

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 your MSU horticultural Extension agent.



Trade name	Common name	Company	Vegetables	REI	Damping off, root rot, stem or foliar blight										Notes			
					Phytophthora	Pythium	Cylindrocium	Fusarium	Rhizoctonia	Sclerotinia	Thielaviopsis	Botrytis rot - floral	English Leaf Spot - flower blights	Botrytis spp.		Powdery Mildew	Rust	
4 Flowable Mancozeb	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.
AQ 10	<i>Amelomyces quisqualis</i>	Ecogen		4												X		Best when applied early morning or late evening when humidity is at its highest. Repeat application every 7 to 14 days. Make a minimum of 2 sequential applications to maintain population of the AQ 10 organism.
Alliette T/O	fosetyl-al	Terra		12	X	X												Also labeled to control downy mildew on rose. Suppresses bacterial blight caused by certain pathogens of <i>Xanthomonas campestris</i> .
Banol	propamocarb hydrochloride	Aventis		12	X	X												For use at all stages of ornamental propagation.
Banrot 8G, 40WP	etrizadazole + thiophanate-methyl	Scotts		12	X	X		X	X		X							
Basamid Granular	dazomet	TopPro		24	X	X		X	X	X	X			X	X			Some ornamentals are very sensitive to trace amounts of gaseous product emitted during treatment. Remove all plants in the area prior to use.
Benefit	thiophanate-methyl + iprodione	Scotts		12				X	X					X	X	X		Do not use on spathiphyllum. Do not use as drench on impatiens or pothos. Use caution when applying to cyclamen and poinsettia in bloom or color.
Bio-Trek 22G	<i>Trichoderma harzianum</i>	Wilbur-Ellis	0	0		X		X	X	X								<i>Trichoderma harzianum</i> strain T-22 will colonize roots in all types of growing media, at pH 5 to 8, at temperatures from 50 to 94 degrees F.
Bio-Trek HB	<i>Trichoderma harzianum</i>	Wilbur-Ellis		4		X		X	X									Bio-Trek HB is labeled as a seed treatment. <i>Trichoderma harzianum</i> strain T-22 will colonize roots in all types of growing media, at pH 5 to 8, at temperatures from 50 to 94 degrees F.
Botran 75 W	dicloran	Gowan		12									X					
Captan 80WP	captan	Micro-Flo		4 days									X	X	X		X	Also controls damping-off of cuttings (see label for specific crops). Do not spray crops listed on the label beyond the point of drip from the leaf surface.
Captec 4L	captan	Micro-Flo		4 days									X	X	X		X	Also controls damping-off of cuttings (see label for specific crops). Do not spray crops listed on the label beyond the point of drip from the leaf surface.
Cavalier 2G, 4.5 F, 50 WSB	thiophanate-methyl	Lesco		12			X	X	X	X	X				X			Cavalier is not labeled for leaf/flower spots or blights. Cavalier 2G is labeled to control <i>Botrytis</i> rot, while Cavalier 4.4 F and 50 WSB are labeled to control <i>Botrytis</i> blight. It is not recommended to incorporate Cavalier with potting mix for plug trays or seedling flats. Apply after transplanting.
Champ DP, Formula 2F	copper hydroxide	Agrol	0	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.
Champion WP	copper hydroxide	Agrol	0	48	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.
Chipco 26019	iprodione	Aventis		12			X	X	X				X	X	X			Do not use as a soil drench on impatiens or pothos. A resin-based surfactant should be added to foliar sprays for use on iris, lilies and tulips.
Chipco Alliette WDG	fosetyl-al	Aventis		12	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.
Cinnamite	cinnamaldehyde	Mycotech	0	4												X		Apply in early morning or late afternoon. Not recommended on arbor, begonia, orchids or poinsettia bracts. Also controls mites, aphids, liverworts, hornworts and pearlweeds. The use of a benign spreader should be used when treating for powdery mildew.
Cleary's 3336F, G, GC, WP	thiophanate-methyl	W. A. Cleary		12			X	X	X	X	X	X	X	X	X	X	X	Cleary's 3336G, GC are not labeled for leaf/flower spots or blights. Use of a wetting agent is recommended with F and WP. Not recommended for use on Swedish ivy, Boston fern or Easter cactus.
Compass	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.
Consan Triple Action 20	quaternary ammonium chlorides	Parkway Research Corp		48			X	X	X	X	X	X	X	X	X	X	X	Also controls downy mildew. Also labeled as a greenhouse disinfectant.
Consyst WDG	chlorothalonil + thiophanate-methyl	Regal		48										X	X	X		Labeled as fungistatic to <i>Pythium</i> diseases when used in a regular program. Also labeled for downy mildew.
Contrast 70 WSP	flutolanil	Scotts		12					X				X				X	Use with a surfactant may improve coverage.
Curalan DF, EG	vinclozolin	TopPro		12						X			X	X	X			Curalan DF not labeled for bulb/corm rot. Poinsettias: do not spray in color or after Nov. 1; some cultivars may be sensitive to leaf spotting, do not use on cv. V-14 Glory.
Cygnus	kresoxim-methyl	TopPro		12											X			Do not make more than 6 applications per season.
Daconil 2787F, Ultrex, Weather Stik, Zn	chlorothalonil	Syngenta		48	X		X	X	X	X			X	X	X	X	X	Do not apply to either green or variegated pittosporum or schefflera. Daconil Ultrex has an REI of 12 hours.
Decree 50 WDG	fenhexamid	SePRO		4												X		This product should be used in a program with other fungicides to provide season-long protection. Avoid making more than 2 consecutive applications of this product. After the 2nd application, use an alternative Botryticide for 2 consecutive sprays before reapplying this product.
Defend 10G, 75WP	quintozene	W. A. Cleary		12					X	X			X	X	X			Defend 10G is not labeled for <i>Botrytis</i> . Defend 75WP is labeled for <i>Botrytis</i> storage rot. Do not apply to philodendron or pilea since injury may occur.
Deny	<i>Burkholderia cepacia</i>	Stine Microbial	0	4		X		X	X									
Dithane T/O, WF	mancozeb	Rohm & Haas		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.
Dragon Mancozeb	mancozeb	Dragon Chemical Corp.	0	24	X		X	X	X					X	X	X	X	Also labeled for bacterial spot. Do not use on French dwarf double or signet-type marigold seedlings.
Duosan WP, 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.
Echo 75 WDG, 90DF, 500, 720	chlorothalonil	Sipcam		12	X		X	X	X				X	X	X	X		Echo 90DF and 720 has an REI of 12 hours. Discoloration of azalea, hydrangea and petunia blooms has been noted on certain varieties when applications are made during flowering.
Engage 10G	quintozene	UHS	0	12									X					Do not use on philodendron or pilea since injury may occur.
Exotherm Termit	chlorothalonil	Rigo	0	48											X			Do not apply when greenhouse temperature is above 75 degrees F. Discoloration of blooms has been noted on some varieties.
Fore 80, WSP, XL	mancozeb	Rohm & Haas		24	X		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 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.
Green-Shield	quaternary ammonium chlorides	Whitmire Micro-Gen		12			X	X	X	X	X	X	X	X	X			Labeled as a greenhouse disinfectant to reduce cross contamination of such diseases as root rot, crown rot, <i>Botrytis</i> , downy mildew and tobacco mosaic virus.
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 before alternating with a fungicide with a different mode of action.
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 due to possible foliar and/or bloom discoloration. Not recommended for use on French marigold. Do not use treated plants for food or feed purposes.
Kocide 4.5LF, 101, LF	copper hydroxide	Griffin	0	24	X								X	X	X			Do not use in a spray solution of pH less than 6.5. Also controls bacterial leaf spot on certain crops. Discoloration of foliage and/or blooms of some crops has been noted. To prevent residues on commercial plants, do not apply just before selling season.
Kocide 2000 T/N/O, DF	copper hydroxide	Griffin	0	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 50	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 4F, DG	mancozeb	Lesco		24	X		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.
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 due to possible phytotoxicity. Discontinue use prior to poinsettia bract formation due to possible phytotoxicity.
Medallion	fludioxonil	Syngenta		12			X	X	X		X		X	X				Drench or at-seeding applications to impatiens or New Guinea impatiens may cause stunting and/or chlorosis.
Micro Sulf	sulfur	Agrol	0	24									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.
Mycostop	<i>Streptomyces griseoviridis</i>	AgBio	0	4	X	X		X	X					X				
Nu-Cop 3L, 50 DF	copper hydroxide	Micro-Flo	0	24	X								X	X	X	X		Also labeled for downy mildew and bacterial leaf spot on certain crops (see label).
Ornalin FL	vinclozolin	Scotts		12						X			X	X	X			Ensure that plants dry off quickly after treatment. Do not spray stressed plants. Do not drench growth media. Do not spray seedlings until formation of 3 true leaves. Do not spray poinsettias in color or after Nov. 1. Some cultivars may be sensitive to leaf spotting. Do not use on poinsettia cv. V-14 Glory.
PathGuard 6F, 90DF	chlorothalonil	Whitmire Micro-Gen		12	X		X	X	X	X			X	X	X	X		
Pentathlon	maneb	Griffin		24	X		X	X	X				X	X	X	X		Do not use on french dwarf double or signet-type marigold seedlings. Also controls <i>Cylindrocadium</i> on azalea.
Pentathlon DF	maneb & zinc ion	Griffin		24	X		X	X	X				X	X	X	X		This product is not recommended for use on marigolds due to highly variable plant responses.
Phydan 20	quaternary ammonium chlorides	Maril		12	X	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		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 snapdragons.
Pipron 84.4 LC	piperatin	SePRO		24											X			Use caution when applying to poinsettia bracts and begonias. Do not treat hydrangea after flower buds are visible.
Plant Shield	<i>Trichoderma harzianum</i>	Bioworks, Inc.	0	0		X	X	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 all types of growing media, at pH 5 to 8, at temperatures from 50 to 94 degrees F.
Plantvax 75W	oxycarboxin	Uniroyal		12													X	Do not mix with insecticides and acaricides since plant injury may occur.
Prodigy 80 DG	fosetyl-Al	Lesco		12	X	X												Also controls downy mildew on rose and suppresses bacterial blight caused by certain pathogens of <i>Xanthomonas campestris</i> .
Protect T/O 80WSP	mancozeb	W. A. Cleary		24	X		X		X				X	X			X	Also labeled for downy mildew. The addition of a spreader-sticker will improve fungicide performance.
Quell	metenoxam	Uniroyal		48	X	X			X									Do not apply more than 0.38 fl. oz./100 gals. to pothos and do not make more than 3 applications. Do not apply more than 0.5 fl. oz./100 gals. to Easter lilies and only make one application at the time of transplanting. Do not apply to English ivy more than once every 6 months.
Revere 10G	quintozene	Lesco		12					X	X								Do not apply to philodendron or pilea since injury may occur.
Revere WSP T/O	quintozene	Lesco		12	X	X		X										
RootShield	<i>Trichoderma harzianum</i>	Bioworks, Inc.	0	0		X	X	X	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 all types of growing media, at pH 5 to 8, at temperatures from 50 to 94 degrees F.
Rubigan EC	fenarimol	SePRO		12												X		
SoilGard 12G	<i>Gliocladium virens</i>	Olympic		0	X	X		X	X	X	X	X	X					Will control <i>Phytophthora</i> only at 1.5 lb./cu. yd. Will control <i>Theilaviopsis</i> only with the addition of sulfur to the media. Wait 24 hours before planting seed, cutting, or other unrooted plant material. Plants with established roots can be directly transplanted into treated media.
Spectro 90 WDG	chlorothalonil	W. A. Cleary		12			X	X	X	X			X	X	X	X		Do not use on green or variegated pittosporum or schefflera more than one time. Not recommended for Swedish ivy, Boston fern, or Easter cactus.
Strike 25WDG	triadimefon	Olympic		12									X		X	X		
Subdue 2E, II, Granular 2%	metalaxyl	Syngenta		12	X	X												See label for special instructions for azalea, pothos and Easter lily. Do not apply to English ivy more than once every 6 months, or injury may occur.
Subdue 2X WSP, GR, MAXX	metenoxam	Syngenta		0	X	X												Check label for precautions concerning specific crops.
Systec 1998, 1998 WDG	thiophanate-methyl	Regal		12			X	X		X	X	X	X	X	X			
Sythane WSP	myclobutanil	Rohm & Haas		24											X	X		
Terraclor 75WP, 400	quintozene	Uniroyal	0	12														



PESTICIDE EMERGENCY INFORMATION

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

Current as of August 2000



Human Pesticide Poisoning

MICHIGAN POISON CONTROL SYSTEM

From anywhere in Michigan, call

1-800-POISON 1
1-800-764-7661

Special Pesticide Emergencies

Animal Poisoning

Your veterinarian:

Phone No.

or

Animal Health Diagnostic Laboratory (Toxicology)
Michigan State University:
(517) 355-0281

Phone No.

and

Fire Marshal Division,
Michigan State Police:
M-F: 8-12, 1-5
(517) 322-1924

* **Telephone Number Operated 24 Hours**

Pesticide Fire

Local fire department:

Traffic Accident

Local police department or sheriff's department:

Environmental Pollution

Pollution Emergency Alerting System (PEAS), Michigan Department of Environmental Quality:

Pesticide Disposal Information

Michigan Department of Environmental Quality, Waste Management Division.
Monday - Friday: 8 a.m.-5 p.m.
(517) 373-2730

District MDEQ Office Phone No.

and

For environmental emergencies:
***1-800-292-4706**

also

***1-800-405-0101**
Michigan Department of Agriculture Spill Response

National Pesticide Telecommunications Network

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

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Extension Bulletin E-2750, Major Revision, February 2001
(destroy previous editions)

By Mary K. Hausbeck and Nicole A. Werner
Department of Botany and Plant Pathology
Michigan State University

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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Major Revision (destroy old) 2:01-1.2M-KMF/GP

