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Chemical Disease Controls for the Greenhouse Industry  
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Michigan State University Extension  
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# Chemical Disease Controls for the Greenhouse Industry



Note: An X in the table below indicates which pathogens are listed on product labels by the company selling the product. It does not guarantee that the pesticide products will provide adequate control of the pathogens listed on the label. For more information on how well pesticide products worked in research trials and for the correct rates for specific crops, contact a greenhouse Extension agent in your area.



Trade name	Common name	Company	Vegetables	REI (hrs)	Damping-off, root rot, stem or foliar blight										Notes		
					Phytophthora	Pythium	Cylindrocladium	Fusarium	Rhizoctonia	Sclerotinia	Thielaviopsis	Botrytis rot - fungal	Fungal leaf spots, flower spots, blights	Botrytis spp.		Powdery mildew	Rust
26 GT	iprodione	Bayer		12			X	X	X				X	X	X		Can also be used to control downy mildew on roses and bacterial blight caused by certain pathogens of <i>Xanthomonas</i> on English ivy, schefflera, anthurium and dieffenbachia. Applications should be made prior to disease development.
3336F, G, GC, WP	thiophanate-methyl	Cleary		12			X	X	X	X	X		X	X	X	X	Cleary's 3336F, GC are not labeled for leaf/flower spots or blights. Use of a wetting agent is recommended. Not recommended for use on Swedish ivy, Boston fern or Easter cactus.
4 Flowable Mancozeb	mancozeb	Lesco		24	X		X	X	X					X	X		The use of a spray adjuvant will improve performance. Do not use treated plants for food or feed purposes.
Aliette WDG	aluminum tris	Bayer		12	X	X											Also labeled for the control of downy mildew and fire blight. Can be applied as a foliar spray, drench application or soil incorporation.
Banner MAXX	propiconazole	Syngenta		24										X		X	Do not apply to African violets, begonias, Boston fern or geraniums.
Banoi	propamocarb hydrochloride	Bayer		12	X	X											For use at all stages of ornamental propagation.
Banrot 8G, 40WP	etridiazole + thiophanate-methyl	Scotts		12	X	X			X	X						X	
Biophos	dipotassium phosphates	AgBio		12	X	X									X		Do not mix with any copper-based fungicides or any sticker, extender, or wetting agent. Also labeled for downy mildew control.
Botran 75-W	dicloran	Gowan	X	12									X		X		
Camelot	copper salts	Whitmire Micro-Gen	X	12	X									X	X	X	Camelot is also labeled for control of bacterial diseases <i>Erwinia</i> sp., <i>Pseudomonas</i> sp., and <i>Xanthomonas</i> sp. Labeled for control of downy mildew on snapdragon and viola. Do not apply to easter lily when in bloom.
Captan 4L	captan	Drexel		4 days									X	X	X		Controls damping-off of cuttings. Do not spray the crops listed on the label beyond the point of drip from the leaf surface.
Captan 50WP	captan	Micro-Flo		4 days									X	X	X		Also controls damping-off of cuttings (see label for specific crops). Do not spray the crops listed on the label beyond the point of drip from the leaf surface.
Captec 4L	captan	Micro-Flo		4 days									X	X	X		Also controls damping-off of cuttings (see label for specific crops). Do not spray the crops listed on the label beyond the point of drip from the leaf surface. Open greenhouse vents during and for at least one hour after application.
Champ DP, Formula 2F	copper hydroxide	Agrol	X	24	X								X	X	X		Also labeled for bacterial diseases on certain crops (see label). Dry prill is a formulation resulting in virtually no dust. Do not tank mix with Aliette.
Champion WP	copper hydroxide	Agrol	X	24	X								X	X	X		Also controls bacterial leaf spot on certain crops (see label) and downy mildew on pansy and snapdragon. Do not apply to hibiscus in flower. To avoid residues on commercial plants, do not spray just before selling. Do not tank mix with Aliette.
Compass O	trifloxystrobin	Olympic		12						X			X	X	X	X	Also controls downy mildew. Applications to poinsettia after bract formation may cause injury. May cause injury to petunia, violet and New Guinea impatiens.
Concorde	chlorothalonil	Griffin		12	X		X	X	X	X			X	X	X	X	Avoid applications during bloom periods. For poinsettia, discontinue applications prior to bract formation.
Consan Triple Action 20	quaternary ammonium chlorides	Parkway Research Corp.		48			X	X	X	X			X	X	X	X	Also controls downy mildew. Labeled as a greenhouse disinfectant.
ConSyst WDG	chlorothalonil + thiophanate	Regal		48									X	X	X		Labeled as fungistatic to Pythium diseases when used in a regular program. Also labeled for downy mildew.
Contrast 70WSP	flutolanil	Scotts		12						X						X	Use with a surfactant may improve coverage. Make no more than 4 applications of Contrast 70WSP per year to ornamental plantings.
Cygnus, Cygnus 50WG	kresoxim-methyl	BASF, Scotts		12									X		X	X	Also labeled for downy mildew on rose and snapdragon.
Daconil Ultrex, Weather Silk, Zn	chlorothalonil	Syngenta		48	X		X	X	X	X			X	X	X	X	Daconil Ultrex and Weather Silk have an REI of 12 hours. Do not apply to either green or variegated pittosporum or schefflera.
Decree 50WDG	fenhexamid	SePRO		12										X			This product should be used in a program with other fungicides to provide seasonlong protection. Avoid making more than 2 consecutive applications of this product. After the second application, use an alternative botryticide for 2 consecutive sprays before reapplying this product.
Dithane T/O, WF	mancozeb	Dow Agro		24	X		X	X	X				X	X		X	Use with a surfactant will improve performance. Do not apply on French dwarf double or signet-type marigold seedlings. Do not use for food or feed purposes. Apply twice weekly to chrysanthemums during blooming period.
Eagle 40WP	myclobutanil	Dow Agro		24									X		X	X	Do not use treated plant materials for food or feed purposes.
Echo 90DF, Zn	chlorothalonil	Sipcam		12	X		X	X	X				X	X	X	X	Discoloration of azalea, hydrangea and petunia blooms has been noted on certain varieties when applications are made during flowering.
Fore, 80WP	mancozeb	Dow Agro		24	X		X	X	X				X	X		X	The addition of a spreader-sticker will improve fungicide performance. Do not apply on French dwarf double or signet-type marigold seedlings. Do not use treated plants for food or feed purposes.
Fungo 50, Flo	thiophanate-methyl	Scotts		12			X	X	X	X	X		X	X	X	X	Also controls <i>Penicillium</i> rots when used on preplanted bulbs. Addition of surfactant improves distribution of product on hard-to-wet plants such as roses.
Heritage	azoxystrobin	Syngenta		4	X			X	X				X	X	X	X	The addition of a non-silicone based wetter-sticker is recommended to enhance coverage. Also controls downy mildew on rose. To reduce possible resistance, do not make more than 3 sequential applications between alternating with a fungicide with a different mode of action.
Iprodione Pro 2SE	iprodione	Micro-Flo		12			X	X	X				X	X	X		Do not use this product as a soil drench on impatiens and pothos. Do not use Iprodione Pro 2SE on spathiphyllum.
Junction	mancozeb	Griffin		24	X								X	X	X	X	Do not apply in a spray solution of pH less than 6.0. Also controls certain bacterial diseases (see label). Avoid spraying azaleas, carnations, chrysanthemums and roses just prior to selling season because of possible foliar and/or bloom discoloration. Not recommended for use on French marigold. Do not use treated plants for food or feed purposes.
Kocide 2000	copper hydroxide	Griffin	X	24	X								X	X	X		Kocide 2000 T/N/O is not labeled for use on vegetables. Also controls bacterial leaf spot on certain crops (see label) and downy mildew on pansy. Discoloration of foliage and/or blooms of some crops has been noted.
KOP Hydroxide 50W	copper hydroxide	Drexel		48	X								X	X	X		Do not use in a spray solution of pH less than 6.5 or greater than 9.0. Also controls bacterial leaf spot on certain cultivars. Discoloration of azalea, carnation, chrysanthemum, ivy and rose foliage and/or blooms has been noted in some varieties. To prevent residues on commercial plants, do not spray just before selling season.
Mancozeb DG	mancozeb	Lesco		24	X		X	X	X				X	X		X	The use of a spray adjuvant will improve performance. Do not use treated plants for food or feed purposes.
Manhandle	mancozeb & myclobutanil	Lesco		24			X						X	X	X	X	Do not use on French dwarf double or signet-type marigold seedlings. Do not apply through irrigation.
Manicure 6 Flowable, Ultrex	chlorothalonil	Lesco		48	X		X	X	X	X			X	X	X	X	Do not use on green or variegated pittosporum or schefflera because of possible phytotoxicity. Discontinue use prior to poinsettia bract formation because of possible phytotoxicity.
Medallion	fludioxonil	Syngenta		12			X	X	X		X		X	X			Drench applications at seedling stage to impatiens or New Guinea impatiens may cause stunting and/or chlorosis.
Micro Sulf	sulfur	Agrol	X	24									X	X	X	X	Greenhouse-grown crops may be much more sensitive to sulfur injury, so the lowest rate should be tried initially. Also controls two-spotted mite.
MilStop	potassium bicarbonate	Bioworks, Inc.	X	4				X					X	X	X		Do not apply this product with any other fertilizer or pesticide. MilStop is not to be applied through any irrigation system.
Mycostop	<i>Streptomyces griseoviridis</i>	AgBio	X	4	X	X		X	X								Also can be used as a seed treatment.
Nordox 75WG	cuprous oxide	Monterey	X	24	X								X	X	X		Do not tank mix with Aliette fungicide. Labeled for control of many bacterial diseases.
Nu-Cop 3L, 50DF	copper hydroxide	Micro-Flo	X	24	X								X	X	X		Also labeled for downy mildew and bacterial leaf spot on certain crops (see label).
OHP 6672 50W, 4.5L	thiophanate-methyl	Olympic		12			X	X	X	X	X		X	X	X	X	Use of wetting agent is recommended for plants that have leaves that are difficult to wet properly.
PathGuard 6F	chlorothalonil	Whitmire Micro-Gen		12	X		X	X	X	X			X	X	X	X	Avoid applications during bloom periods. For poinsettia, discontinue applications prior to bract formation.
Pentathlon	maneb	Griffin		24	X		X	X	X				X	X		X	Do not use on French dwarf double or signet-type marigold seedlings. Also controls <i>Cylindrocladium</i> on azalea.
Phydan 20	quaternary ammonium chlorides	Maril		12	X	X		X	X				X	X	X	X	Also labeled for downy mildew and certain bacterial diseases (see label). Also labeled for use as a disinfectant on greenhouse work areas and equipment to prevent cross-contamination of fungal and bacterial pathogens, algae, mildews and TMV.
Phyton 27	copper complex	Source Technology		24	X	X	X		X					X	X	X	Also controls <i>Erwinia</i> on a variety of ornamental plants (see label). <i>Pseudomonas</i> on geranium and impatiens, <i>Xanthomonas</i> on begonia and geranium, and downy mildew on snapdragon.
Pipron 84.4LC	piperalin	SePRO		12											X		Use caution when applying to poinsettia bracts and begonias. Do not treat hydrangea after flower buds are visible.
PlantShield HC	<i>Trichoderma harzianum</i>	Bioworks, Inc.	X	0		X	X	X	X	X			X	X	X		Use with a non-ionic spreader-sticker is recommended when applying to foliage or stem. Can be applied in hydroponic systems and subirrigation. Also labeled for <i>Myrothecium</i> and downy mildew. <i>Trichoderma harzianum</i> strain T-22 will colonize roots in growing media at pH 5 to 8, and temperatures from 50 to 94 degrees F.
Propiconazole Pro	propiconazole	Micro-Flo		24									X		X	X	Do not apply to African violets, begonias, Boston fern or geraniums.
Protect T/O	mancozeb	Cleary		24	X	X	X	X	X				X	X		X	The addition of a spreader-sticker will improve fungicide performance.
Revere 10G	pentachloro-nitrobenzene	Lesco		12					X	X			X				
RootShield	<i>Trichoderma harzianum</i>	Bioworks, Inc.	X	0		X	X	X	X	X	X		X				Also labeled for <i>Myrothecium</i> . Granules become active above 50 degrees F and are not effective when temperature remains cold. <i>Trichoderma harzianum</i> strain T-22 will colonize roots in growing media at pH 5 to 8 and at temperatures from 50 to 94 degrees F.
Rubigan EC	fenarimol	SePRO		12											X		Do not apply this product through irrigation.
Sextant	iprodione	Olympic		12			X	X	X				X	X	X		Do not use Sextant as a soil drench on impatiens and pothos.
Spectator	propiconazole	Lesco		24									X	X	X	X	Do not apply to African violet, begonia, Boston fern or geranium.
Spectro 90WDG	chlorothalonil thiophanate-methyl	Cleary		12			X	X	X	X			X	X	X	X	Do not use on green or variegated pittosporum or schefflera more than once. Not recommended for Swedish ivy, Boston fern or Easter cactus.
Stature DM	dimethomorph	SePRO		12	X												Also labeled for control of downy mildew on certain plant species.
Stature WP	dimethomorph + mancozeb	SePRO		24	X		X	X					X	X		X	Also labeled for control of downy mildew on certain plant species.
Strike 50WDG	triadimefon	Olympic		12									X		X	X	
Subdue GR, MAXX	mefenoxam	Syngenta		0	X	X											Check label for precautions concerning specific crops.
Sulfur 90W	sulfur	Drexel	X	24									X	X	X		Also labeled to control mites.
SysStar WDG	thiophanate-methyl + flutolanil	Regal		12					X	X			X	X	X		Make no more than four applications of SysStar per year to ornamental plantings. Do not use any treated plants for food or feed purposes.
SysTec 1998, 1998 WDG	thiophanate-methyl	Regal		12			X	X		X	X		X	X	X		
Sythane WSP	myclobutanil	Dow Agro		24									X		X	X	
T-Storm F, 50WSB	thiophanate-methyl	Lesco		12			X	X	X	X	X		X	X	X	X	This product is not recommended for use on Swedish ivy, Boston fern and Easter cactus.
Terraclor 75WP, 400	quintozene	Uniroyal		12					X	X			X	X	X		Labeled for <i>Botrytis</i> rot, not <i>Botrytis</i> blight. Do not apply to <i>Magnolia fuscata</i> as injury may result.
Terraguard 50W	triflumizole	Uniroyal		12			X	X	X	X			X	X	X	X	Do not use on impatiens plugs. Do not exceed 2 oz/100 gal on impatiens transplants.
Terrazole 35WP	etridiazole	Uniroyal		12	X	X							X	X			
Touche EG	vinclozolin	Lesco		12									X	X			For use in greenhouses and nurseries associated with the production of plants for commercial purposes. Do not use on poinsettias in color or after Nov. 1. Do not use on poinsettia cv. V-14 Glory.
Triact 70	neem oil	Olympic		4									X	X	X	X	Also labeled for downy mildew and insects, including whiteflies, aphids, mites and scales.
Truban 5G, 25EC, 30WP	etridiazole	Scotts		12	X	X											
Turicide 10G	pentachloro-nitrobenzene	Uniroyal	X	12						X	X						Mix Turicide 10G into soil medium for best results.
Vital	potassium phosphate	Griffin		4	X	X											Also controls downy mildew and <i>Xanthomonas campestris</i> .
ZeroTol	hydrogen dioxide	BioSafe Systems		0	X	X		X	X	X	X		X	X	X	X	Also controls downy mildew and <i>Pseudomonas</i> and <i>Xanthomonas</i> . Also labeled for use on greenhouse work areas and equipment.
Zyban WSB	thiophanate-methyl + mancozeb	Scotts		24				X	X	X			X	X	X	X	Also controls downy mildew. Do not use on French marigold or gloxinia.

X = Pathogens are listed on label





# PESTICIDE EMERGENCY INFORMATION

For any type of an emergency involving a pesticide, immediately contact the following emergency information centers for assistance.

Current as of April 2003



## Human Pesticide Poisoning

### POISON CONTROL

From anywhere in the United States, call

**1 - 8 0 0 - 2 2 2 - 1 2 2 2**

## Special Pesticide Emergencies

### Animal Poisoning

Your veterinarian:

Phone No.

**or**

National Animal Poison Control Center (\$45 consultation fee per case)

**\*1-800-548-2423 \*911**

**\* Telephone Number Operated 24 Hours**

### Pesticide Fire

Local fire department:

Phone No.

**and**

**\*911**

### Traffic Accident

Local police department or sheriff's department:

Phone No.

**and**

Operations Division, Michigan State Police:

**\*(517) 336-6605**

### Environmental Pollution

District Michigan Department of Environmental Quality (MDEQ) Office Phone No.

Phone No.

**and**

MDEQ Pollution Emergency Alerting System (PEAS):

**\*1-800-292-4706**

also

**\*1-800-405-0101**

Michigan Department of Agriculture Spill Response

### Pesticide Disposal Information

Michigan Clean Sweep, Michigan Department of Agriculture Environmental Stewardship Division.

Monday – Friday: 8 a.m.–5 p.m.

**(517) 241-0235**

### National Pesticide Information Center

Provides advice on recognizing and managing pesticide poisoning, toxicology, general pesticide information and emergency response assistance. Funded by EPA, based at Oregon State University

**7 days a week; excluding holidays 6:30 a.m. – 4:30 p.m. Pacific Time Zone**

**1-800-858-7378**

**FAX: 1-541-737-0761**

Revised by Carolyn J. Randall, Pesticide Education Program, Michigan State University Extension

# Chemical Disease Controls for the Greenhouse Industry

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The Michigan Department of Agriculture (MDA) requires that chemicals used in the greenhouse must have Worker Protection Standards and list "greenhouse" or "glasshouse" in a location on the label other than the "Agricultural Use Requirements" box.

The MDA has also ruled that if the site, host plant and chemical are listed on the label, insects not on the label may be treated. Any other use inconsistent with the label can lead to injury of crops, humans, animals and the environment and can lead to fines and/or condemnation of the crop.

Vegetables include any plants being used as food or that will be transplanted as food crops later.

Always check the label for updated information. Labels change often. Some chemicals listed in this bulletin may be dropped by the

manufacturer or distributor after publication of this bulletin. If you have questions about the legality and/or the registration status of pesticides, contact your county Extension office, pesticide dealer or manufacturer.

Do not apply chemicals to plants that are stressed (by water, high temperatures or high humidity) because this increases the possibility of phytotoxicity. Always treat a small portion of plants of each variety with any new chemical (or combination of chemicals) and check them for damage 7 days later — before treating the whole crop. Chemicals that may not cause phytotoxicity when applied by themselves may cause damage when mixed together.

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