

A Guide to Turfgrass Fungicides For the 1970s

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Imagine this fictitious scene. A group of superintendents is sitting around a dinner table discussing turf problems. One fellow comments that the Chloroneb he used for snow mold didn't give him such good control.

One of the other men says, "Well, then, try Tersan SP. It's new and will really do the job for you."

The third one says, "Well, I got some of this Demosan and, boy, did it clear up the snow mold. Try this one on your greens." As it turns out, all the superintendents were talking about the same chemical produced under different trade names.

There is much confusion of this type in the turfgrass field today. This article will attempt to clarify some of it and serve as a handy cross-reference for the fungicide user. In a later section the cost of some of these fungicides will be compared on a cost-per-1,000 square foot basis. This again can serve as a reference for the fungicide applicator.

The following is an alphabetical listing of the more commonly recognized trade names used in the Northeast. This could vary in other parts of the country, but some starting point is needed. The section titled "Other Names" holds particular importance, because these are the different trade names under which one type of chemical is sold. For example, Thiram is sold under 26 different trade names. It is therefore possible to purchase the same chemical with the same amount of active ingredient from a different company for less money.

The "Uses" category lists the types of diseases that the chemicals are supposed to control. We realize that in some geographic areas a particular fungicide is not recommended for the use under which it is listed. This is regrettable, but the "Uses" section should generally be apropos.

The "Combination" section was included

because of the many different fungicide mixtures used to control diseases. With the number of fungicides that are compatible and can be mixed together, this section could be endless. Therefore, only those combinations manufactured and sold under a trade name are listed.

The final listing is the "Formulations" section. This contains most of the formulations available through the manufacturers. Because there could be some variations from different manufacturers, any mention of application rates is avoided.

The following contains an alphabetical listing of some of the most commonly used turfgrass fungicides. Prices shown are retail prices from Northeastern United States supply houses. These prices could vary in different parts of the country and according to the quantity of the fungicides purchased.

The cost per 1,000 square feet is the main criteria for comparison. This is the cost of the fungicide itself as it is applied to the turf at the given rate, minus labor. The cost was computed in this manner:

$$\begin{aligned} \frac{\text{Cost per case}}{\text{Pounds per case}} &= \frac{\text{Cost per pound}}{16 \text{ oz. per pound}} = \\ \text{Cost per ounce} \times \text{rate per 1,000 sq. ft.} &= \\ \text{Cost per 1,000 sq. ft. of the fungicide} & \end{aligned}$$

By using this same formula, any applicator can quickly and easily compute the cost per 1,000 square feet for any turf fungicide not listed.

Summary:

It is our hope that this information can prove helpful in eliminating some of the confusion and doubts regarding turfgrass fungicides. Hopefully the "Costs" section will allow the applicator to use his fungicide dollar more efficiently.

<u>TRADE NAME</u>	<u>COMMON NAME</u>	<u>OTHER NAMES</u>	<u>USES</u>
Actidione	Cycloheximide		Antibiotic fungicide. Rusts & leaf spots on grasses, powdery mildew, dollar spot, melting out, <i>Helminthosporium</i> . <i>Caution</i> : Incompatible with most wetting agents.
** Benlate	Benomyl	Tersan 1991	Systemic turf fungicide. Controls pink snow mold, dollar spot, brown patch. <i>Shows curative effect</i> . Broad spectrum, <i>Fusarium</i> blight, powdery mildew.
Caddy	Cadmium Chloride	Caddy, Vi-Cad, C-A-D	Turf fungicide. Prevention & Control of dollar spot, copper spot, <i>Helminthosporium</i> & <i>Curvularia</i> leaf spots, brown patch, melting out, damping off.
Cadminate	Cadmium succinate		Turf fungicide. Prevention & control of dollar spot, copper spot, snow mold, red thread.
* Calo-Clor	Corrosive Sublimate plus Calomel	Bi-Cal, Dap-Cal, Calocure, Fungchex Vesicol, 2-1 Fungicide	Turf fungicide. Snow mold, dollar spot, copper spot, <i>Fusarium</i> blight.
* Calomel LD ₅₀ -210 mg/kg (less than corrosive sublimate)	Calomel	Mercurous Chloride	Fungicide. Controls brown patch, dollar spot.
Captan	Captan	Merpan, Orthocide 406	Dollar spot, brown patch, damping off complex, melting out, <i>Fusarium</i> patch, copper spot.
Copper Carbonate, Basic	Malachite Green	Malachite	Excellent seed treatment fungicide (smut), brown patch.
Copper Sulfate	Copper Sulfate	Bluestone, Blue vitriol, Blue Copperas	Fungicide — <i>Fusarium</i> patch or snow molds. (Algaecide)
Daconil 2787	Chlorothalonil	Bravo, Forturf (formerly)	Fungicide, broad spectrum brown patch, copper spot, dollar spot, <i>Helminth</i> . complex, snow mold, melting out.
** Demosan LD ₅₀ -over 11,000 mg/kg	Chloroneb	Chloroneb, Tersan SP	Fungicide, gray snow mold, damping off, <i>Pythium</i> blight & (grease spot, cottony blight, spot blight)
Dexon LD ₅₀ -60 to 150 mg/kg Dermal-100 mg/kg	Dexon	Bay 22555	Fungicide, seeding diseases, <i>Pythium</i> blight (grease spot, cottony blight, spot blight)
Dithane-45 LD ₅₀ -8000 mg/kg	Fore	Mancozeb (Europe)	Fungicide broad spectrum, <i>Helminthosporium</i> species diseases.
Dyrene LD ₅₀ -2710 mg/kg	Dyrene	Direz, Kemate, Triasyn, Turf-Tox D-50	Foliar fungicide, brown patch, dollar spot, red leaf spot, melting out, rust, snow mold. <i>Caution</i> : incompatible with DDT.
Koban	Koban	MF-344	Turf fungicide, Controls pythium blight, (grease spot, cottony blight, spot blight), damping off.
Kromad	Kromad (Cadmium Sebacate)		Brown Patch, copper spot, dollar spot, fading out, <i>Helminthosporium</i> red thread, melting out.

COMBINATIONS

Acti-dione PM, Acti-dione Ferrated, Acti-dione TGF,
Acti-dione Thiram, Acti-dione RZ (with Terrachlor
(PCNB))

Cad-trete; thiram plus cadmium chloride hydrate

Kroma-Clor, Ultra-Clor** (contains 3.3% cadmium,
14-15% Hg plus urea and iron. Kroma-Clor contains
a turf dye.

Blended with corrosive sublimate to form Calo-Clor
and Calocure. Fungchex — 1 part mercuric chloride,
2 parts Calomel.

Combined with other turf fungicides as a color dye
plus some action of controlling brown patch, dollar
spot, etc. Malachite Green & Auramine & Crystal
Violet = Auragreen.

Mixed with lime and water to form Bordeaux
mixture.

Kromad contains 5% Cadmium Sebacate, 5%
Potassium Chromate, 1% Malachite Green,
16% Thiram

FORMULATIONS

Wettable Powder.

50% Wettable Powder.

Liquid (Caddy) 20.1% equivalent to
12.3% elemental cadmium

Wettable Powder.

Wettable Powder, Granular

Wettable Powder or Dusts.

Wettable Powder.

Crystalline or Powder (snow)
Forms.

75% Wettable Powder.

10% Dust 65% Wettable Powder.

80% Wettable Powder.

50% Wettable Powder.

35% Wettable Powder.

Wettable Powder.

<u>TRADE NAMES</u>	<u>COMMON NAMES</u>	<u>OTHER NAMES</u>	<u>USES</u>
Maneb LD ₅₀ -6750 mg/kg	Maneb	Chloroble M, Dithan M-22, Dithane-22 Special, Kyp- man 80, Maneba, Manesan, Manzate, Manzate D. Sopra- nebe, Trimangol, Tri- manzone, Vancide, Maneb 80, Tersan LSR	Fungicide, Dollar spot, brown patch, melting out. <i>Helmintho- sporium</i> sp. leaf spot.
Nabam LD ₅₀ -395 mg/kg	Nabam	Parzate, Chem Bam, Dithane A-40, Dithane D-14, DSE, Spring-Bak	Fungicide, dollar spot, brown patch, melting out.
PCNB	PCNB, terrachlor, quintozene	Terrachlor, Avicol, Botrilex, Brassicol, Folosan, Tilcarex, Tri-PCNB, Tritisan, Fungiclor, Best Turf Fungicide	Soil fungicide, brown patch, dollar spot, <i>Fusarium</i> patch, snow molds, leaf smuts.
Phaltan	Folpet	Thiophal, Folpan, Ortho Lawn & Turf Fungicide	Protective fungicide. Controls melting out.
* PMA LD ₅₀ -of 20% solution, 100 mg/kg	PMA	PMAS, Agrosan, Gallotox, Hong Nien, Liquiphene, Mersolite, Phenmad, Agway Mer- cury, Merbam, Erad, Metasol, Quicksan, Tag-c-lect	Eradicant fungicide, selective herbicide (crabgrass). Bacterial control, brown patch, dollar spot.
Puraturf	No common (cadmium-copper- zinc chromate complex)	Miller 531, Cragturf Fungicide 531	Turf fungicide. Brown patch, copper spot, dollar spot, snow mold.
Thiabendazole	Thiabendazole	Mertect 140-F, Thibenzole, TBZ, Tobaz	<i>Systemic fungicide</i> . Brown patch, <i>Fusarium</i> patch, dollar spot, Broad spectrum.
** Thiophanate Ethyl LD ₅₀ -15,000 mg/kg	Thiophanate	Cleary's 3336*, TD- 1604, Topsin-M, Cercobin-M, MF-44	Broad spectrum <i>systemic turf fungicide</i> showing curative effect.
Thiophanate Methyl LD ₅₀ -7,500 mg/kg	Thiophanate Methyl	TD 1771, MF-509, Topsin-M, Cercobin-M, MF-44	Broad spectrum <i>systemic turf fungicide</i> . Shows curative effect.
Thiram LD ₅₀ -780 mg/kg	Thiram	Thiramad, Arasan, Arasan 42-S, Fermide 850, Hexathir, Mercu- ram, Nomersam, Poly- ram-Ultra, Pomarsol Forte, Spotrete, Ter- san, Thimer, Thiotex, Thirasan, Thylate, Tirampa, TMTDS, Trametan, Tripomol, Tuads, Vancide, TM- 95, Vancide-TM Flowable, Turf tox, Pandram, D&P Turf tox	Fungicide. Controls dollar spot, snow mold, brown patch, copper spot, melting out, damping off.
Zineb LD ₅₀ -5200 mg/kg	Zineb	Aspor, chem Zineb, Dithane Z-78, Hexa- thane, Kypzin, Lona- col, Pamosol 2 Forte, Parzate C., Polyram Z, Tiezene, Tricarbamix, Tritofterol, Zebtox, Zidan, Zinosan, Fungi-kill.	Fungicide for turf. Fading out and <i>Helminthosporium</i> complex, melt- ing out, pink patch or red thread.

*Does not have final USDA label.

**Denotes mercury product—may be restricted or prohibited in some states.

COMBINATIONS

Chem Neb 54—maneb and zinc.
Dithane M-22 Special, Vancide and Maneb also
contains zinc (inert)

With zinc to form *Zineb*. (Mixed in tank.)

PCNB plus Captan = Ortho Lawn Disease Control

With 75% thiram & 3% PMA to form *Thimer* (controls
dollar spot, snow mold, copper spot).

Thiuram 75—tetramethyl thiuram disulfide.
Thiuram M—Thiram 75 mercurous chloride +
mercuric chloride
Thiram + PMA = Scuttl
Mercuram—75% thiram, 4.5% PMA, 31.3%
malachite green

Thimer—75% thiram, 3% PMA.
Cad-Trete-Cadmium chloride plus thiram.

Mixed with nabam and zinc sulfate in spray
tank will form *Zineb*.

FORMULATIONS

80% Wettable Powder.

Liquid containing 22% active
ingredient or 93% wettable powder.

50% Wettable Powder, plus various
dusts.

10% and 20% liquids (10% most
common)

60% Wettable Powder. 5% and 10%
flowable dusts (experimental).

50% Wettable Powder.

Wettable Powder.

Dust, Wettable Powder, water
suspension.

80% Wettable Powder

<u>Material</u>	<u>Ingredient</u>	<u>Cost per unit and package</u>	<u>Rate per 1000 sq. ft.</u>	<u>Cost per oz.</u>	<u>Cost per 1000 sq. ft.</u>
ACTI-DIONE FERRATED	Actibiotic Actidione	81.00/case 8.50/box, 14 oz. 12 box/case	1 oz.	.607	.61
ACTI-DIONE THIRAM	Actibiotic Actidione	76.20/case 6.50/bag, 12x20 oz./case	2 oz.	.325	.65
ACTI-DIONE RZ	Actibiotic Actidione	100.20/18# case 12 x 24 oz. bag	2 oz.	.354	.71
CADDY	Cadmium carbonate	92.50/5 gal. 18.50/gal.	1oz.	.144	.14
CADMINATE	Cadmium carbonate	10.70/#/25# drum	½ oz.	.668	.334
*CALO-CLOR	Mercuric & mercurous chloride	11.22/#/25# drum	1 oz. 2 oz.	.700	.70 1.40
*CALO-GRAN	Mercuric & mercurous chloride	.70/#/10x 30# bags	6 lb.	.043	4.20
CLEARY'S 3336	1,2 bis-(3-ethoxy- carbonyl-2-thioureido) benzene	99.00/12#	2 oz.	.543	1.09
DACONIL	Tetrochloraiso- phthalonitrille	62.40/case 12x2#/case	4 oz.	.162	.65
DEXON	p-Dimethylamino- benzenediazo sodium sulfonate	91.20/24# 8x3# cans	4 oz.	.238	.95
DYRENE	2, 4-Dichloro-6-o chloroanilino-S- triazine	68.00/32# case 8x4# bags	4 oz.	.165	.66
FORE	Manganese dithio- carbamate, zinc	67.00/50# drum	5 oz.	.084	.42
KOBAN	5-ethoxy-3-trichloro methyl-1, 2, 4 - Thiadiazole	7.92/#/25# drum	4 oz.	.495	1.98
*KROMA- CLOR	Mercuric dimethyl-di- carbamate	3.22/#/25# drum	3 oz.	.201	.60
KROMAD	Cadmium sebacate, potassium chromate, thiram	2.50/#/25# drum	3 oz.	.156	.47
*PANOGEN	Methylmercury dicyandiamide	4.65/gal./30 gal. drum	1½oz.	.072	.11
*PMAS	Phenyl mercuric acetate	13.50/gal.	1 oz.	.107	.11
SEMESAN	Hydroxmercuri- chlorophenol	121.00/25# drum	3 oz.	.30	.90
SPOTRETE	75% thiram (tetramethylthiuram disulfide)	40.50/36# 12x3# bags	3 oz.	.07	.21
TERSAN 75	Tetramethylthiuram disulfide	47.00/36# case 12x3# bags	3 oz.	.081	.24
TERSAN SP	1,4-Dichloro-2,5 dimethyloxybenzene	172.80/36# 12x3# case	6-9 oz.	.300	1.80-2.70

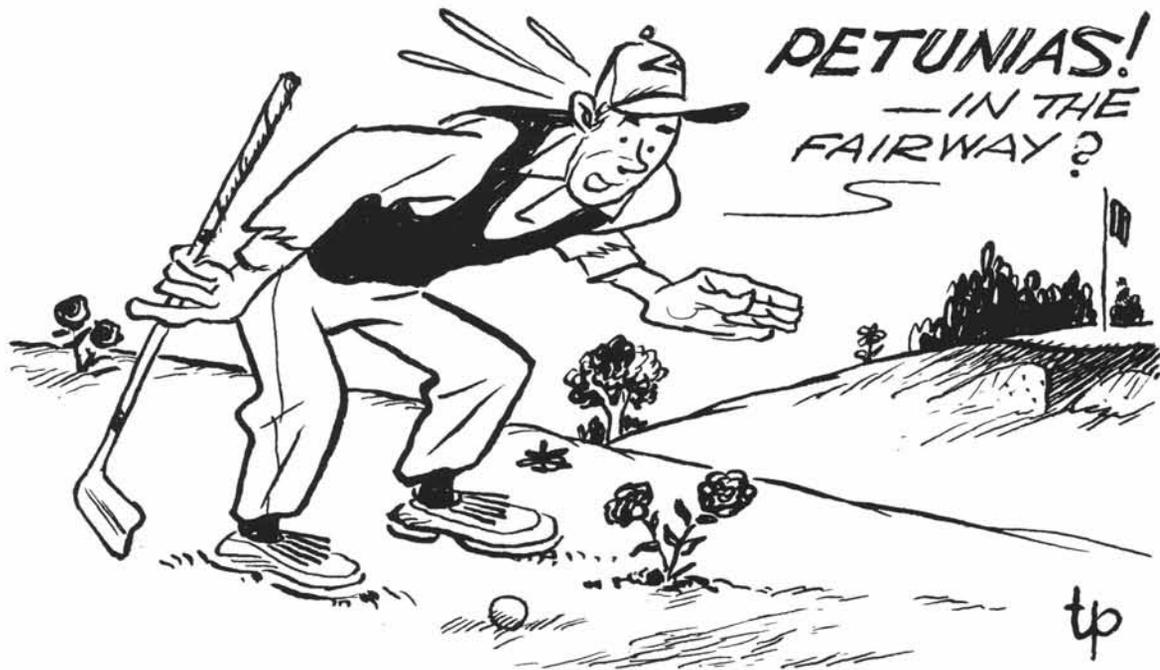
TERSAN LSR	Manganese ethylene bis-dithiocarbamate	30.60/36# 12x3# case	3 oz. .053	.16
TERSAN 1991	Methyl 1-(butylcar bamoyl) -2 benzimid- azolecarbamate	99.60/12# 6x2# bags	1 oz. .546	.55

denotes lb.

*Denotes Mercury Product — May be restricted or prohibited in some states.

SUPER SAM

by Paprocki



Pick the right kind of seed for divots.