (Y-N)	Containment Regs (Y-N)	Bulk Chemical Regs (Y-N)	Chemigation Law (Y-N)	Posting Required (Y-N)	Reciprocal Agreements Certified Applicators (Y-N)	Pesticide Use Reporting Regs (Y-N)	Pesticide Illness Reporting Requirements (Y-N)	COMMENTS
Alabama	N	N	N	N	N	N	Y*	N	N	*With GA, FL, MS
Alaska	N	Y	N	N	N	N*	N	Y	N	*No for state, Yes for several boroughs and cities
Arizona	Y	Y	Y	N	N	Y	Y*	Y	Y	*With NM, TX
Arkansas	N	N	N	Y	N	N	Y	Y	N	
California	Y	Y	Y	Y	N	Y	N	Y	Y	
Colorado	Y	Y	Y	Y	Y	Y	Y	N	N	*1994
Connecticut	Y	Y	N	N	N	Y	N	Y	N	
Delaware	N	N	N	N	N	N	Y	N	N	
Florida	Y	Y	Y	N	Y	N	Y	Y	N	
Georgia	N	N	N	N	Y	Y	Y	Y	N	
Hawaii	Y	Y	N	N	Y	Y	N	Y	Y	
Idaho	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Illinois	Y	N	Y	N	N	Y*	Y	Y	N	*Lawn care only
Indiana	N	N	Y	Y	N	Y*	Y	N	N	*For commercial lawn care only
Iowa	Y	N	Y	Y	Y	Y	Y	Y	Y	*1994
Kansas	N/A	Y	Y	Y	Y	N	Y	Y	N	
Kentucky	Y	N	N	N	N	Y*	Y	N	N	*Lawn care only
Louisiana	Y	Y	Y	Y	N	N	Y	N	N	
Maine	Y	Y*	N	N	N	Y**	N	Y	N	*For drinking water, **Posting for lawn and ornamental applications only
Maryland	N	N	*	*	N	Y**	Y	N	N	*Being developed **Lawn and ornamental only
Massachusetts	Y	N	N	N	N	Y	Y	Y	N	
Michigan	Y	N	N*	N**	N	Y	Y	Y	N	*Pending, **Y-Pesticide, N-Fertilizer
Minnesota	Y	Y	Y	Y	Y	Y	Y	Y	N	
Mississippi	Y	N	N	Y	N	N	Y	Y	Y	
Missouri	Y	N	Y	N	N	N	Y	Y	Y	
Montana	Y	N	N	N	N	N	Y	Y	N	
Nebraska	Y	Y	Y	Y	Y	N	Y	N	N	*1994
Nevada	N	N	N	N	Y	Y	N	Y	Y	
New Hampshire	Y	Y	Y	Y	Y	Y*	N	Y	N	*Turf only
New Jersey	N	N	N	N	N	Y	Y	N	N	
New Mexico	N	N	N	N	N	N	Y	Y	N	
New York	Y	Y	Y	Y	Y	Y	Y	Y	Y	
North Carolina	N	N	N	Y	Y	Y	Y*	N	Y**	*SC, GA, LA, VA, FL; **Senate Bill 533 effective 1/1/94
North Dakota	Y	N	N*	Y	Y	Y	Y	Y	N	*BMPs
Ohio	N	N	Y	Y	N	Y	Y	N	Y	
Oklahoma	N	N	Y	N	N	N	Y	N	N	
Oregon	Y	Y	N	N	N	N	Y	Y	Y	
Pennsylvania	N	Y	Y	N	N	N	Y	N	N	
Rhode Island	Y	N	N	N	N	Y*	Y	Y	N	*Lawncare applications only
South Carolina	Y	Y	N	N	Y	Y	Y	N	N	
South Dakota	Y	N	Y	Y	Y	N	Y	Y*	N	*Required of comm. applicators when requested
Tennessee	Y	N	N	N	N	N	Y	Y	N	
Texas	N	N	N	N	N	Y	Y	Y	Y	
Utah	N	N	N	N	N	N	Y	N	N	
Vermont	Y	Y	Y	Y	N	Y*	Y**	Y	N	*Lawn care only; **ME, NY, MA
Virginia	N	N	N	N	N	N	Y	N	N	
Washington	Y	Y	Y	Y	Y	Y	Y	Y	Y	
West Virginia	Y	N	Y	Y*	N	N	Y	N	N	*Being developed
Wisconsin	Y	Y	Y	Y	Y*	Y	N	N	N	*For commercial lawn care only
Wyoming	N	N	N	N	N	N	Y	Y	N	

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Notes

SECTION E

ENVIRONMENTAL AND SAFETY

The Environmental and Safety section provides information on many aspects of dealing with agricultural chemicals and fertilizer materials. You'll find SCS ratings of the potential for pesticides to leach into groundwater and run off into surface water. The formulation guide will assist you in selecting the best formulation for type of application. Protective clothing and other worker safety requirements of the Worker Protection Standard are explained on pages E 24 and 29. Mammalian and wildlife toxicity charts start on page E 12. Other topics in this section include drift management, safe sprayer operation, nozzle selection, and pesticide packaging innovations. You'll find suppliers of safety and application equipment listed in the Buyers' Guide, beginning on page F 1. An alphabetical list of all manufacturers and suppliers is in Section G.

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Soil-Pesticide Interaction Ratings

Using a pesticide data base and a ranking of soil types, the SCS Soil Pesticide Interaction Screening Procedure estimates the potential for leaching into groundwater and runoff with surface water.

The USDA Soil Conservation Service (SCS) offers ratings for pesticide leachability potential based on soil-pesticide interaction. Using a pesticide data base and a ranking of soil types, the SCS Soil Pesticide Interaction Screening Procedure helps predict the potential for leaching into groundwater and runoff with surface water.

The following potentials were developed by Don Goss from the SCS/ARS/CES Pesticide Properties Database by Don Wauchope, Tasha Brew, Art Hornsby, and John Burt. The database lists more information for each pesticide including solubility, half life, and soil adsorption index as well as manufacturer, use, and formulation types.

Potential 1

This pesticide applied on this soil has a high probability of being lost to surface runoff or leaching. Potential 1 pesticides should be further evaluated for their hazard to humans and animals. If a pesticide is a potential danger to health, an alternate pesticide or other pest management techniques should be selected. The land user should check with consultants, chemical manufacturers or Extension Service for health advisory information.

Potential 2

Potential 2 is a gray area. This pesticide applied on this soil has a possibility of being lost to surface runoff or leaching. The effect of the pesticide on the water resource will need additional on-site evaluation. Some pesticides when applied directly to foliage will rapidly dissipate and will not be a concern.

Look at the sensitivity of the water resource. If the concern is surface water, ask such questions as: Is this water used for drinking? What are the health risks? Have there been fish kills? Where is the field located in relation to the water resource?

If the concern is groundwater, questions might include: What is the health risk? How far down is the

aquifer? Where is the nearest well withdrawal? What is the rate of water leaching from soil into the aquifer? If the pesticide poses a potential problem to a water resource, the land user should consider:

1. Alternate pesticides;
2. Improved pesticide applications such as banding herbicides;
3. Crop management techniques such as rotations; and
4. Biological control.

Potential 3

This pesticide applied on this soil has a very low probability of being lost to surface runoff or leaching. This pesticide could be used according to label with little hazard to the respective water resource.

Applying Pesticide Ratings to Soil Ranking Tables

Soil ranking tables are available at local SCS offices. The soils are ranked as high, intermediate, or nominal for potential for leaching and for surface runoff.

Following are examples of how this pesticide data base can be implemented.

First, determine the appropriate water resource concern — either groundwater or surface water quality.

Potential Pesticide Loss to Leaching:

To find potential pesticide loss to leaching, take the following steps:

1. Find the leaching potential for the soil series from the soil ranking tables available at most SCS offices.
2. Determine the *pesticide leaching potential* from the ratings tables on pages E 4-E 6.
3. Use these ratings with the *potential pesticide loss to leaching matrix* (Fig.1) to determine potential.

Figure 1. Potential pesticide loss to leaching matrix

Soil leaching potential	Pesticide Leaching Potential			
	Large	Medium	Small	Total Use
High	Potential 1	Potential 1	Potential 2	Potential 3
Intermediate	Potential 1	Potential 2	Potential 3	Potential 3
Nominal	Potential 2	Potential 3	Potential 3	Potential 3

Figure 2. Potential pesticide loss to surface runoff matrix

Soil surface loss potential	Pesticide Surface Loss Potential		
	Large	Medium	Small
High	Potential 1	Potential 1	Potential 2
Intermediate	Potential 1	Potential 2	Potential 3
Nominal	Potential 2	Potential 3	Potential 3

Using the Matrix

The intersection of the soil leaching potential and the pesticide leaching potential gives the overall leaching potential — a potential 1, 2, or 3. For example, the shaded “potential 3” area in Figure 1 was from a soil with intermediate soil leaching potential and a pesticide with a small leaching potential.

Surface Runoff

To determine potential surface runoff:

1. Find the soil surface loss potential for the soil

series from the soil ranking tables. If the soil mapping unit has a slope equal to or less than 2% reduce the soil surface loss potential by one unit, i.e., intermediate to nominal.

2. Determine the *pesticide surface loss potential* from the ratings tables on pages E 4-E 6.

3. Use these ratings with the *potential pesticide loss to surface runoff matrix* (Fig. 2) to determine potential. ■

See

Herbicide Ratings ChartE4
Insecticide Ratings ChartE5
Fungicide Ratings Chart.....E6
Growth Regulator Ratings ChartE6

Herbicide Ratings

The following is taken from the SCS/ARS/CES Pesticide Properties Database. The data base lists more information for each herbicide including solubility, half life, and soil sorbtion index as well as manufacturer, use and formulation types.

Trade Name	LEACHING	RUNOFF		Trade Name	LEACHING	RUNOFF	
		Adsorption	Solution			Adsorption	Solution
Acclaim	S	M	M	Hyvar	L	M	L
Alanap	L/e	S/e	M/e	Karmex	M	M	L
Ally	L	M	L	Kerb	L	M	L
Amitrole	M	S	M	Krenite	S	S	M
Arsenal	L/e	M/e	L/e	Lasso	M	S	M
Assure	M	L	M	Lexone/Sencor	L/e	S/e	L/e
Asulox	M	S	M	Linuron	M	M	L
Atrazine	L	M	L	Lontrel	L/e	S/e	M/e
Avenge	XS	L	L	MCPA ester	S/e	M/e	M/e
Balan	S	L	M	MCPA Dimethyl- amine salt	L/e	S/e	M/e
Banvel	L	S	M	MCPP	L/e	S/e	M/e
Basagran	L	S	M	Nortron	M	S	L
Betamix	S	M	M	Ordram	M	S	M
Betanex	S	M	M	Oust	M	S	L
Bladex	M	S	M	Paarlan	S	L	M
Blazer	M/e	S/e	M/e	Poast	S/e	S/e	M/e
Balero	S	S	M	Pramitol	L	M	L
Bucril	S	M	S	Prefar	M/e	L/e	L/e
Butyrac	M/e	S/e	M/e	Probe	S/e	M/e	M/e
Butyrac Ester	S	S	M	Prowl	S	L	M
Caparol	M	M	L	Pyramin	M	S	M
Casoron	M/e	M/e	L/e	Ramrod	S	S	M
Classic	L	S	L	Reflex	L	M	L
Command	M	S	M	Ro-Neet	M	S	L
Cotoran	L	M	L	Roundup	XS/e	L/e	L/e
2,4-Dimethyl- amine salt	M	S	M	Scepter	L/e	M/e	L/e
2,4-D acid	M	S	M	Simazine	L	M	L
2,4-D ester or oil soluble amine	M/e	S/e	M/e	Sinbar	L	M	L
Dacthal	S	L	M	Sonalan	S	L	M
Dalapon	L	S	M	Sonar	S/e	M/e	M/e
Devrinol	M	M	L	Spike	L	M	L
Diquat	XS/e	L/e	S/e	Stam	S	S	M
Dual	L	M	L	Surflan	S	S	M
Eptam	S	S	M	Tandem	S	M	M
Evik	M	M	L	Thistrol	L/e	S/e	M/e
Far-Go	S	L	L	Tillam	S	S	M
Fusilade	S	M	M	Tordon	L/e	M/e	L/e
Glean	L	M	L	Treflan	S	L	M
Goal	XS/e	M/e	S/e	Tupersan	M	M	L
Gramoxone	XS/e	L/e	S/e	Velpar	L	M	L
Hoelon	XS	M	M	Zorial	M	M	L

XS = extra small
 S = small
 M = medium
 L = large
 e = This rating was developed from values that had an unusually wide range or a reasonable estimate was made for the value.

Insecticide Ratings

The following data is taken from the SCS/ARS/CES Pesticide Properties Database. The data base lists more information for each insecticide including solubility, half life, and soil sorption index as well as manufacturer, use, and formulation types.

Trade Name	LEACHING	RUNOFF		Trade Name	LEACHING	RUNOFF	
		Adsorption	Solution			Adsorption	Solution
Abate	XS/g	M/g	S/g	Lorsban	S	M	S
Ambush, Pounce	XS	M	S	Malathion	S	S	S
Amdro	XS/e	M/e	S/e	Mavrik	X/e	M/e	S/e
Antor	S/e	M/e	M/e	Mesurool	M/e	S/e	L/e
Asana	S	M	M	Metasystox(i)	not found		
Azodrin	L/e	S/e	M/e	Metasystox-R	L	S	M
Bidrin	L	S	M	Methyl Parathion	S/e	M/e	M/e
Bolstar	XS/e	L/e	M/e	Mitac	S/e	M/e	M/e
Broot	M/g	S/g	L/g	Mocap	L	S	M
Carzol	XS/g	L/g	S/g	Monitor	M/e	S/e	M/e
Counter	S	S	M	Morestan	S	M	M
Curacron	S	M	M	Nemacur	L/e	M/e	L/e
Cygon	M	S	M	Omite	S/e	L/e	M/e
Cymbush, Ammo	XS/e	M/e	S/e	Orthene	S	S	M
Di-Syston	S/e	S/e	L/e	Petroleum Oil	S/g	M/g	M/g
Diazinon	S/e	L/e	L/e	Phosdrin	S	S	M
Dibrom	S	S	M	Phosphamidon	L/e	S/e	M/e
Dimilin	S	M	S	Sevin	S	S	M
Dyfonate	S	S	L	Supracide	S/e	S/e	M/e
Dylox	L	S	M	Telone II	M	S	M
Ethion	S	L	L	Temik	L	S	M
Furadan	L	M	L	Thimet	S/e	L/e	L/e
Guthion	S	M	M	Thiodan	L/g	S/g	M/g
Imidan	S	S	M	Trigard	L/e	M/e	L/e
Kelthane	XS/g	L/g	S/g	Vapam	M/e	S/e	M/e
				Vendex	S	L	M
Lannate	L	S	M	Vorlex	M	S	M
Larvin	S	S	L	Vydate	S	S	M
Lindane	M	L	L	Zolone	S	M	M

XS = extra small

S = small

M = medium

L = large

e = This rating was developed from values that had an unusually wide range or a reasonable estimate was made for the value.

g = This rating was developed from values that did not have good experimental values and a good estimation procedure was not available.

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The following data is taken from the SCS/ARS/CES Pesticide Properties Database. The data base lists more information for each fungicide or plant growth regulator including solubility, half life, and soil sorption index as well as manufacturer, use, and formulation types.

Fungicide Ratings

Trade Name	LEACHING	RUNOFF	
		Adsorption	Solution
Aliette	X/s	S	M
Apron	L	M	L
Bayleton	M	S	L
Benlate	S	L	L
Botran	S/g	M/g	M/g
Bravo	S	M	M
Carboxin	S	S	M
Daconil	S	M	M
DCNA (dicloran)	S/g	M/g	M/g
Dinocap	S/g	S/g	M/g
DNOC	LG	S/g	M/g
Dodine	XS/g	M/g	S/g
Ferbam	M	S	M
Funginex	S/e	S/e	L/e
Fungo	S/g	M/g	M/g
Mancozeb	S	L	L
Maneb	S/e	L/e	L/e
Morestan	S	M	M
Orbit	M/e	L/e	L/e
PCNB	S/e	M/e	S/e
Pipron	S	M	M
Plantvax	M/g	S/g	M/g
Polyram	XS/e	M/g	S/g
Ridomil	L	M	L
Ronilan	not found		
Rovral	S	S	L
Rubigan	L	M	L
Terrazole	S/g	M/g	M/g
Tersan	S	L	L
Thiram	S	S	L
Tilt	M/e	L/e	L/e
Topsin	S/g	M/g	M/g
Vitavax	S	S	M
Ziram	not found		

Growth Regulator Ratings

Trade Name	LEACHING	RUNOFF	
		Adsorption	Solution
Alar	not found		
Amid-Thin	M/g	S/g	M/g
A-Rest	L	M	L
B-Nine	not found		
Cerone	XS/e	M/e	S/e
Ethrel	XS/e	M/e	S/e
Florel	XS/e	M/e	S/e
Fruitone	M/g	S/g	M/g
Fruitone CPA	M/e	S/e	M/e
Harvade	L/g	S/g	M/g
Kylar	not found		
Limit	not found		
Maleic Hydrazide	L/e	S/e	M/e
NAA-800	M/g	S/g	M/g
Pix	XS/e	L/e	S/e
Prep	XS/e	M/e	S/e
Prime	XS/g	M/g	S/g
Screen	not found		
Tre-Hold	S/g	S/g	M/g

XS = extra small, S = small, M = medium, L = large

e = This rating was developed from values that had an unusually wide range or a reasonable estimate was made for the value.

g = This rating was developed from values that did not have good experimental values and a good estimation procedure was not available.

Formulation Guide

A single active ingredient often is sold in several different formulations. This guide will help you match formulation to type of application being made.

The active ingredient (a.i.) is the agent in a formulation which has a specific effect on a pest, weed, or plant. A single active ingredient often is sold in several different kinds of formulations. You must choose the formulation that will be best for each use. In making your choice, consider:

- The plant, animal, or surface to be protected (phytotoxicity, animal absorption, pitting or marring surface);
- Application machinery available and best suited for the job;
- Hazard of drift and runoff (nearness to sensitive areas, likelihood of wind or rain);
- Safety to applicator, helpers, other humans, and pets likely to be exposed;
- Habits or growth patterns of the pest (bait vs. broadcast spray, granular vs. foliar spray);
- Cost; and
- Type of environment in which the application must be made (agricultural, aquatic, forest, urban, etc.).

The amount of active ingredient and the kind of formulation are listed on the label. For instance, a 50 W contains 50% by weight of a.i. and is a wettable powder. If it is a 10 lb. bag, it contains 5 lb. of a.i. and 5 lb. of inert ingredients. Liquid formulations indicate the amount of a.i. in pounds per gallon. For instance, a 4E means 4 lb. per gallon of the a.i. in an emulsifiable concentrate formulation.

EC or E - Emulsifiable Concentrate

A liquid formulation containing the a.i., one or more solvents, and an emulsifier which allows mixing with water. Little agitation required.

Advantages:

- High concentration means price per pound of a.i. is relatively low and product is easy to handle, transport, and store.
- Little agitation required; not abrasive; will not settle out or separate when equipment is running.
- Little visible residue on fresh fruits and vegetables and on finished surfaces.

Disadvantages:

- High concentration makes it easy to overdose or underdose through mixing or calibration errors.
- Phytotoxicity hazard usually greater.

(cont.)

Suffixes of Chemical Brand Names

Suffix Meaning

Describe The Formulations:

AF	Aqueous Flowable
AS	Aqueous Suspension
D	Dust
DF	Dry Flowable, also Water-Dispersible Granule
EC or E	Emulsifiable Concentrate
ES	Emulsifiable Solution
F or FL	Flowable
G	Granular
OL	Oil-Soluble liquid
P or PS	Pelleted
S	Solution
SP	Soluble Powder
SG	Sand Granules
SL	Slurry
ULV	Ultra-Low Volume Concentrate
W or WP	Wettable Powder
WDG	Water-Dispersible Granules, also Dry Flowable

Describe How A Pesticide Is Used:

GS	For Treatment of Grass Seed
LSR	For Leaf Spot and Rust
PM	For Powdery Mildew
RP	For Range and Pasture
RTU	Ready to Use
SD	For Use as a Side Dressing
TC	Termiticide Concentrate
TGF	Turf Grass Fungicide
WK	To Be Used with Weed Killers
AG	Agricultural

Describe Characteristics Of The Formulation:

BE	The Butyl Ester of 2,4-D
D	An Ester of 2,4-D
K	A Potassium Salt of the Active Ingredient
LO	Low Odor
LV	Low Volatility
MF	Modified Formulation
T	A Triazole
2X	Double Strength

Label For Use In Special Locations:

PNW	For Use in the Pacific Northwest (e.g., Benlate PNW)
TVA	For Use in the Waterways of the Tennessee Valley Authority (e.g., Aqua-Kleen TVA)

- Easily absorbed through skin of humans or animals.
- Solvents may cause rubber or plastic hoses, gaskets, and pump parts and surfaces to deteriorate.
- May cause pitting or discoloration of painted finishes.
- May be corrosive.

S - Solution

For those active ingredients which dissolve readily in water, of which there are relatively few in number. The formulation is a liquid and usually consists of the a.i. and additives. When mixed with water will not settle out or separate.

F or FL - Flowable

A liquid formulation consisting of a finely ground active ingredient suspended in a liquid. Flowables are mixed with water for application.

Advantages:

- Seldom clog nozzles.
- Easy to handle and apply.

Disadvantages:

- Require moderate agitation.
- May leave a visible residue.

WP or W - Wettable Powders

Dry, finely ground formulations which look like dusts. The a.i. is combined with a finely ground dry carrier, usually mineral clay, along with other ingredients that enhance the ability of the powder to suspend in water. The powder is mixed with water for application as a spray. Wettable powders are one

of the most widely used pesticide formulations.

Advantages:

- Low cost.
- Easy to store, transport, and handle.
- Lower phytotoxicity hazard than ECs and other liquid formulations.
- Easily measured and mixed.
- Less skin and eye absorption than ECs and other liquid formulations.

Disadvantages:

- Inhalation hazard to applicator while pouring and mixing the concentrated powder.
- Require good and constant agitation (usually mechanical) in the spray tank.
- Abrasive to many pumps and nozzles, causing them to wear out quickly.
- Residues may be visible.

DF or WDG - Dry Flowables

Dry flowables, also known as water-dispersible granules, are like wettable powders except the active ingredient is formulated on a granule instead of a powder. Requires agitation. Easier to pour and mix than wettable powders because there is less dust.

Advantages:

- More easily measured and mixed.
- Cause less inhalation hazard to the applicator during pouring and mixing.

SP - Soluble Powder

A dry formulation which, when mixed with water, dissolves readily and forms a true solution. When thoroughly mixed, no agitation necessary. Not many formulations of this type are available because few active ingredients are soluble in water.

Comparisons of Pesticide Formulations

Formulations	Mixing/ Loading Hazards	Phytotoxicity	Effect on Application Equipment	Agitation Required	Visible Residues	Compatible With Other Formulations
Wettable powders	Dust inhalation	Safe	Abrasive	Yes	Yes	Highly
Dry flowables/water- dispersible granules	Safe	Safe	Abrasive	Yes	Yes	Good
Soluble powders	Dust inhalation	Usually safe	Non-abrasive	No	Some	Fair
Emulsifiable concentrates	Spills and splashes	Maybe	May affect rubber pump parts	Yes	No	Fair
Flowables	Spills and splashes	Maybe	May affect rubber pump parts; also abrasive	Yes	Yes	Fair
Solutions	Spills and splashes	Safe	Non-abrasive	No	No	Fair
Dusts	Severe inhalation hazards	Safe	—	Yes	Yes	—
Granules and pellets	Safe	Safe	—	No	No	—
Microencapsulated formulations	Spills and splashes	Safe	—	Yes	—	Fair

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ULV - Ultra Low Volume Concentrate

A liquid formulation which may be applied with specialized equipment as is or diluted with a small quantity of specified carrier. Designed to apply only ounces per acre.

Low Concentrate Solution

Small amounts of a.i., 1% or less, used without dilution for structural pests, space sprays in barns, mosquito control, etc.

Aerosol

1. Ready to use type such as household sprays. Commercial type holds 5 to 10 pounds of formulation and can be refillable.

2. For smoke or fog generators that break the liquid formulation into a fine mist or fog using a rapidly whirling disc or a heated surface.

Invert Emulsion

A water soluble pesticide dispersed in an oil carrier. Forms large droplets which do not drift easily.

D - Dusts

Low percentage of a.i. on a very fine dry inert carrier like talc, chalk or clay. Most are ready to use. Danger of drift.

Bait

Active ingredient mixed with food or another attractive substance.

G - Granules

Most often used for soil applications. The a.i. is coated or absorbed onto coarse particles like clay, ground walnut shells, or ground corn cobs.

Advantages:

- Ready to use; no mixing.
- Drift hazard is low because particles settle quickly.
- No spray, little dust mean low hazard to applicator.
- Weight carries the formulation through foliage to soil target.
- Simple application equipment, often seeders or fertilizer spreaders.
- May be more persistent than WPs or ECs.

Disadvantages:

- Do not stick to foliage.
- More expensive than WPs or ECs.
- May need to be incorporated into soil.
- May need moisture to activate pesticidal action.

P or PS - Pellets

Very similar to granules although pellets are usually more uniform and of a specific weight or shape.

Microencapsulation

Particles of a pesticide, either liquid or dry, surrounded by a plastic coating. Mixed with water and applied as a spray. Encapsulation makes timed release possible.

Advantages:

- Increased safety to applicator.
- Easy to mix, handle, and apply.

Disadvantages:

- Constant agitation necessary in tank.
- Bees may pick up the capsules and carry them back to the hive where the released pesticide may poison the entire hive.

Water-Soluble Packet

Water-soluble packets are used to reduce the mixing and handling hazards of some highly toxic pesticides. Preweighed amounts of wettable powder or soluble powder formulations are packaged in water-soluble plastic bags. When the bags are dropped into a filled spray tank, they dissolve and release their contents to mix with the water. There are no risks of inhaling or coming into contact with the undiluted pesticide during mixing as long as the packets are not opened. Once mixed with water, pesticides packaged in water-soluble packets are no safer than other mixtures.

Impregnates

Pesticides that are incorporated into household and commercial products are known as impregnates. Pet collars, livestock ear tags, adhesive tapes, and plastic pest strips contain pesticides that volatilize (evaporate) over a period of time and provide control of nearby pests.

Source: From *Applying Pesticides Correctly*, Ohio State University, and *Safe & Effective Use of Pesticides*, University of California.

Maximum Contaminant Levels In Water Systems¹

Data as published in the Federal Register through July 17, 1992

Primary Drinking Water Standards²

Contaminant	Inorganics	
		Level
Antimony		0.006 mg/l
Arsenic		0.05 mg/l
Asbestos	7 million fibers/l (longer than 10µm)	
Barium		2
Beryllium		0.004
Cadmium		0.005
Chromium		0.1
Cyanide		0.2
Fluoride		4
Lead		0.05
Mercury		0.002
Nickel		0.1
Nitrate (as N)		10
Nitrate + Nitrite (as N)		10
Nitrite (as N)		1
Selenium		0.05
Silver		0.05
Sulfate		Deferred
Thallium		0.002

Pesticides (cont.)

Chlordane	0.002
2,4-D	0.1
Dalapon	0.2
DBCP (1,2-Dibromo-3 chloropropane)	0.0002
Dinoseb	0.007
Diquat	0.02
EDB (Ethylene dibromide)	0.00005
Endothall	0.1
Endrin	0.0002
Glyphosate	0.7
Heptachlor	0.0004
Heptachlor epoxide	0.0002
Lindane	0.004
Methoxychlor	0.1
Oxamyl (Vydate)	0.2
Pentachlorophenol	0.001
Picloram	0.5
Simazine	0.004
Toxaphene	0.005
2,4,5-TP (Silver)	0.01

Secondary Drinking Water Standards

Organics (only those listed are shown)	
Benzene	0.005 mg/l
Ethylbenzene	0.7
Toluene	1
Xylenes (total)	10

Pesticides	
Alachlor	0.002 mg/l
Aldicarb	0.003 ³
Aldicarb sulfone	0.003 ³
Aldicarb sulfoxide	0.004 ³
Atrazine	0.003
Carbofuran	0.04

Aluminum	0.05 to 0.2 mg/l
Chloride	250
Copper	1
Fluoride	2
Foaming Agents	0.5
Iron	0.3
Manganese	0.05
Silver	0.1
Sulfate	250
Total Dissolved Solids	500
Zinc	5
Color	15 color units
Corrosivity	non-corrosive
Odor	3 threshold odor number
pH	6.5 - 8.5

¹ Several other organic chemicals are listed in the regulations but have not been included in the lists presented here.

² Milligrams/liter (mg/l) for water is approximately equal to parts per million.

³ Postponed.

Source: *Environmental Handbook*, 1991 TVA, Updated 1992.

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Maximum Concentration Of Contaminants For The Toxicity Characteristics (40 CFR 261.24)

Contaminant	Regulatory Level (mg/l)	Contaminant	Regulatory Level (mg/l)
Arsenic	5.0	Hexachlorobenzene	0.13
Barium	100.0	Hexachlorobutadiene	0.5
Benzene	0.5	Hexachloroethane	3.0
Cadmium	1.0	Lead	5.0
Carbon tetrachloride	0.5	Lindane	0.4
Chlordane	0.03	Mercury	0.2
Chlorobenzene	100.0	Methoxychlor	10.0
Chloroform	6.0	Methyl ethyl ketone	200.0
Chromium	5.0	Nitrobenzene	2.0
m-Cresol	200.0	Pentachlorophenol	100.0
o-Cresol	200.0	Pyridine	5.0
p-Cresol	200.0	Selenium	1.0
Cresol (total)	200.0	Silver	5.0
2,4-D	10.0	Tetrachloroethylene	0.7
1,4-Dichlorobenzene	7.5	Toxaphene	0.5
1,2-Dichloroethane	0.5	2,4,5-TP (Silvex)	1.0
1,1-Dichloroethylene	0.7	Trichloroethylene	0.5
2,4-Dinitrotoluene	0.13	2,4,5-Trichlorophenol	400.0
Endrin	0.02	2,4,6-Trichlorophenol	2.0
Heptachlor (and its epoxide)	0.008	Vinyl chloride	0.2

Proposed RCRA¹ Action Levels

Constituent	Air ($\mu\text{g}/\text{m}^3$)	Water (mg/l) ²	Soils (mg/kg) ²
Aldicarb	—	0.05	100
Aldrin	0.0004	0.000006	0.02
Aluminum phosphide	—	0.01	30
Arsenic	0.00007	—	80
Chlordane	0.003	0.00003	0.05
DDD	—	0.0001	3
DDE	—	0.0001	2
DDT	0.01	0.0001	2
Dieldrin	0.0002	0.000002	0.04
Disulfoton	—	0.0001	3
Endosulfan	—	0.002	4
Endothall	—	0.07	2000
Endrin	—	—	20
Heptachlor	0.0008	0.000008	0.2
Heptachlor epoxide	0.0004	0.000004	0.08
Lindane	—	—	0.5
Methomyl	—	0.9	2000
Methyl parathion	—	0.009	20
Parathion	—	0.2	500
Toxaphene	0.003	—	0.06

¹ Resource Conservation and Recovery Act

² Milligrams per liter (mg/l) of water is approximately given by parts per million (ppm); milligrams per kilogram (mg/kg) is equal to parts per million.

³ Maximum contaminant level is defined by National Primary Drinking Water Regulations.

Data from Federal Register, Vol. 55, No. 145.
Source: *Environmental Handbook*, 1991 TVA.

TOXICITY OF CERTAIN PESTICIDES¹ (to mammals)
(in mg/kg body weight unless otherwise stated)

Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)	Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)
41-A* DF	(ADJ)	>3980	—	Arsonate Liquid* (MSMA)	(H)	1738	2500
AASTAR* (flucythrinate/phorate)	(I)	14	180	Asana* XL (esfenvalerate)	(I)	458	>2000
AAtrex* (atrazine)	(H)	1869	>3100	Aspon*	(I)	2710-5010	—
Aatrex* 4L (atrazine)	(H)	3800	10,200	Assert* (imazamethabenz-methyl)	(H)	>5000	>2000
AAtrex 80W (atrazine)	(H)	5100	9300	asulam	(H)	>5000	>2000
Aatrex* Nine-O (atrazine)	(H)	1600	10,200	Asulam + 400-SL	(H)	9000	>2500(rat)
Abate* (temephos)	(I)	8600	2000	Atabron* (chlorfluazuron)	(I)	>8500	—
Acaralate* 2E (chloropropylate)	(I)	5000	—	Aterbutox* 20/20 (atrazine/terbutryn)	(H)	2980-3800	—
Acarol* (bromopropylate)	(I)	>5000	>5000	Atratrof* 8P (atrazine/sodium chlorate/ sodium metaborate)	(H)	3100	>20,000
Acarol* 2E (bromopropylate)	(I)	>5000	>10,200	Atratrof* 90 (atrazine/sodium chlorate/ sodium metaborate)	(H)	2436	>20,000
Access* (picloram/triclopyr)	(H)	3383	—	atrazine (tech)	(H)	1780	—
Acenit* (acetochlor)	(H)	1.3096 ml/kg	—	atrazine 4L	(H)	1886	>5000
acephate	(I)	980	>10,250	Avadex* (diallate)	(H)	395	—
acetochlor	(H)	1.3096 ml/kg (male) 1.5537 ml/kg (female)	—	Avenge* (difenzoquat methyl sulfate)	(H)	863	>2028
acetonifin	(H)	>6500	—	Avid* (abamectin)	(I)	650	>2000
Acme* Industrial 4-41 Brush Killer (2,4-D/mecoprop/dicamba)	(H)	1320	—	Avirosan* (piperophos/dimethametryn)	(H)	324	3000
Actellic* (pirimiphos-methyl)	(I)	>2000(female)	>4592(female rat)	Avitrol* (4-aminopyridine)	(REP)	40-7500	—
Affirm* (abamectin)	(I)	>5000	>2000	azadirachtin	(I)	>5000	>2000
Afugan* (pyrazophos)	(F)	151-778	—	Azak* (terbucarb)	(H)	>34,000	—
Agral 90*	(ADJ)	4000	—	azamethiphos	(I)	1180	>2150
Agribrom*	(F)	1390	>2000	Azatin* (azadirachtin)	(I)	>5000	>2000
Agripon*	(B)	>30,000	—	azide	(H)	27	20
AgriTox* (trichloronate)	(I)	37.5	341	azindoyl	(F)	>10,000	>10,000
Agronaa* (alpha-naphthylacetic acid)	(PGR)	1275	—	Azinotox-500* (atrazine)	(H)	3080	—
akton	(I)	146	—	azinphos-ethyl	(I)	12	500
alachlor	(H)	930-1350	—	azinphos-methyl (tech)	(I)	4	150-200(rat)
Alanap* (naptalam acid)	(H)	8200	—	Bancof* (bensultap)	(I)	1105	>2000
aldicarb	(I)	1	20	Bandane* (polychlorodicyclopentadiene)	(H)	575	>1200
aldoxycarb	(I)	25	200	Banrot*	(F)	>5000	2000-4000
aldrin	(I)	38-67	98	Banvel* (dicamba)	(H)	2629	>2000
Alfa-Tox* (diazinon/methoxychlor)	(I)	2000	8000	BAP	(PGR)	3980	—
Alicept* (chloridazon)	(H)	5900	—	barium carbonate	(ROD)	630-750	—
Aliette* (fosetyl AI)	(F)	>5000	>2000	Barespot*- Monobor - Chlorate*	(H)	6800	20,000
Alipur* (cycluron/chlorbufam)	(H)	4600	—	Barespot* Ureabor*	(H)	2710	10,000
d-trans allethrin	(I)	860	—	Barespot* Weed & Grass Killer* (monobor chlorate)	(H)	2330	>10,000
alloydim sodium	(H)	2322	>2000	barium polysulfide	(F/I)	375-500	—
Aliy* (metsulfuron-methyl)	(H)	>5000	>2000	Barnon* (flamprop-isopropyl)	(H)	>3000	—
allyl alcohol	(F)	64	89	BAS 518 (quinmerac)	(H)	>5000	>2000
Alopex* (clofop-isobutyl)	(H)	723(female)	—	Basagran* (bentazon)	(H)	2063	>6050
alpha-cypermethrin	(I)	79	>2000	Basalin* (fluchloralin)	(H)	2110	>4000
alpha-naphthylacetic acid	(PGR)	1000	—	Bay HWG 1608 (tebuconazole)	(F)	4000	>5000
Alsol* (etacelasil)	(PGR)	2066	>3100	Bay SMY 1500 (ethiozin)	(H)	2000	5000(rat)
Alsystin* (triflumuron)	(I)	>5000	>5000(rat)	Baycor* (bitertanol)	(F)	>5000	>5000
Altazar* (hydroprene)	(I)	>34,000	4550	Bayleton* (triadimefon)	(F)	1000	>5000(rat)
Amber* (triasulfuron)	(H)	>5050	>2000	Baytan* (triadimenol)	(F)	700	>5000
Amdro* (tech hydramethylnon)	(I)	>5000	>5000	Baythion* (phoxim)	(I)	>2000	>5000
ametryn (tech)	(H)	1950	—	Baythion C* (chlorphoxim)	(I)	5000	—
Amiben* free acid (chloramben)	(H)	5620	—	Baythroid* (cyfluthrin)(tech)	(I)	500	>5000(rat)
amidithion	(I)	600-660	1600	Beacon* (primisulfuron)	(H)	>5050	>2010
amidosulfuron	(H)	>5000	>5000	benazolin (sodium salt)	(H)	>4800	—
amine methanearsonates	(H)	600	—	Benchmark*	(H)	>5 g/kg	>5 g/kg
amitraz (tech)	(I)	650	>200	bendiocarb (76WP)	(I)	179	>1000
amitrole (tech)	(H)	>2000	>2500	benefin	(H)	>10,000	—
Ammate* (ammonium sulfamate)	(H)	3900	—	benodanil	(F)	>6400	>2000
anilofos	(H)	1000	>2000	benomyl	(F)	>10,000	>10,000
Aniloguard* (anilofos)	(H)	1000	2000	bensulide	(H)	271-1470	—
Animert V-101* (tetrasul)	(I)	12,600	—	Bentazone* (bentazon)	(H)	2063	—
Aniten* (flurenol-butyl)	(H)	>10,000	10,000	benthiocarb	(H)	1300	>2900
Anthio* (formothion)	(I)	365-500	>1000	Benzomarc* (phenobenzorone)	(H)	5000	—
Anthio 80ZP (formothion)	(I)	288	—	benzoximate	(I)	>15,000	—
anthraquinone	(REP)	>5000	>5000	benzyladenine	(PGR)	1300-2125	—
Antor* (diethyl ethyl)	(H)	2300	—	benzyl benzoate	(I)	500-5000	—
Anvil* (hexaconazole)	(F)	6071(female)	—	beta-cyfluthrin (tech)	(F)	500	>5000(rat)
Apollo* SC (clofentezine)	(I)	>5000	>2400	A..... Algicide	H..... Herbicide	REP... Repellent	
Applaud* (buprofezin)	(I)	2198-2355	—	ADJ... Adjuvant	I..... Insecticide	ROD... Rodenticide	
Aqua-Kleen*	(H)	4050	>2000	B..... Bactericide	IGR... Insect Growth	SP..... Seed Protectant	
Aquatrine* (copper complexes)	(A)	0.5-2 ml/kg	—	CS..... Chemosterilant	Regulator	ST..... Seed Treatment	
Arbotect* (thiabendazole)	(F)	3100	—	DEF... Defoliant	L..... Larvicide	SUR... Surfactant	
Aresin* (monolinuron)	(H)	3100	—	F..... Fungicide	M..... Molluscicide	SYN... Synergist	
A-Rest* (ancymidol)	(PGR)	4500	>200	FUM... Fumigant	P..... Pheromone	WP..... Wood Preservative	
Aretit* (dinoseb-acetate)	(H)	60(female)	—	G..... Germicide	PGR... Plant Growth	Regulator	
Argold* (cinnemethylin)	(H)	4553	>2000				
Arsenal* (imazapyr)	(H)	>5000	>2148				
arsenic acid	(H)	48-100	—				

¹ Data as reported to the 1995 Pesticide Dictionary. Except as noted, the figures are for acute oral doses (rat) and acute dermal doses (rabbit).

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Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)	Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)
Betamix* (desmedipham/phenmedipham)	(H)	4100	>2000	†CHE 8728 (tech)	(PGR)	455-523	1000
Betanex* (desmedipham)	(H)	>10-250	2000<10,000	chinosol	(F)	1200	—
Bicep* (atrazine/metolachlor)	(H)	4680	>2000	Chipco* Florel* Pro (ethephon)	(PGR)	>20,000	—
Bidisin* (chlorfenprop-methyl)	(H)	1190-1390	>1273	chlomethoxynil	(H)	>10,000	>5000
bifenox	(H)	>5000	—	chloralose	(REP)	200(mouse)	—
bifenthrin	(I)	375	>2000	chlordanil	(F)	4000	—
Bladafum* (sulfotep)	(I)	10	65	chlordanil	(I)	367-515	>200<2000
blastocidin-S-3	(F)	—	>500	chlordinform	(I)	340	640
Blazer* (acifluorfen-sodium)	(H)	1540	>3680	chlorfenvinphos	(I)	10-39	30-108
Blue Shield* (copper hydroxide)	(F)	1300	—	chlorfluorenl	(H/PGR)	12,700	>10,000
Bolstar* (sulprofos)	(I)	200	>1000(rat)	chlormephos	(I)	7	27
bomyl	(I)	31	—	chlormequat chloride	(B)	883	>4000
Bonzi* (paciobutrazol)	(PGR)	5346	>1000	chlorobenzilate	(I)	2784-3880	—
borax	(H)	2660-5190	—	chlordanil	(F)	11,000	>5000
boric acid	(I)	3500	>10,000	†chloronitropropane	(F)	197	—
Borocil* IV (sodium metaborate tetrahydrate/bromacil)	(H)	3500	10,000	chlorophacinone	(ROD)	3.15	—
BPMC	(I)	640	>5000	chloropicrin	(FUM)	250	—
brodifacoum	(ROD)	0.27	—	chlorothalonil	(F)	>10,000	>10,000
bromacil	(H)	5200	—	chlorotoluron	(H)	>10,000	>2000
bromadiolone	(ROD)	0.56-0.84	—	chlorphoxim	(I)	>5000	>500
bromethalin	(ROD)	201	—	chlorpropham	(H)	3800	—
bromophos	(I)	3750-8000	—	chlorpyrifos	(I)	96-270	2000
bromophos-ethyl	(I)	52-127	—	chlorpyrifos methyl	(I)	1000-3700	>2000
bromopropylate	(I)	>5000	>5000	chlorsulfuron	(H)	3053	>2000
bromoxynil	(H)	190	>2000(rat)	chlorthion	(I)	880	—
bronopol	(B)	180-400	1600	chlorthiophos	(I)	7.8-10.7	—
Bronox* (linuron/trietazine)	(H)	8000	—	Chokegard* (hexadecanal)	(P)	>5 g/kg	>2 ml/kg
Buban 37*	(H)	750-825	—	cholecalciferol	(ROD)	42	—
Bueno* (MSMA)	(H)	2270	3150	Chopper* (imazapyr/isopropylamine)	(H)	>5000	>2000
Bulbosan*	(F)	8900	500	Citowett*	(ADJ)	3180	>5000
Bullet* (alachlor/atrazine)	(H)	8900	>5000	Citrus Fix* (isopropyl ester of 2,4-D)	(PGR)	375	—
buminafos	(H)	5000	12,000-15,000	Clarity*	(H)	3512	>2000(rat)
Bunema*	(F)	590-1032	—	Classic* (chlorimuron ethyl)	(H)	>4000	>2000
Burst* Yield Booster	(PGR)	>5000	—	†Clearcide* (fluothuron)	(H)	336-554	>500
butacarb	(I)	>4000	—	clofentezine	(I)	>3200	—
butachlor	(H)	2000	13,000	ciopryalid	(H)	>5000	>2000
†Butilato Estrella*	(H)	4000-4660	72,000	CNP	(H)	>10,000	>10,000
Butisan S* (metazachlor)	(H)	2150	6810	Cobex* (dinitramine)	(H)	3700	2000
butocarboxim	(I)	153-215	360	Cobra* (lactofen)	(H)	5960	>2000
butonate	(I)	1100-1600	7000	COC* (copper oxychloride)	(F)	1200	—
Butoxone* (2,4-DB)	(H)	>2000	>10,000	Comac* 23-25	(F)	>4000	—
Butoxone Ester* (2,4-DB)	(H)	10,000	—	Command* (clomazone)	(H)	2077	2000
butoxycarboxim	(I)	458	>5000	Commence* (trifluralin/clomazone)	(H)	>540<5400	>5400
butralin	(H)	12,600	10,200	Compete* (fluorglycofen)	(H)	1480	>5000
butylate	(H)	3500-5431	>4640	Conen*	(F)	870	—
Butyrac* (2,4-DB)	(H)	700	—	Confront* (tricyclopyr/clopyralid)	(H)	2164	—
Bux* (bufencarb)	(I)	85-105	680	Copac* (ammonical copper sulfate)	(B)	2530	>2500
cacodylic acid	(H)	2756	—	copper hydroxide	(F)	1000	—
calcium acid methanearsonate	(H)	4000	—	copper naphthenates (tech)	(F)	>6.0 g/kg	—
calcium arsenate	(I)	298	—	copper nordox	(F)	1500	—
Calixin* (tridemorph)	(F)	980	>2000	copper oxychloride	(F)	1470	—
Calo-Clor* (mercurous chloride/mercuric chloride)	(F)	55.2	—	Copper Sandoz* (cuprous oxide)	(F)	470	—
Calo-Gran* (mercurous chloride/mercuric chloride)	(F)	1800	—	copper sulfate	(F)	472	—
calomel	(F)	210	—	Corbel* (fenpropimorph)	(F)	4055	4904
Cannon* (alachlor/trifluralin)	(H)	>3150	>5000	corrosive sublimate	(F)	1-5	—
Canopy* (metribuzin/chlorimuron ethyl)	(H)	1500	>2000	Counter* (terbufos)	(I)	29	182
captafol	(F)	5000-6200	—	4-CPA	(PGR)	850	—
captan	(F)	9000	—	Croneton* (ethiofencarb)	(I)	200	>1000(rat)
Caragard* (terbumeton)	(H)	482-651	>3100	†Crotopex* (flubenzimine)	(H)	>5000	>5000(rat)
Carbamult* (promecarb)	(I)	74-118	>1000	Crossbow* (2,4-D/tricyclopyr ester)	(I)	2589	—
carbaryl	(I)	246-283	—	crotoxyphos	(I)	53	385
carbendazim	(F)	>15,000	>2000	cuprous oxide	(F)	470	—
carbetamide	(H)	11,000	—	Cuproxat* (tribasic copper sulfate)	(F)	2500	>2000
carbofuran	(I)	8	>3000(rat)	Curacron* (profenofos)	(F)	358	277
carbon tetrachloride	(FUM)	7500	—	Cutless* (flurprimidol)	(PGR)	709	602
carboxin	(F)	3820	>8000	Cutrine* Plus (copper alkanolamine complex)	(H)	0.50-2 ml/kg	—
Carbyne* (barban)	(H)	1350	>20,000	cyanazine	(H)	288	>2000
cartap	(I)	345	—	cyanophos	(I)	580-610	—
Carzol* (formetanate hydrochloride)	(I)	20	>10,200	Cycle* (metolachlor/cyanazine)	(H)	1260	2010
Cascade* (flufenoxuron)	(I)	>3000	>2000	cycloate (tech)	(H)	2000-4100	—
Castrix* (crimidine)	(ROD)	1-2	—	cycloheximide	(F)	2	—
Cycoel-Extra* (chlormequat chloride)	(PGR)	2836	>5650(rat)	Cyclosal*	(I)	>5000	—
CECA	(F)	410-420	—	cyhexatin	(I)	540	>2000
Ceidon* (fentiazon)	(F)	10,000	—	Cymag* (sodium cyanide)	(ROD)	6.4	—
Ceredon* (benquinox)	(F)	100	—	cymoxanil	(F)	1100	>3000
Cerewet*	(F)	50	—	cypendazole	(F)	>2500	>1000
Certrol* (bromoxynil octanoate)	(H)	428	>2000	cypermethrin	(I)	250	>2000
Champion* (copper hydroxide)	(F)	2000	—	cyprazine	(H)	1200	—
†CHE 1843 (tech)	(F)	200	>500	cyproconazole	(F)	1020-1330	>2000
				cyprofuram	(F)	174	>1000
				cypromazine	(IGR)	3387	>3100
				Cythion* (malathion)	(I)	5500	>2000(rat)

Mammalian Toxicity

ENVIRONMENTAL AND SAFETY

Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)	Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)
Cyrolane* (mephosfolan)	(I)	8.9	28.7	Dormex* (hydrogen cyanamide)	(PGR)	300	1700
2,4-D	(H)	699	—	Dowicide* 1 (2-phenylphenol)	(F)	2700	—
2,4-D amine	(H)	1492	2871	Dozer* (fenuron-TCA)	(H)	4000-5700	—
2,4-D LV ester	(H)	1492	2871	Drepamon* (tiocarbazil)	(H)	>10,000	>4000
2,4-D LV ester 4	(H)	1492	2871	Drione* (ammonium fluosilicate/ pyrethrins/piperonyl butoxide)	(I)	5	—
2,4-D LV ester 6	(H)	1492	2871	Dropp* (thidiazuron)	(PGR)	>4000	>1000
Daconate*	(H)	2630	2973	DSMA (tech)	(H)	1935	>2000
Dacthal* (DCPA)	(H)	>10,000	>2000	Duosan*	(F)	10,200	8000
dalapon	(H)	9330	—	Dyfonate* (fonofos)	(I)	8-17.5	.25
daminozide	(H/PGR)	8400	>5000	dymet	(I)	2000	8000
Dasanit* (fensulfthion)	(I)	5	15	dymron	(H)	>4000	—
dazomet	(F)	519	>2000	Dyrene* (anilazine)	(F)	>4000	>5000
2,4-DB	(H)	>2000	>10,000	Echo* 500 AG & Turf	(F)	4.2 g/kg	>20 g/kg
DCNA	(F)	>5000	—	edifenphos (tech)	(F)	100-260	700-800(rat)
D-D 92* (dichloropropene)	(F)	127	423	Ekamet*	(I)	1800	500
DDT	(I)	113	—	Elocron* (dioxacarb)	(I)	60-80	3000
DDVP	(I)	.50	300(rat)	†Emblem* (bromoxynil)	(I)	10,000	—
Decis* (deftamethrin)	(I)	128.5	>2000	endosulfan	(H)	160	359
DEF* (tribufos)	(DEF)	348-712	850	endothall	(H)	.51	—
Defol* 6 (sodium chlorate)	(DEF)	1200	—	endothion	(I)	30-50	—
Defy* (2,4-D acetate)	(H)	—	2115	endrin	(I)	7-15	15(female rat)
demeton	(I)	2.5-6	8.2-14	EPN	(I)	26	420
Devrinol* (napropamide)	(H)	>500	—	Eptapur* (buturon)	(H)	5500	—
diazinon (tech)	(I)	1250	2020	EPTC	(H)	1630	—
dibromochloropropane	(FUM)	170-300	1420	Eradex* (thioquinox)	(I)	3400	—
dicamba	(H)	1707	>2000	Eradicane* (EPTC)	(H)	2000-2870	—
dicapthion	(I)	400	—	Eradicane* Extra (EPTC)	(H)	800-1330	—
dichlobenil	(H)	>3160	1350	erbon (form)	(H)	1000-2000	—
dichlofenthion	(I)	270	—	Ergostim*	(PGR)	>20,624	>5000
dichlone	(F)	1300	5000	etaconazole	(F)	1343	>3100
dichloralurea	(H)	6800	—	ethephon	(PGR)	4229	—
dichlorprop	(H)	825-1470	>4000	†Ethide* (dichloronitroethane)	(FUM)	.410	—
dichlorprop-P	(H)	825-1470	>4000	†ethiolate	(H)	400	—
diclofop methyl	(H)	563(female)	>5000(female rat)	ethion (tech)	(I)	21-191	838
diciomezine	(F)	12,000	>5000	ethirimol	(F)	6430	—
dicofol	(I)	570-595	2000-5000	ethofumesate	(H)	6400	>1440
dicrotophos	(I)	17-22	224	ethoprop	(I)	61.5	2.4
†dicryl	(H)	3160	—	ethyl formate	(FUM)	4000	—
dieldrin	(I)	37-80	60-90	ethyl hexanediol	(REP)	6500	—
dienochlor	(I)	3160	>3160	ethylene dibromide	(I)	146	—
diethofencarb	(F)	>5000	>5000	ethylene dichloride	(FUM)	670-890	—
difenconazole (tech)	(F)	1453	2010	Etoc* (prallethrin)	(I)	640	>5000
diflubenzuron	(I)	>4640	>10,000	etridiazole	(F)	1077	1366
diffufenican	(H)	>2000	>2000	Etrofol* (CPMC)	(I)	648	>500
†Dikar*	(F)	>5000	—	Euparen* (dichlofluanid)	(F)	>5000	>5000
dikegulac sodium	(PGR)	31,000	>1000	Euparen M* (tolylfluanid)	(F)	>5000	>5000
†Dian*	(I)	475-600	—	Evik* 80W (ametryn)	(H)	1750	—
Dimanin A*	(B)	290	—	Express* (tribenuron methyl)	(H)	>5000	>2000
dimefox	(I)	1-2	.5	Extrazine II* (atrazine/cyanazine)	(H)	336	>2220
dimefuron	(H)	1000	—	Facet* (quinclorac)	(H)	>4120	>2000
Dimension* (dithiopyr)	(H)	>3600	>5000	FallowMaster* (dicamba/glyphosate)	(H)	4000	>5000
dimethyl phthalate	(REP)	8200	—	Faloc* (2,4-DEP)	(H)	850 (+/-140)	—
dimethoate	(I)	235	400	Faneron* (bromofenoxim)	(H)	1217	>3000
dimethoate 267 E.C.	(I)	150	353(rat)	Far-Go* (triallate)	(H)	2193	>5000
dimethomorph	(F)	3900	>2000	Fastac* (alphacypermethrin)	(I)	79-400	—
dimethrin	(I)	>15	—	Fenatrol* (fenac)	(H)	1780	>3160
diniconazole	(F)	639	>5000	fenazafior	(I)	283	—
dinitramine	(H)	3000	6800	fenbutatin-oxide	(I)	2631	>2000
dinitrophenol	(I)	30	—	fenfuram	(F)	12,900	—
dinobuton	(I)	140	3200	fenitrothion	(I)	800(female)	1200(female rat)
dinocap	(F/I)	980	—	fenoxaprop-ethyl	(H)	2565	>2000
†dinocron-o	(F)	1250	—	fenoxycarb	(IGR)	16,800	>2000
†dinocron-4	(F)	1650	3000	fenpiclonil	(F)	>5000	>2000
dinoseb	(H)	40-60	—	fenproprathrin	(I)	70.6-164	>2000
dinoterb acetate	(H)	62	>2000	fenpropidin (tech)	(F)	>1800	>1800
dinoterb salts	(H)	62	—	fenpropimorph	(F)	3515	>4000
dioxathion	(I)	45	235	fenson	(I)	1560-1740	—
diphacinone	(ROD)	7.0	—	fenthion (tech)	(I)	250	700
diphenamid	(H)	1000	—	fentin chloride (triphenyltin chloride)	(F)	18(mouse)	—
diphenyl	(F)	3280	—				
diphenylamine	(F)	300-1000	—				
		(guinea pig)					
dipropalin	(H)	3600	—	A..... Algicide	H..... Herbicide	REP... Repellent	
diquat dibromide	(H)	215-235	>400	ADJ... Adjuvant	I..... Insecticide	ROD.. Rodenticide	
disulfoton (tech)	(I)	2-12	3.6-15.9	B..... Bactericide	IGR.... Insect Growth	SP..... Seed Protectant	
Disyston S* (oxydisulfoton)	(I)	3.5	92-235	CS..... Chemosterilant	Regulator	ST..... Seed Treatment	
ditalimfos	(F)	5660	1000	DEF... Defoliant	L..... Larvicide	SUR... Surfactant	
dithianon	(F)	638	—	F..... Fungicide	M..... Molluscicide	SYN... Synergist	
diuron	(H)	>5000	>5000	FUM.. Fumigant	P..... Pheromone	WP..... Wood Preserva- tive	
DNOC	(I)	20-50	—	G..... Germicide	PGR... Plant Growth Regulator		
dodemorph acetate	(F)	3944	—				
dodemorph acetate (form)	(F)	4180	4000				
dodine	(F)	1000	>1500				

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Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)	Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)
fenitro hydroxide (triphenyltin hydroxide)	(F)	156-345	1600	hexachlorophene	(F)	560	—
fenuron	(H)	6400	—	hexazinone	(H)	1690	5278
fenvalerate (DMSO)	(I)	451	2500	hexythiazox	(I)	>5000	>5000
ferbam	(F)	>17,000	—	Hibor* C (bromacil/sodium metaborate/ sodium chlorate)	(H)	2700	>10,000
ferimzone	(F)	725	>2000	Hico* DCPAS (dichloropropionate)	(H)	6600	—
Figaron* (ethychlozate)	(PGR)	4800	—	Hinochloa* (mefenacet)	(H)	>5000	>5000(rat)
Fitios B77* (ethoate-methyl)	(I)	340-350	—	Hoelon* 3EC	(H)	512	>5000
flamprop-methyl	(H)	>1200	—	Homai* (thiophanate-methyl/thiram)	(F)	7500	—
flazasulfuron	(H)	5000	—	Honcho* (glyphosate)	(H)	>5000	>5000
Flonex MTS* (maneb)	(F)	6750	>5000	Hope* (dimehypo)	(I/FLUM)	1021	316
Flonex MZ 400* (mancozeb)	(F)	4500	5000	Hosdon* (isothioate)	(I)	150-170	240(mouse)
Flonex Z 400* (zineb)	(F)	5200	5000	Hostaquick* (heptenophos)	(I)	96-121	>2000
fluazifop-butyl	(H)	3328	—	Hostathion (triazophos)	(I)	57-59	≥2000
fluazifop-p-butyl	(H)	2712	>2420	†HPMTS	(B)	926	—
fluazinam	(F)	>5000	—	Hyamine* 1622	(G)	420	—
flucythrinate	(I)	67(female)	>1000	Hyamine* 3500	(G)	447	—
fludioxonil (tech)	(F)	>5000	>2000	†Hybrex* (fenridazon-potassium)	(PGR)	25	5
fluometuron (tech)	(H)	8900	>10,000	hydramethylnon	(I)	1131	>5000
fluoroacetamide	(ROD)	15	—	Hydrol* (allylxy carb)	(I)	90-99	—
flurecol-n-butylester	(H)	>10,000	>10,000	hydroprene	(IGR)	34,000	5100
fluroxypyr meptyl	(H)	>5000	>2000	Hyspray*	(ADJ)	1231	—
flusilazole	(F)	1110	>2000	IBP (iprobefos)	(F)	490	—
tau-fluvalinate	(I)	261-282	>20,000	Imazali 800 EC	(F)	660	4200-4800(rat)
Focus* (cycloxydim)	(H)	>5000	>2000	imidacloprid	(I)	450	>5000
Folex* 6EC (triflufos)	(DEF)	348-712	850	Impact* (flutriafol)	(F)	1480	—
Foliar Triggrr*	(PGR)	>5000	>2000	Imugan* (chlornifformethane)	(F)	>2500	>1000(rat)
Folimat* (omethoate)	(I)	25	200(rat)	ioxynil	(H)	110	—
folpet	(F)	>10,000	—	IPC	(H)	>5000	>5000
fomesafen	(H)	1858	—	iprodione	(F)	>4400	>2000
Fongarid* (furalaxyl)	(F)	940	>3100	isazofos	(I)	40-60	118(female) >3100(male)
Force* (lambdacyhalothrin)	(I)	1531-3091	—	isocarbamid	(H)	3500	>2500
Fore*	(F)	>5000	>5000	isofenphos (tech)	(I)	20	—
formothion	(I)	365-500	>1000	isolan	(I)	11-50	—
Fortress*	(I)	1.8-4.8	12.5-18.5	isoprothiolane	(F)	1190	>10,250
fosamine ammonium	(PGR)	>5000	—	isoproturon	(H)	1826	—
fosetyl-Al	(F)	5000	>2000	Isoproturon 500 SC	(H)	>3600	>6300(rat)
fosthiazate	(I)	57	—	Isothan*	(F)	230	—
Freedom* (alachlor/trifluralin)	(H)	2650	>5000	Joker* (fenthia prop-ethyl)	(H)	977	—
†Frescon (trifenmorph)	(M)	1200-1600	—	karbutilate	(H)	3000	—
Frigate* Lo-Dose	(ADJ)	620(female) 710(male)	>10,000	Karphos* (isoxathion)	(I)	242	>2000
Frontier*	(H)	2400	>2000	kasugamycin	(F)	22,000 20,500	>4000(rat) 10,000(mouse)
Fruitone* CPA (chlorophenoxypropionic acid)	(PGR)	750	—	Kayabest* (methasulfocarb)	(F)	342(mouse)	>5000(rat)
fuberidazol	(F)	500	>5000	Kayaphos* (propaphos)	(I)	61.0	88.5
Fuji-One* (isoprothiolane)	(F)	1190	>10,250	Kepone* (chlordecone)	(I)	114-140	—
†Fumarin* (coumafuryl)	(ROD)	25	—	Kerb* (pronamide)	(F)	8350	>3160
†Fungilon*	(F)	500	—	Kinoprene	(IGR)	3,083	4000
Fungi-Rhap* CU-75 (copper oxide)	(F)	470	—	†K-Lox*	(A)	8 ml/kg	>8 ml/kg
Fungo* 50 (thiophanate methyl)	(F)	9700	>8000	Knox Out* 2FM (diazinon)	(I)	>21,000	>10,000
Fusilade* 2000 (fluazifop-butyl)	(H)	2712	>2420	K-Obiol* (deltamethrin)	(I)	710->40,000	—
Galben* (benalaxyl)	(F)	4200	>5000	Komeen* (copper complex)	(H)	0.75 ml/kg	>8 ml/kg
Gallery* (isoxaben)	(H)	>10,000	—	K-Othrine* (deltamethrin)	(I)	128.5->5000	2000
Galtak* (benazolin-ethyl)	(H)	>5000	—	†Kromad*	(F)	400	1000
Gardoprim* (terbutylazine)	(H)	2000-2160	>3000	Kumulan* (nitrothal-isopropyl/sulfur)	(F)	9400	—
Gatnon* (benzthiazuron)	(H)	1280	—	Kumulus* FL (sulfur)	(F)	>5000	>5000(rat)
GCC-711	(H)	400-440	—	Laccobor Chlorate* (disodium octaborate/sodium chlorate)	(H)	4.3 g/kg	—
Gemini* (linuron/chlorimuron ethyl)	(H)	2300	>2000	†Lambast*	(H)	5700	—
Gesaran* (methoprotryne)	(H)	>5000	>2000	lambdacyhalothrin (tech)	(I)	79	632(rat)
Gesatamin* (atraton)	(H)	1465-2400	—	Lambrol* (fluenethy)	(I)	6-8	—
gibberellic acid	(PGR)	1500(mouse)	—	Lance* (cloethocarb)	(I)	35.4	>4000
Ginstar* (thidiazuron/diuron)	(H)	>5000	>2000	Landmaster* (glyphosate/2,4-D)	(H)	3680	>6366
Glean* (chlorsulfuron)	(H)	5545	3400	Lariat* (alachlor/atrazine)	(H)	4400	>5000
†Glenbar*	(H)	3300	—	Larvin* (thiodicarb)	(I)	166	>2000
glufosinate-ammonium	(H)	2000	>4000	lead arsenate	(I)	150	—
Glycel* (glyphosate)	(H)	4320	—	lenacil	(H)	>11,000	—
glyodin	(F)	4600-7600	—	Lesan* (fenaminosulf)	(F)	75	>100
glyphosate	(H)	>5000	>5000	†Lethane 384 Regulator*	(I)	90	34
Glytac* (EGT)	(H)	7000	—	Lihocin* (chlormequat chloride)	(PGR)	790	—
Gnatrol* (B.t. israelensis)	(I)	>5000	>2000	lime sulfur	(F)	400-500	—
Goal* (oxyfluorfen)	(H)	>5000	>10,000	Limit* (amidochlor)	(PGR)	3100	—
Gokilact* (cyphenothrin)	(I)	318-2640	>5000	lindane	(I)	88-125	1000
Goltix* (methamitron)	(H)	2000	>4000	linuron	(H)	4000(female)	—
Grasp* (tralkoxydim)	(H)	934-1324	—	Lironion* (difenoxuron)	(H)	>7750	>2150
guazatine	(F)	300	>1000	Lithate* 2,4-D (2,4-D)	(H)	850	—
Harness* Plus (acetachlor)	(H)	2690	>5000	Loiop Granule*	(H)	850(mouse)	—
Harvade* 5F (dimethipin)	(PGR)	1180	8000	Londax* (bensulfuron methyl)	(H)	>5000	>2000
Hataclean* (trichlamide)	(F)	>5000	>5000	Luprosil*	(F)	3500	—
heptachlor	(I)	147-220	>2000	MAFA	(F)	2600	—
Herb-All* (cacodylic acid)	(H)	800-1800	—	malathion (tech)	(I)	5500	>2000
Herban* (norea)	(H)	2000	—				
Herbisan* 5 (EXD)	(H)	603	—				
hexachlorobenzene	(H)	40,000	—				

Mammalian Toxicity

ENVIRONMENTAL AND SAFETY

Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)
maleic hydrazide (potassium salt)	(PGR)	3900	—
maleic hydrazide (sodium salt)	(PGR)	6950	—
Maloran* (chlorbromuron)	(H)	>5000	>2000
MAMA	(H)	750	—
Manage* (imibenconazole)	(F)	2800(male) 3000(female)	>2000
mancozeb	(F)	11,200	>15,000
maneb	(F)	7990	>5000
manoc	(F)	4260	—
Margosan-O* (neem extract)	(F)	>10,000	—
Marksman* (dicamba/atrazine)	(H)	5897	>2000
Marshal* (carbosulfan)	(I)	209	>2000
Mataven* (flamprop-methyl)	(H)	1200	>2000
M&B 25-105*	(PGR)	1800	>2000
MCPA	(H)	1160	>4000
MCPA ester	(H)	1492	2871
MCPB	(H)	680	—
mecarbam	(I)	36	>1220
mecarphon	(I)	57	720
mecoprop	(H)	1166	>4000
mecoprop-p	(H)	1050	>4000
medinoterb acetate	(H)	42	—
mefluidide	(H)	>4000	>4000
Meitaxo* (dodemorph acetate)	(F)	5301	>4000
MEMA	(F)	25	—
MEMC	(F)	22-44	—
menazon	(I)	1950	—
†Mecopar*	(H)	1900	—
Meobal*	(I)	380	—
mepiquat chloride (tech)	(PGR)	464	—
meprofil	(F)	>10,000	—
Mesoranil* (aziprotryn)	(H)	3600-5833	>3000
Metacid TS* (thiram)	(F)	560	—
metalaxyl	(F)	669	>3100
metalddehyde	(I)	630	—
metam-sodium	(F)	1891	>3074
†Metasystox* (demeton-S-methyl)	(I)	180	—
Metasystox (i)* (demeton-S-methyl)	(I)	30	30
Metasystox (r)* (oxydemeton-methyl)	(I)	50	150
Metasystox (s)* (oxydeprofos)	(I)	100	—
methamidophos (75% tech)	(I)	20	130(rat)
methidathion (tech)	(I)	44	200
methiocarb (tech)	(I)	20	>5000
methomyl	(I)	17-24	5880
methomyl (24% L)	(I)	—	5880
methoprene	(I)	>34,600	>3000
Methoxone M* (MCPB)	(H)	930	—
methoxychlor	(I)	6000	—
methyl bromide	(FUM)	214	—
methyl nonyl ketone (50C)	(REP)	5000-10,000	—
methyl parathion	(I)	6	45(rat)
methylidymron	(H)	9000	—
metiram	(F)	>6810	>2000
metobromuron	(H)	2000	>10,200
metolachlor	(H)	2780	>10,000
metoxuron	(H)	3200	>2000
metribuzin (tech)	(H)	2000	>20,000(rat)
metulfuron methyl	(H)	>5000	>2000
mevinphos	(I)	3-12	51-60(rat)
mexacarbate	(I)	24	—
Milbex*	(I)	3000(mouse)	—
Milcurb* (dimethirimol)	(F)	2350	—
Milocep* (propazine/metolachlor)	(H)	3868	>5000
Miltox* (zineb/copper oxychloride)	(F)	3630	2000(rat)
MIPC (isoprocarb)	(I)	450	>500
mirex	(I)	306	800
†Mitrax*	(I)	2000	—
†MNFA	(I)	115	—
Mocap* (ethoprop)	(I)	61	2
Modown* (bifenox)	(H)	>5000	—
Mogeton* G (quinochloramine)	(H)	1360-1600	—
molinate (10G)	(H)	>5000	3536
Monceran* (pencycuron)	(F)	>5000	2000
Moncut* (flutolanil)	(F)	>10,000	>5000
Monguard* (diclomezine)	(F)	>12,000	>5000
monoammonium methanearsonate	(H)	750	—
monocrotophos	(I)	8-23	354
monolinuron	(H)	2100-2215 (female)	—
Monoxone* (sodium chloroacetate)	(H)	650	—
monuron	(H)	3600	—
Morestan* (oxythioquinox)	(F/I)	1500	>5000
morfamquat	(H)	368-690	—

Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)
Morocide* (binapacryl)	(I)	421(female)	—
M-Pede*	(I)	16,900	>5000
M-Peril* L	(I)	>5050	>2020
MSMA	(H)	2833	—
MSMA Plus*	(H)	700	—
MSMA Plus HC*	(H)	700	—
MTMC	(I)	268	6000
M-Trak*	(I)	>5050	>2020
mucochloric anhydride	(F)	2000	—
MVP	(I)	>5050	>2020
nabam	(F)	395	—
naled	(I)	191	360
napropamide	(H)	>5000	—
naphthaleneacetamide	(PGR)	1690	2000
1-naphthaleneacetic acid	(PGR)	2520	—
naptalam (acid)	(H)	8200	—
naptalam (sodium salt)	(H)	1770	—
†NaTA (TCA)	(H)	5000(male) 5060(female)	—
NC-319 (halosulfuron-methyl)	(H)	8865	>2000
neburon	(H)	>11,000	—
Nellite* (diamidfos)	(I)	140	100-200
Nemacur* (fenamiphos)	(I)	6	80(rat)
Nemamort* (dichlorodisopropyl ether)	(I)	536	—
Nem-A-Tak* (fosthietan)	(I)	4.7-7.7	27.4-66.1
Neo-Asozin* (methane arsenic acid)	(F)	2600	—
Neo-Pynamin* (tetramethrin)	(I)	>5000	—
Neo-Pynamin Forte* (d-tetramethrin)	(I)	>5000	>5000
†Neosappiran* CPCBS	(I)	2000(mouse)	—
†Neosappiran* DCPM	(I)	5800(mouse)	—
Nevibes* (quinine hydrochloride)	(REP)	620	—
Nevifos* (fosmethilan)	(I)	39-88 µl/kg	4970-8880 µl/kg
Nevirol*	(PGR)	8836.9	—
nicosulfamide	(I)	>5000	—
nicosulfuron	(H)	>5000	>2000
nicotine	(I)	50-60	—
Nimrod* (bupirimate)	(F)	>4000	—
nitrapyrin	(F)	2140(female)	—
nitrofen	(H)	2630	—
nitrothal-isopropyl	(F)	>6400	>250
†N,N-diethylbenzamide	(REP)	2000	—
NoMate* PBW MEC	(P)	>5 g/kg	—
NoMate* Pink Boll Worm Fibers	(P)	>15 g/kg	—
NoMate* TPW Fibers	(P)	>5 g/kg	>2 g/kg
NONIT*	(ADJ)	10,400-11,200	—
norflurazon	(H)	>8000	>20,000
Nortron* (ethofumesate)	(H)	6400	1400
Nosema locustae Canning (spore)	(I)	>5 g/kg	—
†N-Trap* Elm Bark Beetle Pheromone	(P)	>5000	72,000
Nucop* (copper oxychloride)	(F)	1200	—
Nuvanol* N (iodofenphos)	(I)	2100	—
Off-Shoot-O* (methyl esters)	(PGR)	20,500	—
Off-Shoot-T*	(PGR)	25,000	—
Ofunack* (pyridaphenthion)	(I)	770	2300
ofurace	(F)	3500	>5000
Ohric* (dimethachlon)	(F)	1250(mouse)	—
†Omazine*	(F)	590	—
Omni Supreme* Spray Oil	(F)	5 g/kg	3.16 g/kg
Oncol* (benfuracarb)	(I)	110	>2000
One Shot*	(H)	851	2000
Onyxide 172*	(F)	700	—
OPUS* (epoxiconazole)	(F)	5000	2000(rat)
orbencarb	(H)	1010(mouse)	—
Ornitrol*	(CS)	60	—
ortho-phenylphenol	(F)	2700	—
Osbac* (BPMC)	(I)	623	4200
Oust* (sulfometuron methyl)	(H)	>5000	—
Outfox* (cyprazine)	(H)	1200	—
ovex	(H)	2000	—
oxadiazon	(H)	>5000	>2000

A..... Algicide	H..... Herbicide	REP... Repellent
ADJ... Adjuvant	I..... Insecticide	ROD.. Rodenticide
B..... Bactericide	IGR.... Insect Growth	SP..... Seed Protectant
CS..... Chemosterilant	Regulator	ST..... Seed Treatment
DEF... Defoliant	L..... Larvicide	SUR... Surfactant
F..... Fungicide	M..... Molluscicide	SYN... Synergist
FUM... Fumigant	P..... Pheromone	WP..... Wood Preservative
G..... Germicide	PGR... Plant Growth	Regulator

* = Trade Name/R/TM † = Discontinued product

Information presented herein is for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by the manufacturer.

Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)	Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)
oxadixyl	(F)	3480	>2000	propachlor	(H)	500-1700	—
oxamyl	(I)	5.4	2960	propamocarb hydrochloride	(F)	2000-8550	>3000
oxycarboxin	(F)	2000	>16,000	propanil (tech)	(H)	2500	>5000(rat)
oxydemeton-methyl (tech)	(I)	50	130(rat)	propargite	(I)	4029	2940
Paarlan* (isopropanol)	(H)	>5000	—	propazine	(H)	>7000	—
Padan* (cartap)	(H)	345	—	Propel* (lactic acid)	(PGR)	4936	>2000
Panocon* (fenthioicarb)	(I)	7000(mouse)	—	propetamphos	(I)	119	2825(rat)
Panocline* (guazatine)	(F)	300	—	propiconazole	(F)	1517	>4000
para-dichlorobenzene	(FUM)	500	—	propineb	(F)	>5000	>5000
Paraquat	(H)	150	—	propionic acid	(F)	3500	—
parathion	(I)	2	50	propisochlor	(H)	2888	5000(rat)
Paris green	(I)	22	—	Propomit* 720 EC (propisochlor)	(H)	2888	5000(rat)
Parnon* (parinol)	(F)	5000	—	propoxur (tech)	(I)	50	>5000
Pathway* (picloram/2,4-D)	(H)	>5000	—	†propyl isome	(SYN)	1500	—
Pay-Off* (flucythrinate)	(I)	67(female)	>1000	†Protect*	(ST)	12,340	—
PBA	(H)	1140	—	prothoate	(I)	8	655
PCNB (tech)	(F)	1700-5000	2000-4000	Protosan* SC (isoproturon)	(H)	>3600	>6300(rat)
PCP (pentachlorophenol)	(F)	50-500	105	Prowl* (pendimethalin)	(H)	3956	>2200
†Penar*	(PGR)	800-1500	—	Prozine* (pendimethalin/atrazine)	(H)	7071	>2000
penconazole	(F)	2125	>3000	prynachlor	(H)	1177	1926
pencycuron	(F)	>5000	>2000(rat)	Pursuit* (imazethapyr)	(H)	>5000	>2000
Pennacp-M* (methyl parathion)	(I)	>600	>5400	Pynamin* (allethrin)	(I)	1100	—
†Penphene* (tetrachlorothiophene)	(F)	780	—	Pynamin-Forte* (d-allethrin)	(I)	1320	>2500
perfluidone (tech)	(H)	920(mouse)	>4000	Pyramin* (chloridazon)	(H)	2200	>2500
permethrin (tech)	(I)	430-4000	>2000	pyrazolate	(H)	9550	>5000
Perm-EB* (copper naphthenates)	(F)	>5000	2000-20,000	pyrazoxyfen	(H)	1644-1690	—
Permit* (halosulfuron)	(H)	1287	>5000	Pyrellin* EC (pyrethrins/rotenone)	(I)	1500	—
Peropal* (azocyclotin)	(I)	150	>5000	pyrethrins	(I)	1500	>1800
Perthane* (ethylan)	(I)	8170	—	pyrethrum	(I)	1500	>1800
Phenaban 801* (2,4-D)	(H)	>1000	—	pyridaben	(I)	358-435	>2000(rat)
phencapton	(I)	182	—	pyridate	(H)	2000	3400
phenmedipham	(H)	>8000	>4000	pyrifenoxy (tech)	(F)	2900	>5000
phenothiol	(H)	811(mouse)	—	pyroquilon	(F)	321	3100
d-Phenothrin	(I)	>10,000	>10,000	Qikron* (chlorfenethol)	(I)	926-1391	—
phenthoate	(I)	440	2100	quinalphos	(I)	71	1750
phorate	(I)	2-4	—	quizalofop-ethyl	(H)	1670	—
phosalone	(I)	120	1530	quizalofop-p-ethyl	(H)	1210	—
phosmet	(I)	147-316	>4640	Rabbit & Dog Chaser*	(REP)	>11,000	—
phosphamidon	(I)	17-30	267	Rabcide* (fthalide)	(H)	>10,000	—
†Phosvel* (leptophos)	(I)	52.8	>10,000	Racumin* (coumatetralyl)	(ROD)	17.300	40
Phyton*-27 (copper complex)	(H)	4500	—	Rak* 1 Plus (tech)	(P)	>5000	—
picloram	(H)	8200(female)	—	Rak* 5 (tech)	(P)	>5000	—
Pinene II*	(ADJ)	34 g/kg	—	Randox* (CDAA)	(H)	750	—
Pinnacle* (thifensulfuron methyl)	(H)	>5000	>2000	Ranger* (glyphosate)	(H)	2500	>5000
piperonyl butoxide	(SYN)	>7500	—	Rastra* (atrazine)	(H)	930-3080	—
Pipron* (piperalin)	(F)	2500	—	Ratak* (difenacoum)	(ROD)	1.8	—
pirimiphos-methyl	(I)	>2000	4592(female)	Rattler* (glyphosate)	(H)	>5000	>5000(rat)
Pirimor* (pirimicarb)	(I)	147	>500	Ravage* (buthidazole)	(H)	158 l	—
Plix* (mepiquat-chloride)	(PGR)	6900	>5000	refined petroleum distillate	(I)	>15,000	>5000
Planavin* (nitralin)	(H)	>2000(mouse)	>2000	Release* (gibberellic acid)	(PGR)	>5000	>2000
Plant Pin* (butoxycarboxim)	(I)	458	—	Remtal SC* (simazine/trietazine)	(H)	1500	—
plifenate	(I)	>10,000	>1000	resmethrin	(I)	>2500	>3000
PMA	(F/H)	50-100	—	†RES-Q*	(SP)	8000	>1000
Poast* (sethoxydim)	(H)	2676-3125	—	RH 7592	(F)	>2000	>5000
Polado*	(PGR)	>5000	>5000	Rhizocotol*	(F)	100	1400
Po-Akaritox* (tech)	(A)	>14,700	—	†Ricetrine*	(A)	0.5-2.0	—
†Polaris* (glyphosine)	(PGR)	3925	—	Rizomid* MZ (metalaxyl/mancozeb)	(F)	5189	—
Polybor-Chlorate* (disodium octaborate/ sodium chlorate)	(H)	4330	—	Rizolex* (tolclofos-methyl)	(F)	5000	>5000
Polybor* 3	(L)	2.0 g/kg	—	Ro-Neet* (cycloate)	(H)	2000-4100	—
polynoctins complex	(I)	>15,000 (mouse)	>10,000	Ronilan* (vinclozolin)	(F)	>16,000	>2000
polyoxin B	(F)	14,734	—	ronnel	(I)	1740	1000-2000
polyoxin D	(F)	>9600	—	rotenone	(I)	132-1500	—
†Po-San*	(PGR)	7400	—	Roundup* (glyphosate)	(H)	>5000	—
Potablan* (monalide)	(H)	>4000	>800	†Rowmate* (dichlormate)	(H)	1879	—
Potasan*	(I)	19	—	Royaltac*	(PGR)	12,800	—
PQ-8* (copper 8-quinolinolate)	(F)	1606	2000-20,000	Rubigan* (fenarimol)	(F)	2500	—
Pramitol* (prometon)	(H)	2980	>2000	Ruelene* (cruformate)	(I)	770	—
Prefix* (chlorthiamid)	(H)	757	>1000	Rufast* (acrinathrin)	(I)	>5000	>2000(rat)
Preforan* (fluorodifen)	(H)	9000	>3000	Rugby* 10G (codusafos)	(I)	679	155
Previcur* (prothioicarb)	(F)	1300	—	ryania	(I)	1200	—
Prime+*	(H)	3100	—	Ryz-Up* (gibberellic acid)	(PGR)	>5000	>2000
Primicid* (pirimiphos-ethyl)	(I)	192(female)	1000-2000(rat)	Safsan* (sodium fluosilicate)	(I)	125	—
Probe* (methazole)	(H)	2501	>12,500	Salithion* (dioxabenzofos)	(I)	125(mouse)	400
prochloraz	(F)	1600	—	Salute* (metribuzin/trifluralin)	(H)	1995	>2000
procymidone	(F)	6800	>2500	Sanawett*	(ADJ)	3500	—
Prodan* (sodium fluosilicate)	(I)	125	—	Sanazil* EC (imazafil)	(F)	660	4200-4800(rat)
prodiamine	(H)	>5000	>2000	Sancap* (dipropetryn)	(H)	7144	>10,000
profenofos	(I)	358	472	Sanbird* (pyrazolate)	(H)	9550	>5000(rat)
Prolin* (warfarin)	(ROD)	50	—	Sanmite* (pyridaben)	(I)	1350	>2000
Promet* (furrathioicarb)	(I)	137	>2000	†Santophen I*	(G)	2.8 g/kg	—
prometryn	(H)	5235	>3100	†Sapecron* C	(I)	110	>2000(rat)
				Saturn* (benthiocarb)	(H)	1130	>2000
				s-bioallethrin	(I)	784	—

Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)
Scepter* (imazaquin)	(H)	5000	2000
schradan	(I)	9	—
†Scilliroside	(ROD)	0.7	—
Sciex*	(F)	3000	—
Scout X-TRA* (tralomethrin)	(I)	1250	>2000
See*	(H)	2650	—
Select* (clothodim)	(H)	3610	>5000
Semeron* (desmetryn)	(H)	1390	—
Serinal* (chlorzolinat)	(F)	>4500	5000
Seritard* (inabenfide)	(PGR)	>15,000	>5000
Sesamex	(SYN)	2000-2270	—
sesone	(H)	1230	—
sethoxydim	(H)	3200-3500	>5000
Setrete* (PMAA)	(F)	500	—
Sicarol* (pyracarbolid)	(F)	>15,000 (female)	—
siduron	(H)	>7500	—
silvex	(H)	650	—
simazine	(H)	>5000	>3100
simetone	(H)	535	—
simetryn	(H)	1830	—
Sim-Trol* 90 DF	(H)	>5000	>2000
Sincocin*	(H)	>20,000	—
Sirius* (pyrazosulfuron ethyl)	(H)	>5000	>2000
Sisthane* (fenapanil)	(F)	1590	>5000
Snapshot* (isoxaben/oryzalin)	(H)	>5000	—
Sodanit*	(F/H/I)	10-50	—
sodium arsenite	(F)	10-50	—
sodium chlorate	(H)	4950	500
sodium chlorate borate	(H)	2330-2700	—
sodium cyanide	(ROD)	6.4	—
sodium fluosilicate	(I)	125	—
sodium pentachlorophenate	(B/F)	126	275-328
sodium TCA	(H)	5000	—
Soil Trigrn* (cytokinins)	(PGR)	>5000	>2000
solan	(H)	10,000	—
Sonalan* (ethylfluralin)	(H)	>10,000	—
Sonar* (fluridone)	(H)	>10,000	—
Spark* (cytogen)	(PGR)	>5000	—
Spike* (tebuthiuron)	(H)	644	—
Squadron* (pendimethalin/imazaquin)	(H)	>5000	>2000
†S-Seven* (EPBP)	(I)	274(mouse)	—
Sta-Brite	(WP)	778.8	>2000-<20,000
Stam* LV-10	(H)	1384 (+/- 99)	—
†Stannoram* (decafenit)	(F)	700-800	—
Stimukil* (muscalure)	(P)	2760-3840	10,000
Stirrup*-M	(BIO)	>5000	>2000
Stocktrine* II	(A)	0.5-2.0	—
Storm* (flocoumafen)	(ROD)	0.25	3
streptomycin	(B)	9000	—
Strobane*	(I)	220	—
Suffix* (benzoylprop-ethyl)	(H)	1000	>1555
Suffix* BW (flamprop-m-isopropyl)	(H)	>4000	—
sulfaquinoxaline	(ROD)	1370-1600	—
sulfometuron methyl	(H)	>5000	—
†sulfoxide	(SYN)	2000-2500	—
Sumi-Alpha* (esfenvalerate)	(I)	325	>5000
Sumiherb* (bromobutide)	(H)	>5000	>5000
Sumilex* (procymidone)	(F)	6800	>2500
Sumithrin* (d-phenothrin)	(I)	>10,000	>10,000
Sumitol* (secbumeton)	(H)	1000 (+/- 100)	—
Surecide* (cyanofenphos)	(I)	89	>2000
Surflan* (oryzalin)	(H)	>10,000	—
Surpass* (vernolate)	(H)	1800-1900	—
Sutan+* (butylate)	(H)	3500-5431	>4640
sweep	(H)	4197	—
Systhane* (myclobutanil)	(F)	1600	>5000
2,4,5-T	(H)	500	—
Tachigaren* (hymexazol)	(F)	4678	>10,000(rat)
Tackle* (acifluorfen)	(H)	2025	>2000
Talcord* (permethrin)	(I)	>4000	>2000
Tomacn*	(PGR)	1130(mouse)	—
†Tantizon* (isomethiozin)	(H)	>10,000	>1000
Target* MSMA	(H)	2833	—
TCA	(H)	5000	—
TDE	(F)	3400	—
tebuconazole	(F)	4000	>5000
tebupiriphos	(I)	1.8-3.6	9.4-31
tebuthiuron	(H)	644	—
tecloftalam	(B)	2340	>1500
teftubenzuron	(I)	>5000	>2000
Telone* II (dichloropropene)	(F)	224	333
temephos	(I)	4204	2000

Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)
Temik* 15G (aldicarb)	(I)	5(rabbit)	>2000
Tenn-Cop* (copper)	(F)	10-20 g/kg	—
Tenorant* (chloroxuron)	(H)	3700	>10,000
TEPP	(I)	1.2-2	—
terbacil	(H)	5000-7500	—
terbufos (tech)	(I)	4.5	1.1
terbumeton	(H)	433-657	>3170
terbuthylazine	(H)	2000-2160	>3000
terbutryn	(H)	2500	>2000
†Terracur* (thiadiazinthion)	(P/H)	1000	—
Terraneb* SP	(F)	>5000	>5000
tetrachlorvinphos	(I)	>2000	>2500
tetradifon	(I)	>10,000	>10,000
tetramethrin	(I)	>5000	—
thallium sulfate	(ROD)	16	—
Thanite* (isobornyl thiocyanacetate)	(I)	1603	—
thiabendazole	(F)	3100	—
Thimet* 15G (phorate)	(I)	—	99
thiobencarb	(H)	1300	>2000
thiocyclam hydrogen oxalate	(I)	399	1000(rat)
thiometon	(I)	120-130	>1000(rat)
thiophanate	(F)	>15,000	—
thiophanate-methyl	(F)	7500	—
thiram	(F)	1000	>5000
Thistrol* (MCPB)	(H)	680	—
TIBA	(PGR)	813	>10,200
Tillam* (pebulate)	(H)	921-1900	>4640
Tiller* (fenoxaprop-ethyl/MCPA/2,4-D)	(H)	1628	>2000
Tilt* (propiconazole)	(F)	1517	>4000
Tokuthion* (prothiophos)	(I)	1500	>5000
Tolban* (profluralin)	(H)	1808	>10,000
Tomaset* (n-meta-tolylphthalamic acid)	(PGR)	5230	—
Tomilon* (tetrafluoron)	(H)	1265	>2000
Topcide*	(H)	5600	—
Top Cop* Tri-Basic (basic copper sulfate)	(F)	300	—
†Topsin* (thiophanate-methyl)	(F)	>15,000	—
Topsite*	(H)	>5000	>5000
Torak* (dialifor)	(I)	43-53	—
Touchdown* (sulfosate)	(H)	750	>200
toxaphene	(I)	69	—
Tra-Kill*	(H)	3180-3300	—
Transamine* (2,4-D/2,4,5T)	(H)	300-1200	—
Trebon* (etofenprox)	(I)	>42,880	>2100
Tretox 480* (trifluralin)	(H)	3700	—
Trex-San* (2,4-D/dicamba/MCPP)	(H)	1060	—
triazophos	(I)	64(female)	1100
tribonate	(H)	108	—
Tribunil* (methabenzthiazuron)(tech)	(H)	>5000	>5000(rat)
trichlorfon (tech)	(I)	250	>5000(rat)
trichlorobenzoic acid	(H)	1500	—
triclopyr	(H)	630(female)	—
tricyclazole (tech)	(F)	314	—
Tridex*	(H)	603	—
trietazine	(H)	594-841	—
triflumizole	(F)	>1057	>5000
triflunuron	(I)	>5000	>5000
trifluralin	(H)	>10,000	—
triforine	(F)	>2000	>2000
Trimec* (2,4-D/mecoprop/dicamba)	(H)	2380	—
trimethacarb	(I)	125	<2000
Trimidal* (nuarimol)	(I)	1250	—
Tri-Miltex* (mancoze/copper)	(F)	4100	—
Trinatos D* (ametryn/2,4-D)	(H)	375	—
Tri-P.E.* (dimexano)	(H)	340	—
triphenyltin acetate	(F)	140(female)	>2000
triphenyltin hydroxide	(F)	156	1600
Triple Noctin L* (thiram/molybdenum)	(F)	>10 ml/kg	—
Tri-Scept* (imazaquin/trifluralin)	(H)	3161-7908	>2000
Trithion* (carbofenothion)	(I)	6.8-36.9	—
Truban* (ethazol)	(F)	4700	—

A.....	Algicide	H.....	Herbicide	REP...	Repellent
ADJ...	Adjuvant	I.....	Insecticide	ROD...	Rodenticide
B.....	Bactericide	IGR....	Insect Growth	SP.....	Seed Protectant
CS.....	Chemosterilant	Regulator		ST.....	Seed Treatment
DEF...	Defoliant	L.....	Larvicide	SUR...	Surfactant
F.....	Fungicide	M.....	Molluscicide	SYN...	Synergist
FUM..	Fumigant	P.....	Pheromone	WP.....	Wood Preservative
G.....	Germicide	PGR...	Plant Growth		
		Regulator			

* = Trade Name/R/TM † = Discontinued product

Information presented herein is for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by the manufacturer.

ENVIRONMENTAL AND SAFETY

Mammalian Toxicity

Chemical	Action	Oral LD ₅₀ (Rat)	Dermal LD ₅₀ (Rabbit)
Turbo* (metribuzin/metoachlor)	(H)	1876	>2000
†UC 10854	(I)	41	40
unicornazole	(PGR)	2020	>2000
Urbacid*	(F)	1000	—
†Ureabor* 8D	(H)	3500	—
Uribest* (naprounilide)	(H)	15,000	—
Urox* (monuron TCA)	(H)	2300-3700	>1000
Ustilan* (ethidimuron)	(H)	>5000	>5000
validacin	(F)	>20,000	—
vamidothion	(I)	100	—
Vacate 4-EC*	(I)	940	916
†Vacor* (pyriminil)	(ROD)	4.75(Norway rat)	—
		18.0(roof rat)	—
Validacin* (validamycin)	(F)	>20,000	—
Vancide* 51 (ziram)	(F)	3120	—
Vantal* (dimethoate)	(I)	900	>4240
Vegadex* (CDEC)	(H)	850	—
Vendex* (fenbutatin-oxide)	(I)	2631	>2000
Verdict* (haloxyfop-methyl)	(H)	2179	3536
Verdinal* (phenisopham)	(H)	>4000	>1000
vernolate	(H)	1800-1900	—
Veto* (EPN/methyl parathion)	(I)	9-25	—
Vigil* (diclobutrazol)	(F)	4000	—
vinclozolin (tech)	(F)	>10,000	—
Visko-Rhap* (2,4-D/2,4-DP)	(I)	900	—
Voltage* (pyraclofos)	(I)	237	>2000
vondozeb	(F)	>10,000	—
Vorlex* (methyl isothiocyanate)	(FUM)	489	1243
Wallop*	(H)	>5000	>5000
warfarin	(ROD)	3	—
Weedar* Emulsamine* (dodecylamine/ 2,4-D)	(H)	1400	—
Weedmaster* (dicamba/2,4-D)	(H)	>5000	>20,000
Weedtrine-D* (diquat dibromide)	(H)	230	—
Weed-Rhap* A-4D (2,4-D)	(H)	1150	2115
Weed-Rhap* LV-4D (2,4-D)	(H)	1492	2871
Weed-Rhap* LV Ester 6 (2,4-D)	(H)	1492	2871
Wepsyn 155* (triamiphos)	(F/I)	20	1500
WSCP	(ADJ)	3690	—
XL 2G* (benefin/oryzalin)	(H)	3750	—
XMC	(I)	542	—
Yamaclean M*	(H)	914	—
yellow oxide of mercury	(F)	18	—
Yukahope* (clomeprop)	(H)	>5,000	—
Yukamate* (dimepiperate)	(H)	950	—
Yukawide* (benzofenap)	(H)	>15,000	>5000(rat)
†Zardex* (cycloprate)	(I)	12,200	6270
zinc phosphide	(ROD)	45.7	—
zineb	(F)	>5200	>10,000
ziram	(F)	1400	>6000
Zyban*	(F)	10,200	8000

CATEGORIES OF TOXICITY¹ (to birds, fish, bees)

Chemical	Action	Bird	Fish	Bee
abamectin	(I)	—	—	HT
Acarol® (bromopropylate)	(I)	—	—	MT
Acenit®	(H)	—	—	MT
acephate	(I)	MT	PNT	HT
acetochlor	(H)	—	T	MT
aclofen	(H)	ST	MT	MT
Actellic® (pirimiphos-methyl)	(I)	HT	HT	MT
Advantage® (carbosulfan)	(I)	—	—	HT
Afugan® (pyrazophos)	(F)	—	HT	HT
AgriSpon®	(B)	PNT	—	—
Agrox® D-L Plus	(I)	T	T	—
Agrox® 2-Way	(I)	—	T	—
alachlor	(H)	ST	HT	PNT
Alanap® (naptalam acid)	(H)	—	PNT	PNT
aldicarb	(I)	HT	HT	PNT
aldoxycarb	(I)	HT	ST	PNT
aldrin	(I)	VHT	VHT	—
Algimycin PLL-C®	(A)	PNT	PNT	—
d-trans allethrin	(I)	—	HT	—
alloydim sodium	(H)	—	MT	PNT
alpha-cypermethrin	(I)	—	HT	—
Alysystin® (triflumuron)	(I)	ST	PNT	T
Amdro® (hydranmethylnon)	(I)	ST	—	—
ametryn	(H)	—	MT	MT
Amiben® free acid (chloramben)	(H)	ST	PNT	PNT
amitraz	(I)	ST	HT	PNT
amitrole	(H)	PNT	PNT	PNT
anilofos	(H)	MT	—	—
Aniten® (flurenol-butyl)	(H)	—	PNT	—
anthraquinone	(REP)	ST	PNT	PNT
AQ:10® (ampelomyces quisqualis)	(F)	PNT	PNT	—
Aqua-Kleen® (2,4-D butoxyethyl ester)	(H)	—	PNT	PNT
Argold®	(H)	—	MT	MT
Asana® XL	(H)	—	HT	HT
Assert® (imazamethabenz-methyl)	(H)	—	PNT	MT
asulam	(H)	—	PNT	PNT
atrazine (tech)	(H)	ST	ST	PNT
Avenge® (difenzoquat metilsulfate)	(H)	PNT	—	—
azamethiphos	(I)	HT	HT	PNT
azinphos-ethyl	(I)	HT	VHT	HT
azinphos-methyl	(I)	HT	VHT	T
Bacillus thuringiensis	(I)	PNT	PNT	PNT
Banvel® (dicamba)	(H)	HT	ST	PNT
BAP	(PGR)	—	T	T
BAS 518 (quinmerac)	(H)	PNT	ST	PNT
Basagran® (bentazon)	(H)	—	PNT	PNT
Baycor® (bitertanol)	(F)	PNT	MT	PNT
Bayleton® (triadimefon)(tech)	(F)	PNT	ST	PNT
Bayluscid® (niclosamide)	(I)	—	HT	—
Baytan® (triadimenol)	(F)	PNT	ST	PNT
Baythion®	(I)	HT	ST	—
Baythroid® (cyfluthrin)	(I)	PNT	HT	MT
†Benchmark® (flurtamone)	(H)	PNT	MT	—
benodanil	(F)	—	—	PNT
benomyl	(F)	MT	MT	PNT
bensulide	(H)	—	MT	—
beta-cyfluthrin	(I)	PNT	ST	HT
bentazone	(H)	—	PNT	PNT
benzofenap	(H)	—	MT	—
bifenox	(H)	PNT	HT	—
bifenthrin	(I)	PNT	HT	HT
Bio-Sect®	(I)	PNT	PNT	PNT
Bitrex®	(REP)	—	PNT	—
Bladafum® (sulfotepp)	(I)	—	MT	—
Blazer® (acifluorfen)	(H)	PNT	ST	—
Bolstar® (sulprofos)	(I)	MT	ST	—
BPMC	(I)	—	ST	—
bromacil	(H)	—	ST	PNT
bromadiolone	(ROD)	—	HT	PNT
bromophos	(I)	—	HT	—
bromophos-ethyl	(I)	—	T	T
bromoxynil	(H)	—	HT	PNT
Buller®	(H)	—	HT	—
buminafos	(H)	—	—	PNT
Butisan® (metazachlor)	(H)	PNT	MT	PNT

Chemical	Action	Bird	Fish	Bee
butocarboxin	(I)	—	PNT	—
Butoxone® (2,4-DB)	(H)	—	MT	PNT
Butoxone Ester® (2,4-DB)	(H)	—	MT	PNT
butylate	(H)	—	MT	PNT
Butyrac® (2,4-DB)	(H)	—	MT	PNT
calcium arsenate	(I)	MT	ST	—
Calixin® (tridemorph)	(F)	ST	MT	PNT
captan	(F)	—	HT	PNT
captan	(F)	ST	HT	PNT
Carbamult® (promecarb)	(I)	—	HT(blue-gill)	HT
carbaryl	(I)	ST	MT	HT
carbendazim	(F)	PNT	—	PNT
carbetamide	(H)	—	—	PNT
carbofuran	(I)	MT	—	—
carbon tetrachloride	(FUM)	PNT	—	—
carboxin	(F)	PNT	—	PNT
Carzol® (formetanate hydrochloride)	(I)	HT	—	MT
Cascade®	(I)	ST	ST	MT
chinosol	(F)	PNT	PNT	PNT
Chipco® Florel® Pro	(PGR)	—	ST	PNT
chloranil	(F)	—	—	PNT
chlordan	(I)	—	HT	—
chlordimeform	(I)	—	—	PNT
chlorfenvinphos	(I)	—	HT	T
chlorfuretol	(H/PGR)	—	—	PNT
chlormephos	(I)	MT	HT	HT
chlormequat chloride	(B)	ST	—	PNT
chlorobenzilate	(I)	—	—	PNT
chloroneb	(F)	PNT	—	—
chlorophacinone	(ROD)	—	—	PNT
chloropicrin	(FUM)	—	HT	PNT
chlorothalonil	(F)	—	HT	PNT
chlorotoluron	(H)	ST	—	PNT
chlorpropham	(H)	PNT	MT	PNT
chlorpyrifos	(I)	HT	HT	HT
cholecalciferol	(ROD)	ST	—	—
Citowett®	(ADJ)	—	HT	—
Clarity®	(H)	—	PNT	—
Classic®	(H)	PNT	—	—
clofentezine	(I)	—	—	PNT
clomeprop	(H)	—	MT	—
CNP	(H)	—	ST	—
COC® (copper oxychloride)	(F)	—	T	—
Compete® (fluoroglycofen)	(H)	PNT	MT	PNT
Conдор® G (Bt)	(I)	PNT	PNT	—

PNT ... Practically Non Toxic	MT Moderately Toxic	HT Highly Toxic
ST Slightly Toxic	T Toxic	VHT ... Very Highly Toxic

A Algicide	H Herbicide	REP ... Repellent
ADJ Adjuvant	I Insecticide	ROD ... Rodenticide
B Bactericide	I GR Insect Growth Regulator	SP Seed Protectant
CS Chemosterilant	L Larvicide	ST Seed Treatment
DEF ... Defoliant	M Molluscicide	SUR ... Surfactant
F Fungicide	P Pheromone	SYN ... Synergist
FUM ... Fumigant	PGR ... Plant Growth Regulator	WP ... Wood Preservative
G Germicide		

* = Trade Name/R/TM † = Discontinued product

Bird: Acute Oral (mg/kg)	Bird: Dermal (ppm)	Fish (ppm)
PNT >2000	PNT >5000	PNT >100
ST 501-2000	ST 1001-5000	ST 10-100
MT 51-500	MT 501-1000	MT 1-10
HT 10-50	HT 50-500	HT 0.1-1
VHT <10	VHT ... <50	VHT <0.1

Bee:
 HT: Kills on contact during application and for one or more days after.
 MT: Kills bees if applied over them. Can be used with limited danger to bees if not applied over bees in the field or hives. Correct dosage, timing, and method of application are essential.
 PNT: Relatively nontoxic. Can be used with few precautions with minimum injury to bees.

¹ Data as reported to the 1995 Pesticide Dictionary. Except as noted, the figures are for acute oral doses (rat) and acute dermal doses (rabbit). Information presented herein is for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by the manufacturer.

Chemical	Action	Bird	Fish	Bee	Chemical	Action	Bird	Fish	Bee
Copac*	(B)	—	HT	PNT	ethephon	(PGR)	ST	HT	PNT
copper oxide	(F)	—	HT	PNT	ethion (tech)	(I)	ST	HT	HT
copper oxychloride	(F)	—	—	PNT	ethirimol	(F)	PNT(hen)	—	PNT
Copper Sandoz*	(F)	—	ST	—	ethofumesate	(H)	—	—	PNT
copper sulfate	(F)	—	MT	HT	ethoprop	(I)	HT	HT	—
Croneton*	(I)	MT	ST	—	ethylene oxide	(FUM)	—	—	PNT
crotoxyphos	(H/I)	—	MT	MT	etridiazole	(F)	ST	MT	—
cryolite	(I)	PNT	ST	PNT	Euparen* (dichlofluanid)	(F)	PNT	VHT	PNT
cyanazine	(H)	—	—	PNT	Euparen M* (tolylfluanid)	(F)	PNT	VHT	PNT
cycloate	(H)	—	—	PNT	Express* (tribenuron methyl)	(H)	PNT	—	—
cyclosal	(I)	PNT	MT	—	Facet* (quinclorac)	(H)	PNT	PNT	PNT
cyhexatin	(I)	PNT	—	PNT	Faneron* (WP)	(H)	—	—	PNT
cymoxanil	(F)	PNT	PNT	—	Far-Go* (triallate)	(H)	PNT	MT	—
cypermethrin	(I)	—	MT	HT	Fastac* (alphacypermethrin)	(I)	ST	ST	MT
cyproconazole	(F)	ST-MT	ST	PNT	fatty acids, pesticidal	(I)	PNT	PNT	PNT
cyromazine	(IGR)	—	PNT	—	fenbutatin-oxide	(I)	PNT	VHT	—
Cyrolane* (mephosfolan)	(I)	—	HT	HT	fenfuram	(F)	—	ST	PNT
2,4-D	(H)	HT	PNT	HT	fenitrothion	(I)	MT	MT	HT
Dacthal* (DCPA)	(H)	ST	PNT	MT	fenoxaprop-ethyl	(H)	PNT	HT	—
dalapon	(H)	ST	PNT	PNT	fenpiclonil	(F)	PNT	T	PNT
daminozide	(PGR)	PNT	PNT	PNT	fenpropathrin	(I)	ST	MT	HT
Dasanit* (fensulfothion)	(I)	HT	HT	HT	fenpropidin (tech)	(F)	ST	T	PNT
dazomet	(F)	MT	HT	PNT	fenpropimorph	(F)	PNT	—	PNT
2,4-DB	(H)	—	ST	PNT	fenthion	(I)	HT	HT	T
DCNA	(F)	ST	—	PNT	fenuron	(H)	—	ST	PNT
DDT	(I)	—	HT	—	fenvalerate (DMSO)	(I)	PNT	HT	HT
DDVP	(I)	—	ST	HT	ferbam	(F)	—	MT	PNT
Decis* (deltamethrin)	(I)	—	—	HT	fluidoxnonil	(F)	PNT	T	PNT
DEF* (tribufos)	(DEF)	HT	ST	PNT	tau-fluvalinate	(I)	—	HT	MT
desmedipham	(H)	PNT	MT	PNT	Focus* (cycloxydim)	(H)	ST	—	PNT
Devrinol* (napropamide)	(H)	ST	—	PNT	Folex* 6EC (tribufos)	(DEF)	—	HT	—
diazinon	(I)	HT	HT	HT	Foimats* (omethoate)	(I)	MT	MT	T
dicamba	(H)	—	—	PNT	folper	(F)	ST	HT	PNT
dichlobenil	(H)	ST	—	PNT	Fongarid* (furalaxyl)	(F)	—	ST	PNT
dichlofenthiol (form)	(I)	—	HT	PNT	Force* (tefluthrin)	(I)	—	HT	—
dichloralurea	(H)	—	ST	—	Fore*	(F)	PNT	ST	—
dichlorprop	(H)	MT	ST	PNT	Fortress*	(I)	HT	HT	—
dichlorprop-P	(H)	MT	—	PNT	fosamine ammonium	(PGR)	ST	PNT	PNT
diclomezine	(F)	PNT	ST	—	Frigate* Lo-Dose	(ADJ)	—	HT	—
dicofol	(I)	MT	HT	PNT	Frontier*	(H)	—	MT	—
dicrotophos	(I)	—	—	HT	fuberidazol	(F)	ST	MT	PNT
dieldrin	(I)	—	VHT	T	Fury* (zeta-cypermethrin)	(I)	—	HT	HT
dienochlor	(I)	—	HT	PNT	Fusarex* (tecnazene)	(FPGR)	—	—	PNT
difenoconazole (tech)	(F)	PNT	T	PNT	gibberellic acid	(PGR)	—	—	PNT
diflubenzuron	(I)	PNT	—	PNT	glyodin	(F)	—	—	PNT
dikegulac sodium	(PGR)	PNT	PNT	PNT	glyphosate	(H)	—	PNT	PNT
Dimension* (dithiopyr)	(H)	PNT	PNT	—	Goal* (oxyfluorfen)	(H)	PNT	HT	PNT
dimethoate	(I)	HT	—	HT	Goltix* (methamitron)	(H)	ST	—	PNT
dimethomorph	(F)	—	PNT	—	Granol* N-M	(F)	T	T	—
diniconazole	(F)	—	—	PNT	Granox* P-F-M	(F)	T	T	—
dinobuton	(F)	HT	HT	HT	Granox* Plus	(F)	T	T	—
dinocap	(F/I)	—	HT	PNT	guazatine	(F)	—	—	PNT
dinoseb	(H)	HT	HT	HT	Hataclean* (trichlamide)	(F)	PNT	MT	PNT
dinoterb salts	(H)	—	T	T	heptachlor	(I)	—	—	HT
diphenamid	(H)	ST	ST	ST	heptenophos	(I)	—	T	T
diphenylamine	(F)	—	HT	—	Herbisan* 5 (EXD)	(H)	—	—	PNT
diquat	(H)	—	—	PNT	Hercon* Vaportape II	(I)	HT	HT	—
disulfoton	(I)	HT	MT	MT	hexachlorophene	(F)	ST	—	—
Disyston S* (oxysulfoton)	(I)	HT	MT	HT	Hinochloa* (mefenacet)	(H)	PNT	MT	—
dithianon	(F)	—	—	PNT	Hoelon* 3EC	(H)	PNT	HT	PNT
diuron	(H)	PNT	ST	PNT	Honcho*	(H)	—	PNT	—
DNOC	(I)	—	ST	HT	Hostaquick* (heptenophos)	(I)	—	T	T
dodemorph acetate (E.C.)	(F)	—	—	PNT	Hostathion* (triazophos)	(I)	—	T	T
dodine	(F)	ST	HT	PNT	Hybrex*	(PGR)	—	PNT	—
Dormex* (hydrogen cyanamide)	(PGR)	—	PNT	—	hydramethylnon	(I)	ST	—	—
draxoxolon	(F)	HT	T	—	imazalil	(F)	—	—	PNT
Dustret A*	(F)	—	HT	—	imidacloprid	(I)	MT	PNT	MT
Dyfonate* (fonofos)	(I)	HT	HT	HT	indole-3-butyric acid	(PGR)	—	—	PNT
Dyrene* (anilazine)	(F)	PNT	HT	PNT	ioxynil	(H)	—	MT	ST
Echo* (chlorothalonil)	(F)	—	HT	—	IPC	(H)	PNT	ST	—
edifenphos	(F)	ST(quail)	HT	PNT	iprodione	(F)	—	MT	PNT
Ekamer*	(I)	—	—	HT	isazofos	(I)	MT	—	—
Elocron* (dioxacarb)	(I)	ST	—	—	isofenphos	(I)	VHT	MT	—
endosulfan	(I)	HT	HT	MT	isoproturon	(H)	—	ST	PNT
endothall	(H)	—	HT	PNT	Kayabest* (methasulfocarb)	(F)	—	HT	—
endrin	(I)	—	—	MT	Kayaphos* (propaphos)	(I)	HT	MT	—
EPN	(I)	HT	—	—	Kerb* (pronamide)	(H)	PNT	PNT	PNT
EPTC	(H)	—	T	PNT	K-Tea*	(A)	—	T	—

Chemical	Action	Bird	Fish	Bee
lambda-cyhalothrin	(I)	ST	HT	—
†Lance* (cloethocarb)	(I)	—	HT	HT
Larvin* (thiodicarb)	(I)	HT	HT	MT
lenacil	(H)	—	ST	PNT
Lesan* (fenaminosulf)	(F)	—	—	PNT
Limit*	(PGR)	PNT	ST	PNT
lindane	(I)	MT	MT	HT
linuron	(H)	—	MT	PNT
malathion	(I)	MT	HT	HT
Maloran* (chlorbromuron)	(H)	—	ST	PNT
mancozeb	(F)	—	MT	MT
maneb	(F)	ST	HT	PNT
manoc	(F)	—	MT	PNT
Margosan* O	(F)	—	—	PNT
Mataven* (flamprop-methyl)	(H)	ST	ST	ST
MCPA	(H)	MT	PNT	PNT
MCPB	(H)	—	ST	PNT
mecoprop	(H)	ST	PNT	PNT
mecoprop-P	(H)	PNT	PNT	PNT
MEMC	(F)	—	—	PNT
Mesoranil*	(H)	—	ST	—
metalaxyl	(F)	—	PNT	PNT
metalddehyde	(M)	HT	PNT	PNT
metam-sodium	(F)	MT	HT	PNT
Metasystox (i)* (demeton-S-methyl)	(I)	HT	PNT	T
methamidophos	(I)	HT	ST	T
methidathion	(I)	—	—	HT
methiocarb	(I)	VHT	MT	PNT
methomyl	(I)	—	T	T
methoprene	(I)	—	MT	—
methoxychlor	(I)	—	PNT	PNT
methyl bromide	(FUM)	—	—	PNT
metiram	(F)	ST	MT	PNT
metobromuron	(H)	ST	PNT	PNT
metolachlor	(H)	PNT	—	PNT
metoxuron	(H)	—	ST	PNT
metribuzin	(H)	MT	ST	PNT
mevinphos (tech)	(I)	HT	ST	HT
mexacarbate	(I)	—	—	HT
Milcurb* (dimethirimol)	(F)	—	—	PNT
MIPC (isoprocarb)	(I)	—	ST	—
Mocap* (ethoprop)	(I)	HT	HT	—
molinat	(H)	—	MT	—
Monceren (pencycuron)	(F)	ST	—	—
monocrotophos	(I)	HT	MT	HT
monolinuron	(H)	—	PNT	PNT
monuron	(H)	—	PNT	PNT
Morestan* (oxythioquinox)	(I)	MT	—	PNT
MSMA	(H)	—	PNT	PNT
nabam	(F)	—	—	PNT
naled	(I)	MT	HT	HT
napropamide	(H)	—	ST	PNT
1-naphthaleneacetic acid	(PGR)	—	—	PNT
naptalam (acid)	(H)	—	PNT	PNT
NaTA	(H)	—	PNT	PNT
neburon	(H)	—	—	MT
Nemacur* (fenamiphos)	(I)	HT	HT	PNT
Nevifos* (fosmethilan)	(I)	—	—	PNT
Neviol*	(PGR)	—	PNT	PNT
nicosulfuron	(H)	PNT	PNT	—
nicotine	(I)	—	—	PNT
Nimrod* (bupirimate)	(F)	—	—	PNT
nitrapyrin	(F)	—	—	PNT
nitrofen	(H)	—	HT	PNT
nitrothal-isopropyl	(F)	PNT	—	PNT
NONIT*	(ADJ)	—	MT	MT
norflurazon	(H)	ST	PNT	PNT
Norton* (ethofumesate)	(H)	—	—	PNT
Nucop* (copper oxychloride)	(F)	—	T	—
Nuvanol* N (iodofenphos)	(I)	—	T	T
Oncol* (benfuracarb)	(I)	PNT	HT	—
OPUS* (epoxiconazole)	(F)	PNT	MT	PNT
Ovex*	(H)	—	MT	PNT
oxadiazon	(H)	—	HT	HT
oxadixyl	(F)	—	PNT	—
oxamyl	(I)	—	T	T
oxycarboxin	(F)	—	—	PNT
oxydemeton-methyl	(I)	MT(quail)	ST	T

Chemical	Action	Bird	Fish	Bee
Paarlan* (isopropalin)	(H)	—	—	PNT
paraquat	(H)	MT	ST	PNT
parathion	(I)	HT	HT	HT
Pay-Off* (flucythrinate)	(I)	—	—	HT
PCNB	(F)	PNT	HT	PNT
pencycuron	(F)	PNT	PNT	PNT
Penncap-M*	(I)	HT	HT	HT
permethrin	(I)	PNT	HT	HT
Peropal* (azocyclotin)	(I)	MT	VHT	PNT
phencapton	(I)	—	—	PNT
phenmedipham	(H)	PNT	—	PNT
phenothate	(I)	—	MT	T
phorate	(I)	VHT	ST	MT
phosalone	(I)	—	HT	PNT
phosmet	(I)	ST	HT	HT
phosphamidon	(I)	HT	MT	HT
pictoram	(SYN)	—	ST	PNT
piperonyl butoxide	(SYN)	—	PNT	PNT
pirimiphos-methyl	(I)	HT	T	T
Pirimor* (pirimicarb)	(I)	—	PNT	PNT
Pix* (mepiquat chloride)	(PGR)	PNT	PNT	PNT
Planavin* (nitralin)	(H)	—	—	PNT
Plant Pin* (butoxycarboxim)	(I)	—	PNT	—
PMA	(F/H)	—	—	PNT
Poast* (sethoxydim)	(H)	ST	ST	MT
Polado*	(PGR)	—	PNT	—
polynactins complex	(I)	—	—	PNT
Pondmaster* (glyphosate)	(H)	—	PNT	PNT
Potablan* (monalide)	(H)	—	—	PNT
Pramitol* (prometon)	(H)	—	—	PNT
Preforan* (fluorodifen)	(H)	—	—	PNT
Previcur* (prothiocarb)	(F)	—	—	PNT
Probe* (methazole)	(H)	—	—	PNT
prochloraz	(F)	—	—	PNT
procymidone	(F)	—	MT	—
prometryn	(H)	—	HT	PNT
propachlor	(H)	—	HT	PNT
propamocarb hydrochloride	(F)	—	—	PNT
propanil	(H)	ST	MT	—
propargite	(I)	ST	HT	PNT
propazine	(H)	—	—	PNT
Propel*	(PGR)	PNT	PNT	—
propetamphos	(I)	—	MT	—
propham	(H)	PNT	ST	—
propiconazole	(F)	PNT	PNT	—
propineb	(F)	PNT	—	PNT
Proponit* (propisochlor)	(H)	PNT	MT	PNT
propoxur	(I)	PNT	ST	T
Prowl*	(H)	—	HT	PNT
Pynamin* (allethrin)	(I)	—	—	MT
Pyramin* (chloridazon)	(H)	PNT	PNT	PNT
pyrazolate	(H)	—	ST	—
Pyrellin* E.C.	(I)	—	HT	—
pyridate	(H)	ST	PNT	PNT
pyroquilon	(F)	—	ST	PNT
quinalphos	(I)	—	—	HT
quizalofop-ethyl	(H)	PNT	HT	PNT
Racumin* (coumatetralyl)	(ROD)	—	ST	—
RAK* 1 Plus	(P)	—	PNT	PNT
RAK* 2	(P)	—	PNT	PNT
RAK* 5	(P)	—	PNT	PNT
†Raticate* (norbormide)	(ROD)	—	PNT	—

PNT ... Practically Non Toxic	MT Moderately Toxic	HT Highly Toxic
ST Slightly Toxic	T Toxic	VHT ... Very Highly Toxic
A Algicide	H Herbicide	REP ... Repellent
ADJ ... Adjuvant	I Insecticide	ROD ... Rodenticide
B Bactericide	IGR..... Insect Growth Regulator	SP Seed Protectant
CS Chemosterilant	L Larvicide	ST Seed Treatment
DEF ... Defoliant	M Molluscicide	SUR ... Surfactant
F Fungicide	P Pheromone	SYN ... Synergist
FUM ... Fumigant	PGR.... Plant Growth Regulator	WP Wood Preservative
G Germicide		

* = Trade Name/R/TM †=Discontinued product
For definition of toxicity levels, see chart on page E20.

Information presented herein is for preliminary planning only. Exclusive reliance must be placed on information/directions supplied by the manufacturer.

Chemical	Action	Bird	Fish	Bee
Raven* (Bt)	(I)	PNT	PNT	—
refined petroleum distillate	(I)	—	HT	—
resmethrin	(I)	—	HT	HT
Ridomil*	(F)	—	PNT	PNT
Ro-Neet* (cycloate)	(H)	—	MT	PNT
rotenone	(I)	ST	HT	PNT
Rubigan* (fenarimol)	(F)	—	—	PNT
Rugby* (cadusofos)	(I)	HT	HT	—
Scout X-TRA*	(I)	—	HT	HT
Select*	(H)	—	PNT	PNT
Semeron* (desmetryn)	(H)	—	PNT	PNT
Seritard*	(PGR)	—	ST	—
sethoxydim	(H)	ST	ST	PNT
simazine	(H)	PNT	PNT	PNT
sodium arsenite	(F/H/I)	HT	HT	—
Sonalan* (ethylfluralin)	(H)	—	—	PNT
Sonar* (fluridone)	(H)	PNT	—	—
Suffix* BW	(H)	PNT	—	PNT
sulfur	(F)	—	PNT	PNT
Sumiherb* (bromobutide)	(H)	—	MT	—
Sumilex* (procymidone)	(F)	—	MT	PNT
Sumithrin* (d-phenothrin)	(I)	—	—	HT
Surecide* (cyanofenphos)	(I)	—	HT	—
Surflan* (oryzalin)	(H)	ST	—	PNT
Sutan+* (butylate)	(H)	ST	HT	PNT
Sylgard* 309 Silicone Surfactant	(SUR)	—	T	—
†Systox* (demeton)	(I)	—	MT	HT
2,4,5-T	(H)	—	—	PNT
Tachigaren* (hymexazol)	(F)	PNT	—	—
TCA	(H)	—	PNT	PNT
tebuconazole	(F)	ST	MT	PNT
tebupirimphos	(I)	HT	MT	—
tebuthiuron	(H)	—	PNT	—
teflubenzuron	(I)	—	ST	—
temephos	(L)	—	ST	—
Tenoran* (chloroxuron)	(H)	ST	PNT	PNT
terbacil	(H)	—	PNT	PNT
terbumeton	(H)	—	PNT	PNT
terbutryn	(H)	PNT	HT	PNT
tetrachlorvinphos	(I)	—	—	HT
tetradifon	(I)	ST	—	PNT
tetramethrin	(I)	—	HT	HT
thiabendazole	(F)	—	ST	PNT
thiocyclam hydrogen oxalate	(I)	—	MT	MT
thiofanox	(I)	—	ST	PNT
thiometon	(I)	—	—	HT
thiophanate-methyl	(F)	PNT	HT	PNT
thiram	(F)	ST	HT	PNT
Thistrol*	(H)	—	ST	PNT
Tillam* (pebulate)	(H)	—	MT	MT
Tilt* (propiconazole)	(F)	PNT	PNT	—
Tokuthion* (prothiophos)	(I)	—	HT	—
Tolban* (profluralin)	(H)	—	—	PNT
Touchdown* (sulfosate)	(H)	ST	PNT	MT
Trebon* (etofenprox)	(I)	ST	MT	—
Tribunil* (methabenzthiazuron)	(H)	—	ST	PNT
trichlorfon	(I)	HT	HT	HT
tricylopyr	(H)	—	—	PNT
trietazine	(H)	MT	MT	PNT
triflumizole	(F)	—	HT	—
trifluralin	(H)	PNT	MT	PNT
triforine	(F)	—	PNT	MT
Trimidal* (nuarimol)	(I)	—	—	PNT
triphenyltin hydroxide	(F)	—	—	PNT
Triumph* (isazofos)	(I)	HT	—	—
Uribest* (naproanilide)	(H)	—	HT	—
Ustilan* (ethidimuron)	(H)	ST	—	PNT
validacin	(F)	—	MT	PNT
vamidothion	(I)	—	ST	PNT
Verdict* (haloxyfop-methyl)	(I)	ST	ST	—
vernolate	(H)	PNT	PNT	PNT
Vigil*	(F)	—	HT	—
vinclozolin	(F)	PNT	ST	PNT
Vorlex*	(FUM)	—	HT	PNT
warfarin	(ROD)	—	—	PNT
XMC	(I)	—	ST	—
zineb	(F)	ST	HT	PNT
ziram	(F)	—	MT	PNT

Worker Protection Standard Is Law

As of January 1, 1995, ag employers must be in compliance with all provisions of EPA's Worker Protection Standard.

In August 1992, the Environmental Protection Agency (EPA) revised its Worker Protection Standard (WPS) that protects agricultural workers from pesticide exposure. Originally due to take effect on April 15, 1994, many of the standard's provisions were delayed until January 1, 1995, to allow more time for the ag community to learn about WPS and prepare for implementation. These new regulations apply to "agricultural workers" and "pesticide handlers."

Most pesticide uses involved in the production of agricultural plants on a farm, nursery, forest, or greenhouse are covered by the WPS. If you are using a pesticide product with labeling that refers to the Worker Protection Standard, you must comply with the WPS.

Owners and immediate family who work on the farm are exempt from most regulations under the WPS (see checklist on page E 27). But they must comply with requirements for personal protective equipment and restricted-entry intervals.

Cut-rose Workers Given Exception

EPA has issued a 2-year exception for cut-rose workers in following WPS early-entry restrictions, but only with the following conditions:

- Treated area may be entered only 4 or more hours after application;
- Protective clothing and equipment must be worn, and proper training on use of this equipment must be given;
- Label and exception information must be made available to workers;
- Measures must be taken to mitigate heat stress;
- Soap, clean towels, and water must be provided to workers for washing; and
- Workers are limited to 3 hours of early entry per 24 hours.

Exceptions are being sought for other cut-flower workers as well as irrigation workers and crop advisors, but as of this writing no other exceptions have been included in WPS.

PROTECTIONS FOR WORKERS

For growers who employ agricultural workers — those who perform tasks related to the cultivation and harvesting of plants on farms or in greenhouses, but who aren't involved in actual pesticide handling or application — the following rules apply:

Information

In a central location at the growing area, the following must be displayed:

- A WPS safety poster (available from EPA or WPS material suppliers) explaining that WPS exists and offering tips on how workers can protect themselves from pesticides' harmful effects;
- Name, address, and phone number of nearest emergency medical facility;
- Information about each pesticide application from before it begins until 30 days after the restricted-entry interval (REI). NOTE: An REI is the time following an application when entry into the treated area is prohibited, except in very few cases. REIs are found on pesticide labels either under the heading "Agricultural Use Requirements" in the Directions for Use section or next to the crop or application method to which they apply. (See "Read The Label" on page E 25 and "Understanding Restricted-Entry Interval Requirements" on page E 29.)

The posted information must include the pesticide's name, EPA registration number, active ingredient, location and description of treated area, time and date of application, and REI.

Growers must tell workers where this information is posted, allow them access, keep the information updated, and keep it legible. The information must be posted until at least 30 days after the REI expires.

Oral and Posted Warnings

Workers must be orally warned about applications or posted warnings must be placed at entrances to treated areas according to the labeling requirements. Both oral and posted warnings should be used if the labeling requires. If not, workers should be informed which method, oral or posting, is used.

If oral warnings are issued (this need only be done for any workers who will pass within 1/4 mile of affected area), the following must be provided:

- Location and description of treated area;
- REI information, including a warning not to enter during REI.

ENVIRONMENTAL AND SAFETY

Affected workers who begin their shifts after application starts must receive the same warnings at the beginning of their shifts.

If 14-inch-by-16-inch, WPS-designed signs are being posted (EPA's compliance manual describes them), they must be placed at all entrances to treated areas including access roads, adjacent labor camp borders, and established walking routes. If no usual entrance points exist, signs must be posted in corners of treated areas or easily seen places. The warning signs should be posted just before application, left up during REI, and removed before workers enter and within 3 days of REI ending.

Training

Workers must be trained in pesticide safety. This must take place before they enter areas where REIs have been in effect within the last 30 days. They must be retrained every 5 years thereafter. Workers must be trained before accumulating 15 days of fieldwork. (EPA is proposing to cut the 15-day pretraining period or eliminate it, but as of this writing no decision has been made.)

Persons eligible to conduct this training include:

- Pesticide applicators in any level of certification;
- Graduates of state or federal "train the trainer" programs; and
- Those trained (according to EPA guidelines) as pesticide handlers who work under supervision of pesticide applicators.

To verify that workers have been trained, EPA has developed a voluntary program adopted by 37 states and Puerto Rico. Trainers use EPA-developed

or EPA-approved training materials, issue plastic training verification cards, and keep rosters of those trained. Trainers issue plastic cards to workers, verifying they have been trained. Even though WPS does not require it, growers who train workers themselves should keep training logs specifying who was trained and when.

Decontamination Sites

Growers must provide decontamination sites for workers in pesticide-treated areas who are performing tasks involving contact with anything which may contain pesticides, be it soil, water, or plant surfaces. These sites must be provided until 30 days after the REI ends or, if no REI was in effect, 30 days after the end of application.

The decontamination sites must be located within 1/4 of a mile of the work area but must not be in treated areas or areas under REIs.

The sites must contain enough water for routine and emergency whole-body washing and eye flushing, and plenty of soap and single-use towels.

Emergencies

If a worker is poisoned or injured by pesticides, growers must arrange immediate transport to an appropriate medical facility. The victim and medical personnel should be supplied with the following:

- Product name;
- EPA registration number;
- Active ingredient;
- Medical information from label;

(If you do not understand the label, find someone to explain it to you in detail.)

May Be Fatal If Swallowed • Harmful If Absorbed Through Skin • Causes Substantial But Temporary Eye Injury • Causes Skin Irritation • Lethal • May Cause Skin Sensitization Reactions In Certain Individuals • Avoid breathing vapor or spray mist. Do not get in eyes, on skin, or on clothing.

Personal Protective Equipment (PPE)
Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category G on an EPA chemical resistance category selections chart.

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves such as Barrier Laminate or Viton
- Shoes plus socks

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

First Aid

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. As soon as possible, wash outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

An organophosphate insecticide/fungicide.

If swallowed: Do not induce vomiting. Contact a toxicologist immediately. Call a physician or Poison Control Center immediately.

If in eyes: Flush with plenty of water for at least 15 minutes. Get medical attention.

If on skin: Wash with plenty of soap and water. Get medical attention if irritation persists.

If inhaled: Remove to fresh air if effects occur.

Note to physician: Chlorpyrifos is a...
symptomatically...

Physical or Chemical Hazards
Combustible - Do not use or store near heat or open flame. Do not cut or weld container.

Directions for Use
It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Read all Directions for Use carefully before applying.
Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements
Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and emergency procedures for the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 24 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves such as Barrier Laminate or Viton
- Shoes plus socks

Storage and Disposal
Storage: Store...
Prevent cross...
not s...
ad

Read The Label

The WPS required pesticide manufacturers to include appropriate WPS requirements on new agricultural labels by April 21, 1994. Until October 23, 1995, products with both old and new labels will be available for sale. After that date, however, dealers cannot sell or distribute pesticide products without the WPS label.

New features on WPS labels include:

- Standardized Personal Protective Equipment (PPE) requirements for handlers.
- A statement permitting only protected handlers to be in the area during application, and requiring that the product be applied in a manner that will not result in contact to workers or others.
- An Agricultural Use Requirements box that includes such features as the restrictions on entering areas after

pesticides have been applied and a statement requiring employers to provide their agricultural employees with all WPS protections.

- Description of how it was used; and
- Information about victim's exposure.

HANDLERS/APPLICATORS

Any agricultural grower or dealer employing pesticide handlers and applicators — those who mix, load, apply, clean or repair equipment, or act as flaggers, etc. — must comply with the rules for ag workers as well as the following:

Training

Handlers require more extensive training than regular workers and must receive this training before they do any handling tasks.

Information

Before handlers work with any pesticides, they must be informed of all pesticide instructions for safe use. The labeling must be accessible to each handler through the entire handling and application process.

The following information must be displayed at a central location to inform handlers about specific pesticide applications:

- Area treated: location and description;
- Product name;
- EPA registration number;
- Active ingredient (common or chemical name);
- Time of application: month/day/time;
- Restricted-entry interval; and
- Do not enter until: month/day/time;

The grower must ensure that an applicator knows the area

to be treated, whether an REI will be in effect while the applicator is on the farm, and restrictions on entering those areas.

Equipment Safety

Employers must let only properly trained and equipped handlers repair or clean equipment that contains pesticides or residues. Handlers must be told how to use equipment safely.

Personal Protective Equipment

Pesticide labeling lists what personal protective equipment (PPE) must be worn by handlers coming in contact with the pesticides. This equipment includes coveralls, gloves, goggles, and respirators. (See box below for PPE definitions.)

Handlers must be supplied with PPE as required on the label. Handler employers must make sure PPE is:

- Clean and in operating condition;
- Worn and used correctly;
- Inspected each day before use; and
- Repaired or replaced as needed.

Handlers must be provided with a pesticide-free area for storing personal clothing, putting PPE on, and taking it off. Handlers cannot take PPE home.

PPE must be stored and washed separately from other laundry. If PPE will be reused, it must be cleaned before each day of reuse. If workers are employed to wash PPE, they must be informed of the following:

- PPE may be contaminated;

Continued on page 28

Personal Protective Equipment (PPE) Definitions

Personal protective equipment (PPE) — Apparel and devices worn to protect the body from contact with pesticides or pesticide residues, including:

- Coveralls;
- Chemical-resistant suits, gloves, footwear, aprons, and headgear;
- Protective eyewear; and
- Respirators.

While the following attire is not defined as PPE, the labeling may require pesticide handlers or early-entry workers to wear it for some tasks:

- Long- and short-sleeved shirts;
- Long and short pants;
- Shoes and socks; and
- Other items of regular work clothing.

If such non-PPE attire is required, the employer must make sure that it is worn.

Chemical-resistant — allows no measurable amount of the pesticide being used to move through the material during use.

Waterproof — allows no measurable movement of water (or water-based solutions) through the material during use.

Chemical-resistant suit — a loose-fitting, one- or two-piece, chemical-resistant garment that covers, at a minimum, the entire body except for the head, hands, and feet.

Coverall — a loose-fitting one- or two-piece garment that covers, at a minimum, the entire body except the head, hands, and feet. Coveralls are made of fabric such as cotton or a cotton-polyester blend, and are not chemical-resistant. The pesticide labeling may specify that the coveralls be worn over a layer of clothing. (*Substitution:* A chemical-resistant suit may be worn instead of coveralls and any required inner layer of clothing.)

Chemical-resistant apron — one made of chemical-resistant material, covering the front of the body from mid-chest to the knees. (*Substitution:* If a chemical-resistant suit is worn, no apron is required.)

Gloves — hand coverings of the type listed on the pesticide label. Gloves or glove linings made of leather, cotton, or other absorbent materials *must not be worn* for handling or early-entry activities unless these materials are listed on the pesticide labeling as acceptable for such use. (*Substitution:* Leather gloves may be worn

over chemical-resistant liners for tasks with sharp-thorned plants. After leather gloves have been worn for such work, however, they may be worn *only* with chemical-resistant liners and may not be worn for any other use.

Chemical-resistant footwear — chemical-resistant shoes, boots, or shoe coverings worn over shoes or boots. (*Substitution:* Leather boots may be worn in rough terrain, if chemical-resistant footwear with appropriate durability and tread is unavailable.)

Protective eyewear — goggles, face shield, or safety glasses with front, brow, and temple protection. (*Substitution:* A full-face respirator.)

Chemical-resistant headgear — a chemical-resistant hood or hat with a wide brim.

Respirator — a device that protects the respiratory system, of the type listed on the pesticide label, and appropriate for the pesticide product being used and the activity being performed. (*Substitution:* Respirator with canister approved for pesticides, or with an organic-vapor cartridge equipped with pesticide prefilter.)

Where To Get More Information

If you still have questions regarding compliance with EPA's Worker Protection Standard (WPS), there is information available.

EPA offers *Worker Protection Standard for Agricultural Pesticides: How To Comply — What Employers Need To Know*. The manual, priced at \$8.00 with discounts for larger orders, is available from the Government Printing Office (GPO), Washington, DC 20402, or call 202-512-1800. Mention publication number 055-000-00442-1.

Also available through the GPO are a variety of other WPS items, including:

- WPS Quick Reference poster, Publication Number 055-000-00445-5;
- "Protect Yourself from Pesticides — Guide for Agricultural Workers," including training videos and flipcharts and available in Spanish and other languages; and
- "Protect Yourself from Pesticides — Guide for Pesticide Handlers," offering detailed training information. Gempler's, Inc., which provides a wealth of WPS

compliance materials, including some listed above, offers growers a single, free copy of its *Reference Guide for EPA's Worker Protection Standard*. Gempler's guide contains EPA's above-mentioned manual, technical information on pesticide safety, and a Gempler's compliance product guide. Call 800-382-8473 or FAX 800-551-1128.

The USDA's Economic Research Service has issued a report, "A Summary of the Worker Protection Standard for Agricultural Pesticides." The report is available for \$9 from USDA, EMS-ID, Room 228, 1301 New York Ave. NW, Washington, DC 20005-4788; or call 800-999-6779. Mention report number AIB-680.

USDA is expected to have a manual for training handlers available soon. Call its publication office at 202-720-7507.

For more information about WPS, call the local government agency responsible for pesticides; your regional EPA office; or EPA Headquarters, Occupational Safety Branch (H7506C), Office of Pesticide Programs, EPA, Washington, DC 20460; 703-305-7666. State contacts for WPS questions are listed on page E 28.

Compliance Checklists

Check the following topics under your classification to ensure you are complying with WPS:

Requirements For Agricultural Workers

- ✓ Information at a central location
- ✓ Pesticide safety training
- ✓ Decontamination sites
- ✓ Emergency assistance
- ✓ Restrictions during applications (do not allow workers in area)
- ✓ Special application restrictions in nurseries and greenhouses
- ✓ Restrictions during REIs (and limitations on early entry)
- ✓ Posted and oral application warnings

Requirements For Employed Or Commercial Pesticide Handlers

- ✓ Information at a central location (doesn't apply for commercial handlers)
- ✓ Pesticide safety training
- ✓ Decontamination sites
- ✓ Emergency assistance
- ✓ Restrictions during applications (do not allow pesticide to contact anyone directly or through drift)
- ✓ Monitoring handlers (if handling "skull and crossbones" pesticides anywhere or fumigants in greenhouses)

- ✓ Specific instructions for handlers
- ✓ Equipment safety
- ✓ Personal protective equipment (provide, clean, maintain PPE, and prevent heat illness)
- ✓ Exceptions to PPE (closed systems, enclosed cabs, and open and enclosed cockpits)

Exemptions For Immediate Family Members Of Agricultural Owners

Although agricultural owners are encouraged to give all WPS protections to themselves and their families, the WPS does not require them to provide the following:

- ✓ Information at a central location
- ✓ Pesticide safety training
- ✓ Decontamination sites
- ✓ Emergency assistance
- ✓ Posted and oral application warnings
- ✓ Monitoring handlers
- ✓ Specific handling instructions
- ✓ Equipment safety.
- ✓ PPE care, management
- ✓ Early entry duties (training and instructions, decontamination sites, care and management of PPE)

Continued from page 26

- Exposure to pesticides may have harmful effects;
- How they can protect themselves while handling PPE; and
- How they can clean PPE correctly by applying instructions from PPE manufacturers.

PPE heavily contaminated with undiluted pesticide that has "DANGER" or "WARNING" written on the labeling must be discarded in a manner consistent with federal, state, and local laws.

Respirator Fitting And Maintenance

Handler employers must replace dust/mist filters when the filters become damaged, when the respirator or pesticide label requires, and when breathing becomes difficult. Vapor-removing cartridges or canisters must be replaced when odor, taste, or irritation is noticed or when the respirator or pesticide label requires.

Application In The Field

Handler employers must ensure that sight or voice contact is made at least every 2 hours with anyone handling pesticides labeled with "skull and crossbones."

APPLICATOR RESPONSIBILITIES

Responsibility for directly enforcing REIs — including posting signs and verbally warning workers not to reenter a field for a specified amount of time after an application — falls to the grower. Still, commercial applicators must ensure the owners/operators who hire them know:

- The location and description of the area to be treated;
- The time and date of application;
- The product name, EPA registration number, and active ingredient(s);
- All REIs for products the applicator is applying;
- Whether the product label requires both oral warnings and treated-area posting;
- PPE required for handlers and early-entry PPE required for workers; and
- All other safety requirements on labeling for both workers and other people.

Applicators must ensure a pesticide does not contact, directly or through drift, anyone other than trained and PPE-equipped handlers. ■

State Contacts For WPS Questions

The contact person listed below for each state should be able to help you answer most worker protection questions. This list has been provided by EPA and the Agricultural Retailers Association (ARA).

STATE	AGENCY	CONTACT	PHONE
AK	DEC	Karl Kalb	907-745-3236
AL	Dept. of Ag.	Pal Morgan	205-242-2656
AR	Plant Board	Don Alexander	501-225-3590 (fax)
AZ	Dept. of Ag.	Dan Danielson	602-407-2910
CA	EPA	Tom Hall	916-445-3920
CO	EPA	Ed Stearns	303-293-1745
CT	EPA	Debra Cattucio	203-566-5148
DC	DCRA/EPA	Mark Greenleaf	202-404-1167
DE	Dept. of Ag.	Larry Towle	302-739-4811
FL	Dept. of Ag.	Elizabeth Braxton	904-488-3314
GA	Dept. of Ag.	Hamp Simkins	404-651-7861
HI	Dept. of Ag.	Gerald Kinro	808-973-9401
IA	Dept. of Ag.	Charles Eckerman	515-281-8590
ID	Dept. of Ag.	Fred Rios	208-324-7014
IL	Dept. of Ag.	Thomas Walker	217-785-2427
IN	Purdue Univ.	Joseph Becovitz	317-494-1585
KS	Board of Ag	Sue Ann Funk	913-296-2263
KY	Dept. of Ag.	Ernest Collins	502-564-4696
LA	Dept. of Ag.	Peter Grandi	504-925-3760 (fax)
MA	Dept. of Ag.	Lillian Rivera	617-727-3020 (ext. 130)
MD	Dept. of Ag.	John Bergquist	410-841-5710
ME	Dept. of Ag.	Tammy Gould	207-287-2731
MI	Dept. of Ag.	Katherine Fedder	517-373-1087
MN	Dept. of Ag.	Calvin Blanchard	612-297-2530
MO	Dept. of Ag.	Jim Lea	314-751-5508
		Paul Andre	314-751-9198
MS	MPAC	Tommy McDaniel	601-325-3390
MT	Dept. of Ag.	Steve Baril	406-444-3730
NC	Dept. of Ag.	Kay Glenn	919-733-3556
ND	Dept. of Ag.	Jack Peterson	701-224-2231
NE	Dept. of Ag.	Jamie Green	402-471-2394
	EPA	Lloyd Anderson	402-437-5080
NH	Dept. of Ag.	Murrey McKay	603-271-3550
NJ	EPA	Nancy Santiago	609-530-4146
NM	Dept. of Ag.	Sherry Sanderson	505-646-4837
NV	Dept. of Ag.	Chuck Moses	702-688-1180
NY	DEC	J. Sibbald Moran	518-457-7482
OH	Dept. of Ag.	Robert DeVeney	216-297-6452
OK	Dept. of Ag.	Jerry Sullivan	405-521-3864 (ext. 254)
OR	OSHA	Marilyn Schuster	503-378-3272
PA	Dept. of Ag.	Dave Bingamen	717-787-4843
RI	DEM	E. Lopes-Duguay	401-277-2781
SC	Clemson Univ.	Tammy Lark	803-656-3171
SD	Dept. of Ag.	Brad Berven	605-773-4012
TN	Dept. of Ag.	Karen Roecker	615-360-0795
TX	Dept. of Ag.	Earnest Valle	512-463-7717
UT	Dept. of Ag.	Gary King	801-538-7188
VA	Dept. of Ag.	Don Delorme	804-371-0152
VT	Dept. of Ag.	John Berino	802-828-2431
WA	Dept. of Ag.	Ann Wick	206-902-2051
	DLI	Don Locke	206-956-5426
WI	Dept. of Ag.	Eric Nelson	608-266-9429
WV	Dept. of Ag.	Robert Frame	304-558-2209
WY	EPA	Ed Stearns	303-293-1745

Understanding Restricted-Entry Interval Requirements

EPA's Worker Protection Standard established new REIs for many pesticides. Check revised labels for restricted-entry and protective clothing requirements.

A pesticide's restricted-entry interval (REI) is the time immediately after application when entry into the treated area is limited. Some pesticides have one REI, such as 12 hours, for all crops and uses. Other products have different REIs depending on the crop or method of application. When two or more pesticides are applied at the same time and have different REIs, the longer interval must be followed.

The REI is listed on the pesticide labeling either under the heading "Agricultural Use Requirements" in the "Directions for Use" section of the pesticide labeling, or next to the crop or application method to which it applies (see box on page E 25).

Some pesticide labeling requires a different REI for arid areas. Average rainfalls can be obtained from any nearby weather bureau.

In general, the REI is:

- 48 hours for products in Toxicity Category I (signal word Danger). This is extended to 72 hours if applied outdoors in areas with less than 25 inches of rain per year.
- 24 hours for products in Toxicity Category II (signal word Warning).
- 12 hours for categories III and IV (signal word Caution).

Signal words can be found on the product label. See the box on page E 30 for toxicity categories and their respective signal words.

The chart below lists personal protective equipment (PPE) requirements for different toxicity categories. Remember that there may be exceptions to the requirements. In all cases follow label instructions.

(Continued on next page.)

MINIMUM PPE AND WORK CLOTHING FOR HANDLING ACTIVITIES

Route of Exposure	Toxicity Category of End-use Product			
	I	II	III	IV
Dermal Toxicity or Skin Irritation ¹	Coveralls worn over long-sleeved shirt and short pants	Coveralls worn over short-sleeved shirt and long pants	Long-sleeved shirt and long pants	Long-sleeved shirt and long pants
	Socks Chemical-resistant footwear	Socks Chemical-resistant footwear	Socks Shoes	Socks Shoes
	Chemical-resistant gloves ²	Chemical-resistant gloves ²	Chemical-resistant gloves ²	No minimum ⁴
Inhalation Toxicity	Respiratory protection device ³	Respiratory protection device ³	No minimum ⁴	No minimum ⁴
Eye Irritation Potential	Protective eyewear	Protective eyewear	No minimum ⁴	No minimum ⁴

¹ If dermal toxicity and skin irritation potential are in different toxicity categories, protection shall be based on the more toxic (lower numbered) category.
² For labeling language for chemical-resistant gloves, see WPS.
³ For labeling language for respiratory protection device, see WPS.
⁴ Although no minimum PPE is required by the WPS for this toxicity category and route of exposure, EPA may require PPE on a product-specific basis.

Understanding Restricted-Entry Interval Requirements (continued)

TOXICITY CATEGORIES BY HAZARD INDICATOR				
Hazard Indicators	"Danger" I	"Warning" II	"Caution" III	"Caution" IV
Oral LD ₅₀	up to and including 50 mg/kg	from 50 thru 500 mg/kg	from 500 thru 5000 mg/kg	greater than 5000 mg/kg
Inhalation LD ₅₀	up to and including .2 mg/liter	from .2 thru 2 mg/liter	from 2.0 thru 20 mg/liter	greater than 20 mg/liter
Dermal LD ₅₀	up to and including 200 mg/kg	from 200 thru 2000 mg/kg	from 2000 thru 20,000 mg/kg	greater than 20,000 mg/kg
Eye Effects	Corrosive corneal opacity not reversible within 7 days	Corneal opacity reversible within 7 days; irritation persisting for 7 days	No corneal opacity; irritation reversible within 7 days	No irritation
Skin Effects	Corrosive	Severe irritation at 72 hours	Moderate irritation at 72 hours	Mild or slight irritation at 72 hours

Safe And Efficient Sprayer Operation

Yield and crop quality often depend on effective application of pesticides, growth regulators, and fertilizers. Too little chemical wastes time and materials; an overdose adds to the cost and may damage the crop. Proper selection, use, and maintenance of sprayers save money and chemicals.

Low pressure boom sprayers are commonly used to apply chemicals, particularly in the Corn Belt. This article focuses on operating, maintaining, and cleaning low pressure boom sprayers.

Proper Maintenance

Sometimes applicators give thought to maintenance only when parts fail and/or leaks occur. It is best, however, to follow a preventive maintenance program every year at the end of the spraying season. Also, check the equipment carefully before the next spraying season begins. Periodically replace all components subject to wear. The following suggestions reduce the failure of sprayer components and prolong useful life.

1. Flush a new sprayer before using to remove metal chips and dirt resulting from manufacturing. Remove and clean all nozzles. Then flush the sprayer with clean water.
2. Use only those chemicals for which the sprayer is designed. For instance, liquid fertilizers corrode galvanized surfaces and parts made from copper, brass, bronze, and steel. Use a sprayer made completely of stainless steel to apply fertilizers. Aluminum is satisfactory for some nitrogen fertilizers but not for mixed fertilizers.

3. Use water that looks clean enough to drink. Most troubles with sprayers can be traced to foreign materials in the water. They clog screens and wear out nozzles and pumps. Filter any water pumped from ditches, ponds, or lakes before filling the tank.

4. Observe the output pattern of nozzles periodically. Streaks in the pattern indicate that foreign materials are inside the nozzles. Remove and clean nozzles; use a soft brush for the tip and screen. Cleaning with a pin, a knife, or any other metallic object can completely change the spray pattern capacity of the tip.

5. Inspect all strainers, screen, and nozzle tips after each day's spraying. Clean the strainers daily. Partially clogged strainers create a pressure drop and reduce nozzle flow rate.

Operation Check List

The objective of spraying is uniform, complete coverage. Application errors result from using misaligned or clogged nozzles, nozzles with different fan angles, or nozzles placed at uneven heights throughout the boom. These common problems result in streaks, untreated areas, or over-application of chemicals. The following guidelines will make spraying more effective.

1. Select the recommended chemical for the specific spraying job.
2. Read and follow all directions on the pesticide label.
3. Mix the chemical in sufficient liquid carrier to get uniform recommended coverage over the sprayed

area. Use clean water.

4. Consider the possibility of drift causing damage to plants, animals, or people adjacent to the sprayed area. Usually less drift occurs in early morning and late evening because of less wind.
5. Check to see if the framework of the sprayer is securely fastened together and to its carrier.
6. Make sure all vital parts of the sprayer are functioning properly. Check for leaks.
7. Select nozzles that provide the desired droplet size, flow rate, and pattern (see sidebar on page 39). Mount nozzles tightly to their positions.
8. Watch the nozzles periodically to detect clogging.
9. Operate the tractor at a uniform speed to ensure uniform application. Doubling speed halves the application rate.
10. Keep the proper height at all sections of the boom.
11. Set the pressure within the recommended range.
12. Do not run the pump without liquid in the tank.
13. Always calibrate the sprayer for application of the exact amount of chemical needed.
14. Maintain the system in peak condition by periodic inspections and repairs. Carry extra nozzles, washers, other spare parts, and tools for quick repairs in the field.
15. Clean the sprayer whenever pesticides are changed and at the end of the season.
16. Store the sprayer in a dry place, preferably a building.
17. Check all sprayer components carefully. Make note of any repairs that are

How To Reduce Pesticide Waste

Purchase Only What You Need

Avoid problems with unused products (undiluted pesticide concentrate) by checking your storage area each year before purchasing chemicals. Buy only what you can use in one growing season. Store unused pesticides properly for use the following season. Contact your county Extension office for information on proper pesticide storage.

Improve Application Accuracy

Check the accuracy of your sprayer periodically to make sure you are applying the amount recommended on the pesticide label. Guidelines established by the U.S. Department of Agriculture and the Environmental Protection Agency indicate that the difference between a sprayer's actual application rate and intended application rate should not exceed 5% of the intended rate. However, surveys conducted in Ohio and other states indicate that only one out of four sprayers are applying chemicals with application errors less than 5%.

Eliminate Leftover Spray Mixture

Avoid leftover diluted pesticide in your spray tank following a pesticide application. A few simple calculations can be used to determine the amount of spray mixture needed to spray a given size of field. Follow these steps to determine the amount of water and pesticide concentrate you need to add to the tank:

1. Determine the area to sprayed (acres, square feet, etc.)
2. Multiply this area by the application rate of the sprayer to find the amount of spray mixture needed in gallons.
3. Multiply the area to be treated by the pesticide rate to determine the amount of pesticide rate you must add to the tank.

Example:

A sprayer has been calibrated to apply 15 gallons of spray mixture per acre. The pesticide label recommends 2 pints of commercial product per acre for broadcast application. Determine how much water and pesticide must be added to cover 10 acres.

Spray mixture needed

= Spray output (gpa) x acres to be sprayed
= 15 gallons/acre x 10 acres = 150 gallons of spray mixture

Amount of spray mixture needed

= 10 acres x 2 pints/acre = 20 pints (2.5 gallons)

So, if the total solution should be 150 gallons, the final mixture should contain 147.5 gallons of water and 2.5 gallons of pesticide formulation.

Rinse Containers Immediately

Concentrated pesticide residues leaking from unrinsed, discarded containers can cause significant environmental contamination. Up to 3 ounces of pesticide may be left inside a 5-gallon container after normal emptying. Depending on the cost of the product, the money saved in pesticide cost alone through proper container rinsing could be significant. Containers should be rinsed immediately after they are emptied because residue can dry and become difficult to remove.

Triple rinsing is the most common procedure for rinsing containers. It involves filling each container at least one-quarter full with water, replacing the lid, shaking the container, and then emptying the liquid from the container into the spray tank. This is done three times with each container. Pressure rinsing allows containers to be rinsed while pesticides are emptied into the spray tank. Special nozzles attached to a garden hose are used to puncture plastic and metal containers. When turned on, the nozzle produces a forceful spray inside the empty container. By holding the container over the opening of the spray tank or holding tank while rinsing, the rinse water can be captured as it drains from the container spout. It takes a few minutes to properly triple rinse a container, but less than a minute to pressure rinse. The amount of rinsate generated is also reduced with the pressure-rinsing method.

Reduce Rinsate

Spray equipment requires periodic cleaning and rinsing to keep vital components in good working condition and when switching from one pesticide to another. Improper management of rinsate has great potential for contaminating surface and groundwater. The best way to eliminate this problem is to perform all interior and exterior rinsing in the field immediately following the application. Equipment may also be rinsed at a modern pesticide mixing and loading facility equipped with a concrete rinse pad and rinsate-collection pit. However, disposal of the rinsate collected in the pit could become a major problem. This is why it is important to reduce the amount of rinsate to a minimum. If possible, reuse the rinsate when preparing the next batch of tank mixture. Make sure all the dirt and debris in the rinsate are filtered out before adding the rinsate to the spray tank. The small amount of solids left in the collection pit should be dried and taken to a hazardous waste disposal site or spread evenly over a large part of the field. Information on constructing a

ENVIRONMENTAL AND SAFETY

rinse pad and pesticide-storage facility is available at your local county Extension office.

Modify Spraying Equipment

Take advantage of technological advancements in pesticide application equipment design, and modify your equipment to improve application efficiency while reducing pesticide waste. Recent developments in pesticide application equipment allow for safer operation and less risk to the applicator and the environment. For example, sprayers with in-line pesticide-injection systems eliminate leftover tank mixtures. With these systems, the pesticide and water are kept in separate tanks. A separate metering pump feeds the pesticide into the spray line. Any excess water is left in the water tank, and excess pesticide remains in the pesticide tank.

Many new sprayers are equipped with a small tank that holds clean water to rinse out the sprayer tank in the field. Immediately following the application, clean water can be pumped into the large spray tank, and the rinse water can be sprayed over the target field, provided registered rates are not exceeded and application is consistent with label directions.

Research is underway to develop new equipment and methods that will further improve application efficiency. For example, researchers are developing systems that automatically adjust pesticide rates according to the amount of organic matter in the soil. This system operates on the principle that lighter soils, which are low in organic matter, require less pesticide than darker soils.

Some studies indicate that ultra-low volume (ULV) pesticide applications using electrostatic nozzles provide satisfactory insect control at half the rate recommended

for conventional spraying. Such techniques mean greater pesticide efficiency and less pesticide consumption, which result in reduced pesticide waste.

Choose Pesticides Packaged In Returnable/Refillable Containers

Many agricultural chemical companies have developed new pesticide packaging to protect users from exposure and reduce pesticide waste. For example, minibulk containers, ranging in volume from about 40 to 600 gallons, have become increasingly popular over the last few years. Minibulk containers reduce the number of small containers, which are major sources of pollution. Minibulk tanks usually are returned to the dealer for refilling or for deposit. Nearly every major company offers a minibulk for one or more of its products.

While some companies are promoting small-volume returnable containers, others are trying to eliminate the container altogether. One company has pressed dry pesticide into an effervescent tablet that can be broken into small parts for reduced applications or used whole at full strength for normal applications. Another company is packaging pesticides in small water-soluble pouches that improve safety in normal handling and eliminate problems with container rinsing and disposal.

Some equipment manufacturers and agricultural chemical companies are joining forces to reduce pesticide waste and improve applicator safety. Returnable chemical containers are being designed to fit directly into a valve on the lid of a planter's pesticide hopper. This reduces the risk of the applicator inhaling pesticide dust, which is a recurrent problem with conventional dry granular pesticide packaging. ■

Source: Adapted from Bulletin 819, "Reducing Pesticide Waste," by H. Erdal Ozkan and Mark L. Wilson, The Ohio State University Extension.

Dealer Environmental Checklist

Identifying areas of your retail facility that require updating and improvement is an important part of being a responsible environmental steward. The following checklist covers some of the areas that chemical and fertilizer dealers should evaluate regularly. It is not intended to take the place of an independent environmental audit, nor does it assure full compliance with laws and regulations governing a business operation.

Storage and Handling

Prevention of air, soil, and surface and groundwater contamination should be a top priority in the operation of your facility.

Liquid Fertilizer

- Yes No Are all liquid tanks inside a diked area?
- Yes No Are fertilizer tanks maintained in a containment area separate from pesticide tanks?
- Yes No If fertilizer tanks are under roof, is the containment volume adequate to hold at least 110% of the largest single tank within the containment area (taking into consideration the displacement volume of all tanks within the area)?
- Yes No If the containment area is not under roof, is the containment volume adequate to hold the volume of the largest single tank within the containment area (taking into consideration the displacement volume of all tanks within the area), plus freeboard and rainfall amounts as prescribed by your state regulations?
- Yes No Are all pipes, valves, and hoses located within a containment structure?
- Yes No Is the containment structure inspected regularly for cracks or leaks?
- Yes No Are leaks from tanks, pipes, valves, equipment, or containment structures repaired as soon as they are found?
- Yes No Are spills immediately cleaned up?
- Yes No Are any underground sumps periodically leak-checked with clean water?
- Yes No Are contained fluids reused in product mixes?

Dry Fertilizer

- Yes No Is all product stored under a roof?
- Yes No Is rainwater diverted from contact with the product?
- Yes No Is contaminated rainwater collected and used as product?
- Yes No Is all spilled product immediately recovered and used?
- Yes No Is fugitive dust contained from storage areas?
- Yes No Is fugitive dust contained from transfer areas?

Pesticides

- Yes No Are agrichemicals stored in a separate area to prevent possible contamination of animal feed, grain, fertilizer, or other materials?
- Yes No Are flammable/combustible materials segregated from all ignition sources?
- Yes No Are all bulk chemicals under a roof?
- Yes No Are all bulk chemicals inside a diked area?
- Yes No Is rainwater captured in your diked area collected for use in your application blends or mixes?
- Yes No If pesticide tanks are under roof, is the containment volume adequate to hold at least 110% of the largest single tank within the containment area (taking into consideration the displacement volume of all tanks within the area)?
- Yes No If the containment area is not under roof, is the containment volume adequate to hold the volume of the largest single tank within the containment area (taking into consideration the displacement volume of all tanks within the area), plus freeboard and rainfall amounts as prescribed by your state regulations?
- Yes No If the pesticide containment area is outside, do you have plans to bring it under roof?
- Yes No Are routine inspections made of the storage area to check for leaks and spills?
- Yes No Are these inspections documented?
- Yes No Are inspections filed on site?
- Yes No Are leaks repaired immediately?
- Yes No Are spills immediately cleaned up and the waste properly disposed?

ENVIRONMENTAL AND SAFETY

- Yes No Is the containment area equipped with a spill collection sump and holding tank?
 Yes No Are all pesticide mini-bulk tanks stored in an area that would prohibit runoff into streams, ditches, or well heads?
 Yes No Are contained fluids reused in product mixes?
 Yes No Are packaged chemicals stored inside a secure building designed to hold water or other chemicals used in fire extinguishing?
 Yes No Are all pesticide containers kept closed except during transfer operations?

Mixer and Loadout Areas

- Yes No Is the mixer located within a containment area capable of holding its contents?
 Yes No Is all product loading done over a loadout pad with a collection sump?
 Yes No Can the loadout pad containment system handle the volume of the largest transport truck?
 Yes No Is the loadout pad constructed in a manner to prevent excessive drainage of a rainwater runoff onto its collection sump?

Rinsate Handling and Reuse

- Yes No Is all equipment field-rinsed?
 Yes No Is any equipment rinsed at the facility upon return from the field?
 Yes No If rinsed at the facility, is rinsate collected and reused?
 Yes No Is rinsate segregated by crop type to facilitate reuse?
 Yes No Is all on-site equipment washdown done on a rinse pad?
 Yes No Is all washwater/rinsate collected and reused?
 Yes No Is a pump available for emptying the rinse pad sump?
 Yes No Is the liquid collected from the rinse pad sump stored in an above-ground tank?
 Yes No Is the rinsewater storage container connected to a mix tank to facilitate reuse?

Fuel Storage

- Yes No Are all on-site fuel tanks located above ground and contained?
 Yes No Are all underground storage tanks registered?
 Yes No Are all underground petroleum tanks equipped with leak detection and corrosion protection systems?
 Yes No Are fuel and product tanks and piping at risk from vehicle collisions?

Safety and Security

A safe workplace is critical for the dealer and his employees. Train and equip employees to recognize occupational hazards and to protect themselves and the facility from harm.

- Yes No Are employees trained in proper handling of fertilizer and pesticide products?
 Yes No Are employees trained to use protective clothing, eye protection, and safety equipment?
 Yes No Do you have frequent, regularly scheduled employee safety meetings and training?
 Yes No Are eye washes, safety showers, respirators, and other personal protective gear and equipment readily available and in good working order?
 Yes No Do all employees use appropriate protective gear and equipment when handling products?
 Yes No Have employees been instructed not to smoke or eat while handling pesticides?
 Yes No Do you have Material Safety Data Sheets (MSDSs) for all hazardous materials (such as pesticides, ammonia, or acids) used at the facility?
 Yes No Are the MSDSs readily available to all employees?
 Yes No Is the mixing area properly ventilated for hot mixing and pesticide handling?
 Yes No Are appropriate warning signs regarding hazardous chemicals and no smoking areas prominently displayed?
 Yes No Are all product storage tanks labeled properly by content?

Source: Adapted from Dealer Environmental Checklist, a cooperative project by the Tennessee Valley Authority's National Fertilizer & Environmental Research Center and the Agriculture for a Clean Environment (ACE) program. ACE was co-sponsored by the National Fertilizer Solutions Association and the National AgriChemical Retailers Association to inform and assist retail dealers in addressing changing environmental concerns.

particle, enabling it to remain airborne longer and, under the right conditions, to drift farther from the application site.

While evaporative loss of spray materials occurs under almost all atmospheric conditions, these losses are less pronounced under the environmental conditions that occur in the cooler parts of the day — early morning and late afternoon. The relative humidity is usually highest during these cool periods.

Atmospheric Stability

Atmospheric stability is an important factor influencing drift. Under normal meteorological conditions, the air temperature decreases by 5.4°F per 1000 feet of height. Cool air tends to sink, displacing lower warm air and causing vertical mixing. As a warm air layer rises, suspended droplets rise with it and dissipate into the upper layers by normal air turbulence and vertical mixing.

However, problems may arise when the atmosphere is very stable. Under stable conditions, a warm air layer at some distance overhead may become a blanket, holding down cooler air underneath. This phenomenon is usually referred to as atmospheric inversion. Particles suspended in the cool layer cannot move anywhere except laterally, possibly for several miles. Eventually, the suspended cloud may encounter a downdraft, forcing it back to earth and depositing it off-target — possibly over a sensitive crop.

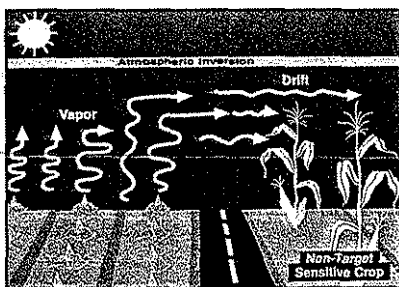
Again, the best way to avoid drift associated with atmospheric inversions is to eliminate the formation of small particles (150 microns or smaller) from the spray effluent.

Operator Skill and Care

Under a given spray situation, any one of the previous eight factors may be the most critical in reducing drift hazards. It is the applicator who determines this critical factor and takes precautions against it.

Equipment Modifications

Spray droplets from conventional sprayers deposit mainly onto upper sides of horizontal surfaces due to gravity, or on vertical surfaces by their velocity and movement in air currents around the target. Scientists and equipment companies have been exploring the possible use of other forces to



Atmospheric inversion can result in drift damage miles from the target area.

increase application efficiency while reducing spray drift. Some new developments for increasing deposition efficiency of especially small droplets include partially or completely covered booms, air-assisted spraying, and electrostatic spraying.

Shielded Sprayer Boom

Partially covering a sprayer boom with a shield has been shown helpful in reducing spray drift. Results from laboratory tests conducted at the University of Missouri indicated that a mechanical shield could reduce spray drift deposit by up to 70%. Tests conducted under field conditions generally showed reduction in drift deposits of up to 65% with the shield.

Covered (Shrouded) Boom

Covering the boom completely with a shroud has been shown to reduce drift. Some companies have developed simple shrouds, while others have improved the aerodynamics of airflow around the shield by placing an airfoil over the shield.

Another advantage of a covered shield is that pesticides can be applied using small droplets that provide better coverage, and the volume of carrier needed can be reduced significantly.

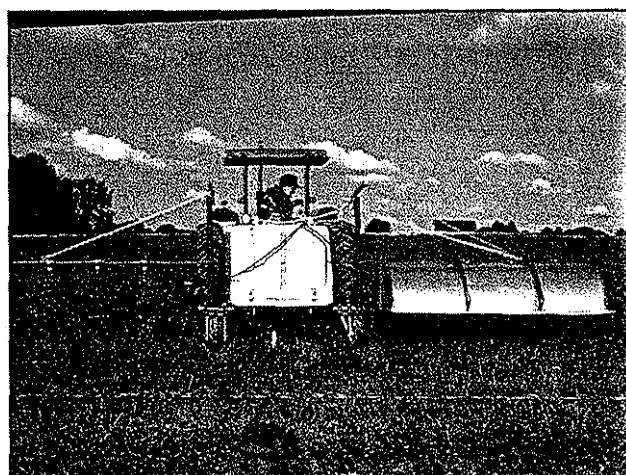
Air-Assisted Spraying

Several studies have shown that air assistance reduces drift deposits from boom sprayers. The general concept with air-assisted spraying is to use air to replace part or all of the water as a pesticide carrier. Some air-assist systems simply atomize the spray solution, while others use high-velocity airflow to transport the spray mixture to the target. This enables the applicator to use small droplets without increasing the risk of drift. At least one company manufactures a sprayer that uses a stream of air to direct the spray to the target by entraining droplets in a downward-moving air curtain.

Electrostatic Spraying

Electrostatic charging of small droplets has been considered as a possible way to increase the deposition of small droplets. An electrical field between the nozzle and the plant leaf is generated by charging droplets. The attraction between small, charged droplets and the plant canopy is expected to provide the additional force to move droplets toward the plants and resist drift.

Source: Adapted from *Reducing Spray Drift*, Extension Bulletin 816, by H. Erdal Ozkan, Professor, Dept. of Agricultural Engineering, Ohio Cooperative Extension Service, The Ohio State University.



Shielded booms can reduce spray drift.

Choose The Right Respirator

Exposure to harmful chemicals can result in countless physiological effects — particularly when the respiratory system is involved. Potential health hazards can be dramatically decreased for applicators and other pesticide handlers if the proper personal respiratory protection is used.

While many criteria enter into the respirator selection equation — level of protection, comfort, fit, price, ease of maintenance — the most important consideration is worker protection.

The American National Standards Institute (ANSI), in definitive guidelines on Practices for Respiratory Protection (Z88.2-1980 3.5.5), states that selection of a respirator shall be based on seven factors:

1. The nature of the hazardous operation or process;
2. The type of respiratory hazard;
3. The location of the hazardous area in relation to the nearest area having respirable air;
4. The period of time for which protection must be provided;
5. The activities of workers in the hazardous area;
6. The physical characteristics, functional capabilities, and limitations of the various types of respirators; and
7. Respirator protection factors.

Regulatory Agencies

The three government agencies that have the most influence in regulating respiratory protection in the United States are:

1. The Occupational Safety and Health Administration (OSHA), which provides guidelines to determine respirator use based on various contaminant levels;
2. The National Institute for Occupational Safety and Health (NIOSH), which certifies respirators and quality assurance programs for respirator production; and
3. The Environmental Protection Agency (EPA), which regulates environmental concerns.

Types of Respirators

Once the level of protection has

been established, the selection can be narrowed to a specific respirator category. The two most popular types of respirators used in the agricultural chemical industry are: 1) air-purifying respirators (APR), and 2) powered air-purifying respirators (PAPR).

Fit

A respirator that fits poorly can result in the inhalation of dangerous chemicals. Facemasks made of silicone rubber have good sealing characteristics and can be made better with the addition of a wide sealing edge against the face. Both full-face and half-face respirator styles are usually available in a variety of sizes to facilitate a proper fit. OSHA 29CFR1910.134 states: "To assure proper protection, the facepiece fit shall be checked by the wearer each time he puts on the respirator."

Comfort

There is a direct correlation between comfort and user acceptance. If workers have comfortable respirators, they are less likely to remove or adjust them. An important comfort consideration is the type of material used in the construction of the mask. Common materials include silicone rubber, neoprene, EPDM, nitrile, natural rubber, and PVC. Most safety professionals prefer silicone because of its chemical resistance, durability, elasticity, and comfort. For example, silicone rubber is unaffected by ozone-containing environments in which organic materials such as nitrile, natural rubber, and neoprene slowly deteriorate.

Materials should be hypoallergenic to reduce skin irritation, especially in hot, humid environments.

APR

APRs are often thought of as the least expensive type of respirator because of their simplicity.

APRs use ambient air purified through filters or cartridges. They are lightweight, easy to maintain, and

provide the maximum comfort with the least restriction of movement. Two types of APRs are available:

- Reusable respirators in which the facepiece is reused but the cartridges and filters are thrown away; and
- Disposable respirators that are completely discarded.

The inhalation/exhalation system should be designed to reduce breathing fatigue and should have few moving parts. Breathing systems with the fewest parts are easiest to maintain and require less inventory. Some respirators even use the mask itself as a seal for the cartridge rather than the easy-to-lose traditional gaskets. A variety of respirator filter/cartridges are available for protection against chemicals such as pesticides, organic vapors, dusts, fumes, acid gases, and mists.

PAPR

PAPRs utilize a battery-driven blower to force air into the mask through a purifying element (a filter, cartridge, or canister), thus reducing worker fatigue.

The two most common PAPR configurations are belt-mounted and face-mounted. Belt-mounted units position the motor, battery, and filter/cartridge elements on a belt worn around the user's waist, feeding air to the mask by a low pressure convoluted hose. These units are normally used in the chemical industry because chemical cartridges and canisters are too heavy to be comfortably mounted on the facepiece. Belt-mounted PAPRs are available in a variety of styles including tight-fitting full facemasks, helmets, and hoods. Conversely, face-mounted PAPRs position the blower and filter/cartridge elements on the facepiece assembly, with the battery mounted on a belt and connected to the facepiece blower motor by an electrical cable.

An important consideration when buying a PAPR is the total cost of operation. Some PAPRs use one filter or cartridge while others use three or four. Filters and cartridges range in price from \$7 to \$21. An inexpensive PAPR using two cartridges a day may cost more in the long run than a more sophisticated PAPR using only one cartridge. To determine cost effectiveness, one should compare budgets for an entire year or a complete job.

A common and costly PAPR repair occurs when a hard-wired power cord is pulled out of the blower assembly,

requiring replacement of both the cord and blower. This cost can be avoided by purchasing units with disconnect fittings at both ends of the power cord.

Both NiCad and lead-acid battery packs are available for PAPRs. NiCad batteries, though more expensive, are more desirable, being lighter and having longer life. Batteries should last at least 8 hours on one charge so as not to interrupt a work day.

Trickle chargers eliminate overcharging and are available with some NiCad systems. Charging times vary dramatically; some take only 4 hours while others take as long as 20 hours.

Here are some PAPR comfort

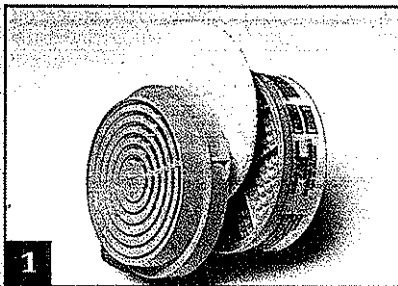
features worth consideration:

- Weight (PAPRs range from 56 ounces to over 7 pounds);
- Low profile (filters should not protrude past the face and obstruct the worker's movement or vision);
- A large, single-curve lens for clear vision;
- A speaking diaphragm for easy communication with co-workers;
- Multiple facepiece sizes for more accurate fit; and
- Battery packs that are contoured to comfortably fit the shape of the hip. One should also check the length of the PAPR's warranty period before

buying. PAPR warranties can range from 30 days to 1 year. ■

Source: Adapted from "Respirator Selection for Chemical Safety," by Ben Matranga, marketing manager for Survivair, a manufacturer and distributor of safety products. His article originally appeared in the April 1992 issue of *Ag-Pilot International*.

How To Select And Wear An APR Half Mask

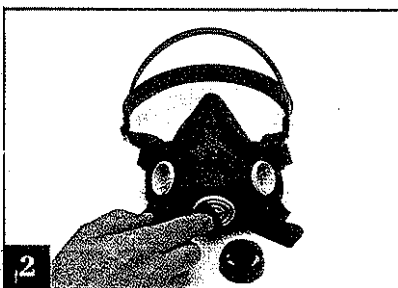


- Carefully inspect your facemask for any cracks, tears, holes, or dirt. Make sure the cradle suspension and headstraps are in good working condition. Stretch each headstrap to check its elasticity.

- If the cartridge needs changing, unscrew the used cartridge (Fig. 1) and replace it with a new replacement cartridge that has no dents, cracks, or distortion. Screw the new cartridge into the holder, but don't force it. The cartridge should thread on easily.

If you use a filter pad and need to change it, unsnap the cover at the tab. Replace with a clean filter pad and snap the cover back in place.

- Check the exhalation valve by unsnapping the outside cover (Fig. 2). Lift the valve and inspect the seat and valve for cracks, tears, dirt, and distortion. To check for proper operation, exhale and pause before inhaling. If the valves fail to close during the pause, they must be replaced.



- Inspect both of the inhalation valves. Lift the valves from the inside and look for cracks, tears, dirt, and distortion.

- To don the respirator, place it over the bridge of your nose. Swing the bottom in so it rests comfortably against your chin. Hold the respirator in place while you put the cradle headstrap over your head. (Fig. 3)



- Make sure the respirator fits properly on your face, then fasten the bottom headstraps around your neck. Now adjust the cradle headstraps so the mask conforms snugly to your face. (Fig. 4)

- Test for positive pressure by covering the exhalation valve and gently exhaling. Your facemask passes this test if a slight positive pressure can be built up inside the mask without any air leaking out at the seal. (Fig. 5)

- Test for negative pressure by removing cartridges and lightly covering threaded connection with the palms of your hands. Inhale gently until the facemask collapses slightly, then hold your breath for 10 seconds. Your facemask passes this test if it remains in the slightly collapsed position, and no air leaks in from the sides of the mask. (Fig. 6)



Consider Packaging When Choosing Pesticide Products

Convenience, safety, and environmental concerns continue to drive packaging innovations.

Cost per acre and field performance will probably always be the prime drivers behind pesticide product selection. But handling convenience, safety, and new regulations are making packaging and container design a key factor in grower and dealer product selection, according to Mike Burkett, bulk herbicides manager for Sandoz Crop Protection, Des Plaines, IL.

So What's New?

Here's a quick look at some of the latest packaging innovations:

- BASF Corp., Research Triangle Park, NC, has made two of its major products, Pix plant growth regulator and Facet herbicide, available in dry-flowable formulations. Facet 75 DF herbicide, a dry-flowable formulation in convenient, water-soluble polyvinyl alcohol (PVA) bags, was registered recently by the Environmental Protection Agency. Production capacity has been increased so Facet DF will be available to all rice growers this season. Facet 75 DF replaces Facet 50 WP, a wettable-powder formulation.

Each PVA bag contains one pound of Facet DF. The product will be packaged with five PVA bags sealed in a foil-lined bag. A case holds four foil-lined bags. Since Facet DF is generally applied at a 1/2-pound-per-acre rate, a case containing 20 PVA bags will treat 40 acres.

BASF has made other packaging changes. Pix will be available in a

returnable system, Pix Solitaire, which holds 15 gallons of Pix concentrate, a liquid formulation. The Solitaire system operates via a new vac-u-meter pump that is calibrated for easy use and requires no electricity. Because the system is returnable, triple rinsing containers is eliminated.

The standard formulation of PIX plant regulator will also be available in 1- and 2 1/2-gallon jugs.

Conclude B&G from BASF is a one-rate postemergence herbicide for control of grasses and broadleaf weeds in soybeans. It will be available in a 2-gallon Duplex II split jug with separate openings for each product and in the Prodigy system—a reusable, closed, stainless steel tank that keeps the two products separated until application. Prodigy features a lock-down control center that automatically calibrates equal rates of the two products. Conclude will be sold in Alabama, Arkansas, Delaware, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Michigan, Mississippi, Missouri, New Mexico, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and Wisconsin.

- Du Pont, Wilmington, DE, has improved its water-soluble packaging for Accent corn herbicide and Concert, Lexone, and Lorox soybean herbicides. A new polyvinyl alcohol (PVA) film dissolves better under varying conditions, eliminates

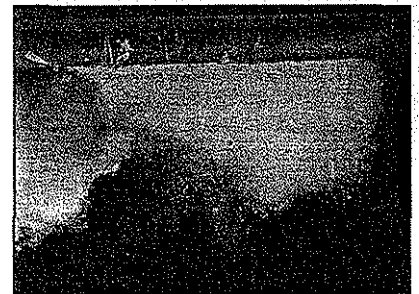
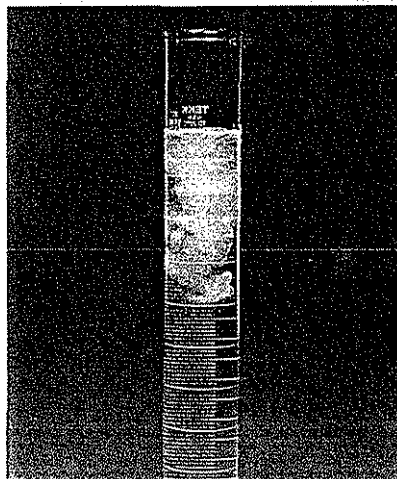
plugged screens or spray nozzles, is more compatible with other products in the spray tank, is less likely to interact with leftover residues, and remains supple for at least 2 years, says Darryl Meade, Du Pont chemist and product delivery systems specialist.

For large-scale applications, dry flowable Concert also will be marketed in 1-pound plastic jugs in northern Illinois, Iowa, Minnesota, northern Missouri, South Dakota, Nebraska, and Wisconsin. Each jug treats 32 acres, saving measuring and mixing time, and reducing container triple rinsing and disposal.

- A new gel formulation of Buc-tril bromoxynil herbicide forced Rhone-Poulenc, Research Triangle Park, NC, to rethink its water-soluble packaging. The new laminated Gel-Tec Pak is stronger and less likely to leak than a single-ply film. It also self-heals when small punctures occur. Each bag is enclosed in a plastic overpack with an easy-open tear tab. The gel itself reduces solvent emissions and won't freeze.

- Zeneca Inc., Wilmington, DE, has redesigned the formulation and package of Force 1.5G. The soil insecticide, now formulated in montmorillonite clay granules, is

Convenient, safe packaging: (below) Du Pont's Concert SP in water-soluble packets; (middle) Griffin Corp.'s spray-dried Direx 80DF; (right) Rhone-Poulenc's Buc-tril gel in the Gel-Tec Pak; Zeneca's Force 1.5G in a heavy-duty weatherproof plastic bag.



packaged in heavy-duty weatherproof plastic bags that feature a skid-resistant surface, a special flap for lifting, and an easy-open spout for quick and complete emptying.

- Monsanto, St. Louis, MO, is using a 2½-gallon container with an innovative air flow handle that lets the air flow back into the container at the same rate the contents are emptied. The result: a no-glug, no-splash, no-drip jug. It is also the first herbicide container this size to eliminate the foil seal, which has been replaced with a resealable cap.

- Griffin Corp., Valdosta, GA, utilizes a new method for producing dry flowable material with its Direx 80DF herbicide. The new Crystal formulation method, essentially spray-drying the material, offers customers an alternative to liquid. Direx 80DF was formulated in this manner and packaged in an AgPak for the first time in 1993. Super Tin 80WP AgPak was also offered in AgPaks in 1994.

- Riverdale Chemical Co., Glenwood, IL, patented a dry form of 2,4-D to produce Solution herbicide in water-soluble PVA packaging 2 years ago. Originally offered in the Wheat Belt, Solution now is available for use in the Corn Belt and with no-till soybeans. Both the 9- and 45-ounce packets are sold in sets of eight packets per cardboard box. Riverdale has also introduced

Triplet Water Soluble, a dry, totally water-soluble combination of 2,4-D, mecoprop, and dicamba, packaged in water-soluble bags.

- The Accu-Pak line from Ciba, Greensboro, NC, now includes Agree bioinsecticide for use on a variety of fruit, nut, and vegetable crops. The pre-measured, water-soluble PVA bag comes in sets of five 1-pound packets per bag, four bags per box.

The company is also introducing Ridomil PC Liquid. This mixture of Ridomil and PCNB fungicides was previously available from Ciba as Ridomil PC 11G, a granular product. The Ridomil PC Liquid is packaged in Twin-Pak, which ensures accurate rates and eliminates time-consuming tank mixing.

- American Packaging Corp., Philadelphia, PA, developed Dissolve A Bag, a bag-within-a-bag design, for the ag chemical market. Agtrol Chemical Products, Houston, TX, has introduced Champ Formula II Dry Flowable soil fungicide in the package.

The sealed, water-soluble inner bag is put directly into the spray tank, where it dissolves with the product. The residue-free outer bag, with its perforated tear strip and square bottom, is made of a patented Kard-O-Gard high barrier film (PVdC) that increases the product's shelf life, resists flex cracking, and can be completely burned.

- Sandoz has introduced the Starr mini-bulk for their liquid herbicides, Frontier and new Guardsman. The low-maintenance 110-gallon mini-bulks and 300-gallon poly units are the first systems without moving parts. No calibration is needed for the patented TruForce measuring chamber, which also prevents any contact with the product. The stackable, pelletized square tanks feature a sumped bottom to maximize product use.

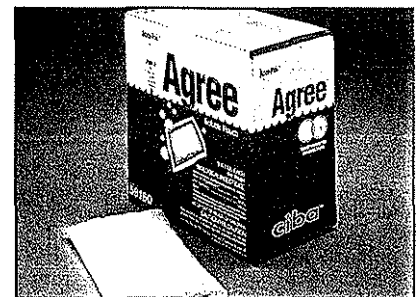
The Future For Packaging

Some future products to look for: Rhone-Poulenc is developing Gel-Tec paks and gel formulations for other products — even water-based formulations, which currently cannot utilize water-soluble packaging.

Also in the company pipeline is "bag-within-a-bag" technology, where a water-soluble pack of one product is suspended in the gel formulation of a second product. As the outer bag dissolves, the inner pack is released and also dissolves, creating a tank mix of the two products.

Source: *Farm Chemicals* magazine, March 1994. By Amy L. Fahnestock, assistant editor.

(Left to right) Sandoz' Guardsman is packaged in the Starr mini-bulk. (middle, top) The new "no-glug" Monsanto container, designed to eliminate splashing and drips. (middle bottom and right-hand photos) A variety of water soluble packages are now available.



Keeping Pesticides Out of Groundwater

Is your groundwater vulnerable to contamination from pesticide leaching? Certain chemicals and soil conditions are more prone to chemical movement in the soil than most.

A combination of chemical selection, soil properties, site characteristics, and management practices contributes to the potential for pesticide residues to move into groundwater. Key factors you should consider when making a pesticide application decision include:

Chemical Selection

Some chemicals adsorb or bind readily to soil particles and organic matter. The higher the adsorption rate of a certain chemical, the less likely it is to leach down into the groundwater. Also, some chemicals are more persistent, or last longer before they are broken down, than others. The more persistent a chemical, the longer it is subject to the forces of leaching or runoff.

Soil Properties

If your soil texture is porous, it could allow large quantities of water to move through it rapidly. Downward movement of water is greater in soils with low water-holding capacity, such as sand. Soils with more clay and organic matter tend to hold water and chemicals longer. Also, the amount

of organic matter influences how well chemicals will be held or bound in the soil.

Site Characteristics

Extra precautions need to be taken to protect the water supply in those areas where the water table or groundwater is close to the soil surface. Also, sinkholes or abandoned wells in your fields could provide a direct route for pesticides to move into the groundwater.

Management Practices

- Properly store, mix, and apply pesticides.
- Carefully rinse and dispose of chemical containers.
- Know what to do with equipment rinse water.

These are all essential ingredients of water quality protection. Safe use of pesticides is good common sense and good business, plus it's a front-line defense for your drinking water.

Whenever using pesticides, always remember to check the label for warnings about the chemical's potential to leach to groundwater. If you can't find the information you need, your pesticide retailer or the product manufacturer can answer your questions.

Steps to Follow

Keep in mind the following pointers to help prevent the movement of pesticides through the soil and into groundwater:

- Carefully plan the timing and method of pesticide application to avoid heavy rains or irrigation.
- Apply only the amount of pesticide needed to do the prescribed job.
- Check application equipment regularly for leaks, malfunctions, and calibration.
- Chemigation users should install devices to prevent possible back-siphoning of pesticides into the water supply system. Seals and gaskets must be compatible with the chemical being injected into the system.
- Conservation tillage, cover crops, contour strip cropping and no-till are good ways to minimize runoff and possible water quality degradation.

Source: Agricultural Crop Protection Association
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