

## Commercial Landscape and Nursery Crops Disease Control

D. M. Benson, Professor, Plant Pathology

**Table 10-13. Commercial Landscape and Nursery Crops Disease Control**

DISEASE Pesticide and Formulation	Rate of Formulation (per 100 gallons)	Schedule and Remarks
<b>Anthracnose (<i>Colletotrichum</i>, <i>Gleosporium</i>, <i>Elsinoe</i>, <i>Marssonina</i>, <i>Mycosphaerella</i>, and others)</b>		
azoxystrobin (Heritage)	1 to 4 oz/100 gal	Repeat every 7 to 28 days. Apply at the first sign of disease. Should not be applied to certain plant species; see label. Do not apply to apple or flowering cherry trees. May cause phytotoxicity on certain crabapple cultivars. See label.
chlorothalonil (Daconil Ultrex) 82.5WDG (Daconil WeatherStik) 54F	1.4 lb/100 gal 1.375 pt/100 gal	Reapply at 7- to 14-day intervals.
chlorothalonil + propiconazole (Concert II)	9 to 35 fl oz/100 gal	Apply as a full coverage spray. Reapply at 14 -21 day intervals. Refer to label for specific rate and application instructions.
chlorothalonil + thiophanate-methyl (Spectro) 90WDG	1 to 2 lb/100 gal	Repeat applications at 7- to 21-day intervals, according to label. See label for maximum seasonal application rules.
copper hydroxide  (Champ WG) (Nu-Cop) 50DF (CuPRO 2005)	0.5 lb/100 gal 1 lb/100 gal 0.75 to 2.0 lb/100 gal	Begin at first sign of disease, and repeat at 7- to 14-day intervals. Do not tank mix copper formulations with Aliette. Avoid contact with metal surfaces. Discoloration of blooms may occur on certain plant varieties- check label.
copper hydroxide + mancozeb (Junction)	1.5 to 3.5 lb/100 gal	Phytotoxicity may occur. Reapply at 7- to 14-day intervals.
copper octanoate (Camelot O)	0.5-2.0 gal/100 gal	Begin at first sign of disease, and repeat at 7- to 10-day intervals. Camelot O may cause copper toxicity on some plant species.
copper sulfate pentahydrate (Phyton 27)	See label	See label. To avoid phytotoxicity, do not use any copper compound on alyssum.
cyprodinil + fludioxonil (Palladium)	2 to 4 oz/100 gal	Spray on a 7 to 14 day interval while conditions are conducive to disease development. After two applications, alternate with another fungicide with a different MOA for two applications
mancozeb (Dithane) 75 DF, (Fore) 80 WSP, (Mancozeb DG) (Pentathlon LF) (Protect DF)	1.5 lb/100 gal 0.8 to 1.6 qt/100 gal 1 to 2 lb/100 gal	Repeat application on 7- to 10-day intervals. Use of a spreader sticker will improve performance. Repeat application on 7- to 10-day intervals. Repeat application on 7- to 21-day intervals. Use of a spreader sticker will improve performance.
metconazole (Tourney)	1 to 4 oz/100 gal	Repeat in 14 to 28 days when conditions favor disease
pyraclostrobin + boscalid (Pageant Intrinsic)	8 to 12 oz/100 gal	Apply prior to disease development. Repeat at 7- to 14-day intervals. Make no more than two sequential applications. Do not expose petunia or impatiens in flower or wintercreeper or nine bark to spray or drift as injury may occur.
tebuconazole (Torque)	4 to 8 fl oz/100 gal	Begin applications 14 to 21 days prior to when disease is expected, or at very first sign of disease.
thiophanate-methyl (AllBan Flo) (Cleary 3336) F (SysTec 1998) FL	10.75 to 20 fl oz/100 gal 12 to 16 fl oz/100 gal 20 fl oz/100 gal	Apply as buds break or at first sign of disease. Repeat application on 7- to 14-day intervals.
thiophanate-methyl + mancozeb (Zyban) WSB	24 oz (4 bags) /100 gal	Apply at 7-day intervals.
triticonazole (Trinity) 19SC	8 to 12 fl oz/100 gal	Spray every 7 to 14 days. Use preventively. Begin applications when conditions favor fungal infection and before disease symptom development.
<b>Bacterial Leaf Spot (<i>Pseudomonas</i>, <i>Xanthomonas</i>)</b>		
<i>Bacillus subtilis</i> (Rhapsody, Cease)	2 to 8 qt/100 gal	Begin applications when conditions favor disease development prior to the onset of disease. Thorough coverage is essential. Repeat at 7-day intervals.
copper hydroxide  (Champ WG) (Nu-Cop) 50DF (CuPRO 2005)	0.5 lb/100 gal 1 lb/100 gal 0.75 to 2.0 lb/100 gal	Begin at first sign of disease, and repeat at 7- to 14-day intervals. Do not tank mix copper formulations with Aliette. Avoid contact with metal surfaces. Discoloration of blooms may occur on certain plant varieties- check label.
copper hydroxide + mancozeb (Junction)	1.5 to 3.5 lb/100 gal	Begin at first sign of disease, and repeat at 7- to 14-day intervals.
copper octanoate (Camelot O)	0.5-2.0 gal/100 gal	Begin at first sign of disease, and repeat at 7- to 10-day intervals. Camelot O may cause copper toxicity on some plant species.
copper sulfate pentahydrate (Phyton 27)	See label	
didecyl dimethyl ammonium chloride (KleenGrow)	0.06 to 0.38 fl. oz. per gallon of water	Apply starting at week 3 or earlier if conditions are favorable for disease. Use a watering device to srench the top and bottom of the leaves and stems, avoiding flowers in full bloom, every 14 days to prevent the spread of spores and the build-up of organic material. Remove severely infected plants and disinfect the area with 1.0 fl. oz. KleenGrow per gallon of water.
<b>Black Root Rot (<i>Thielaviopsis basicola</i>)</b>		
etridiazole + thiophanate-methyl (Banrot) 8G  (Banrot) 40W	Broadcast 8 to 12 lb/1,000 sq ft 6 to 12 oz/100 gal	After application, rake in or lightly cultivate soil.  Apply in sufficient volume to saturate the soil mixture. Irrigate immediately. Repeat at 4- to 12-week intervals if necessary. Protects against <i>Thielaviopsis</i> and <i>Pythium</i> but is not as effective against <i>Thielaviopsis</i> as thiophanate-methyl-only products that have a higher concentration of active ingredient.
fludioxonil (Medallion)	1 to 2 oz/100 gal	Apply as a drench at transplanting as a preventive. If needed, re-treat transplants 21 to 28 days after initial application. Do not apply as a seed or soil drench to impatiens or New Guinea impatiens.

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DISEASE Pesticide and Formulation	Rate of Formulation (per 100 gallons)	Schedule and Remarks
<b>Black Root Rot (continued)</b>		
thiophanate-methyl (AllBan Flo) (Cleary 3336) F, (3336) F	7.5 to 20 oz/100 gal 8 to 16 fl oz/100 gal	Apply as a heavy spray or drench at the rate of 1/2 to 2 pints per sq ft. Repeat at 4- to 8-week intervals. Apply 8 oz as a drench or directed spray after seeding, or apply 12 to 16 oz after transplanting. Repeat at 21- to 28-day intervals.
(OHP 6672) 50WP, (T-Storm) 50WSB	12 to 16 oz/100 gal	Apply 1 to 3 pt/sq ft after transplanting to thoroughly soak growing medium. Repeat at 21- to 28-day intervals.
(SysTec 1998) FL (T-Storm Flowable), OHP 6672 (4.5L)	10 to 20 fl oz/100 gal 20 fl oz/100 gal	Apply as heavy spray or drench at a rate of 1 to 2 pints per sq ft. Repeat at 2- to 4-week intervals. Apply as heavy spray or drench at a rate of 1 to 2 pints per sq ft. Repeat at 2- to 4-week intervals.
triflumizole (Terraguard) 50W	1 to 4 oz	Apply as soil drench at 2- to 4-week intervals. Use higher rate under heavy disease pressure. For use in greenhouses, shadehouses, and nurseries.
<b>Black Rot of Bulb Crops (<i>Sclerotinia sclerotiorum</i>)</b>		
PCNB (Terraclor) (Revere) 10G	5 to 9.75 fl oz/100 gal 40 lb/sq ft	Spread evenly on soil and mix into upper 6 to 7 in. of soil.
thiophanate-methyl (AllBan Flo) (Cleary 3336) F	10.75 to 20 oz/100 gal 8 to 16 fl oz/100 gal	Apply late Spring or at first sign of disease. Repeat every 7-14 days as needed during disease period. Apply 8 oz as a drench or directed spray after seeding, or apply 12 to 16 oz after transplanting. Repeat at 21- to 28-day intervals.
(OHP 6672) 50WP, (T-Storm) 50WSB	12 to 16 oz/100 gal	Apply late Spring or at first sign of disease. Repeat every 7-14 days as needed during disease period.
(SysTec 1998) FL, OHP 6672 (4.5L)	20 fl oz/100 gal	Apply as heavy spray or drench at a rate of 1 to 2 pints per sq ft. Repeat at 2- to 4-week intervals.
<b>Black Spot-Rose (<i>Diplocarpon rosae</i>)</b>		
<i>Bacillus subtilis</i> (Rhapsody, Cease)	2 to 8 qt/100 gal	Begin applications when conditions favor disease development, prior to the onset of disease. Thorough coverage is essential. Repeat at 7-day intervals.
chlorothalonil (Daconil Ultrex) 82.5 WDG (Echo) 90DF	1 lb/100 gal 0.875 lb/100 gal	Apply at bud break. Repeat applications at 7- to 14-day intervals. Knockout roses are sensitive to chlorothalonil.
tebuconazole (Torque)	4 to 8 fl oz/100 gal	Begin applications 14 to 21 days prior to when disease is expected, or at very first sign of disease.
thiophanate-methyl (AllBan Flo) (Cleary 3336) F	10.75 to 20 oz/100 gal 8 to 16 fl oz/100 gal	Apply late Spring or at first sign of disease. Repeat every 7-14 days as needed during disease period. Apply 8 oz as a drench or directed spray after seeding, or apply 12 to 16 oz after transplanting. Repeat at 21- to 28-day intervals.
(OHP 6672) 50WP, (T-Storm) 50WSB	12 to 16 oz/100 gal	Apply late Spring or at first sign of disease. Repeat every 7-14 days as needed during disease period.
(SysTec 1998) FL, (T-Storm Flowable), OHP 6672 (4.5L)	20 fl oz/100 gal	Apply as heavy spray or drench at a rate of 1 to 2 pints per sq ft. Repeat at 2- to 4-week intervals.
thiophanate-methyl + mancozeb (Zyban) WSB	24 oz (4 bags)/100 gal	Apply at 7-day intervals.
<b>Botrytis Blight (Gray Mold)</b>		
<i>Bacillus subtilis</i> (Rhapsody, Cease)	2 to 8 qt/100 gal	Begin applications when conditions favor disease development prior to the onset of disease. Thorough coverage is essential. Repeat at 7-day intervals.
chlorothalonil (Daconil Ultrex, Daconil Weatherstik)	1.4 lb/100 gal	Repeat applications at 7- to 14-day intervals.
cyprodinil + fludioxonil (Palladium)	4 to 6 oz/100 gal	Spray on a 7 to 14 day interval while conditions are conducive to disease development. After two applications, alternate with another fungicide with a different MOA for two applications. Cautionary statement on label for applications to Geraniums, Impatiens and New Guinea Impatiens.
fenhexamide (Decree)	See label	Repeat applications at 7- to 14-day intervals. Do not make more than two consecutive applications of product.
fludioxonil (Medallion)	2 to 4 oz/100 gal	Spray to runoff at 7- to 14-day intervals. Do not make more than two consecutive applications of Medallion before rotating to another effective product with a different mode of action.
iprodione (Chipco 26GT) (18 Plus, Iprodione Pro 2SE)	1 to 2.5 qt/100 gal 1 to 2.5 qt/100 gal	Apply at 7- to 14-day intervals. Limit total applications to a maximum of 4 per year.
mancozeb (Dithane, Fore, Mancozeb)	1.5 lb/100 gal	Addition of a nonionic surfactant will improve performance. Re-treat at 7- to 10-day intervals.
metconazole (Tourney)	1 to 4 oz/100 gal	Repeat in 14 to 28 days when conditions favor disease
pyraclostrobin + boscalid (Pageant Intrinsic)	8 to 12 oz/100 gal	Apply prior to disease development. Repeat at 7- to 14-day intervals. Make no more than two sequential applications. Do not expose petunia or impatiens in flower or wintercreeper or nine bark to spray or drift as injury may occur.
<b>Cylindrocladium Stem Canker or Root Rot</b>		
chlorothalonil (Chlorothalonil DF) (Chlorothalonil 500ZN) (Chlorothalonil 720 SFT) (Chlorostar VI, Daconil Weather Stik, Echo 720, Manicure 6F) (Daconil Ultrex) 82.5WDG (Echo) 90DF, (Echo Ultimate) (Exotherm Termil)	See label 1.9 pt/100 gal 1.37 pt/100 gal 1 3/8 pt/100 gal 1.4 lb/100 gal 1.25 lb/100 gal 1 can/1,000 sq ft	Repeat at 7- to 14-day intervals. Apply to foliage when plants are dry or nearly dry.  See label for method of application.
chlorothalonil + thiophanate-methyl (Spectro) 90WDG	1.0 to 2.15 lb per 100 gallons	For best results use spray mixture the same day it is prepared. Spray uniformly over the area to be treated with a properly calibrated power sprayer, apply as a full coverage spray to run-off when conditions are favorable for disease development.

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DISEASE Pesticide and Formulation	Rate of Formulation (per 100 gallons)	Schedule and Remarks
cyprodinil + fludioxonil (Palladium)	2 to 4 oz/100 gal	For stem diseases ensure full spray coverage of all stems and inner areas of the plant to the soil/media. Apply on a 7 to 14 day interval while conditions are conducive to disease development. After two applications, alternate with another fungicide with a different MOA for two applications. No drench applications on label.
<b>Cylindrocladium Stem Canker or Root Rot (continued)</b>		
fludioxonil (Medallion) 50WSP	1 to 2 oz/100 gal	Completely drench the growing medium. Repeat at 21- to 28-day intervals. Two applications per year when conditions favor disease development are usually adequate for control.
pyraclostrobin + boscalid (Pageant Intrinsic)	8 to 12 oz/100 gal	Apply prior to disease development. Completely drench the growing medium. Repeat at 7- to 14-day intervals. Make no more than two sequential applications. Do not expose petunia or impatiens in flower or wintercreeper or nine bark to spray, as injury may occur.
tebuconazole (Torque)	4 to 8 fl oz/100 gal	Begin applications 14 to 21 days prior to when disease is expected, or at very first sign of disease. Not for use in greenhouses.
thiophanate-methyl (AllBan Flo) (Cleary 3336) F	7.5 to 20 fl oz/100 gal 8 to 16 fl oz/100 gal	Apply as drench or heavy spray at 0.5 to 2 pints per sq ft. Repeat at 4- to 8-week intervals. Apply 8 oz after seeding or sticking, or 12 to 16 oz after transplanting as a drench or directed spray at a rate that thoroughly soaks the growing media through the root zone. Repeat every 21 to 28 days.
(OHP-6672) 50WP, (T-Storm) 50WSB	12 to 16 oz/100 gal	Apply as a drench or heavy spray at a rate of 1 to 3 pints per sq ft. Repeat at 21- to 28-day intervals.
(SysTec 1998) FL (T-Storm Flowable), (OHP 6672) 4.5L	10 to 20 fl oz/100 gal 20 fl oz/100 gal	Apply as a drench or heavy spray at a rate of 1 to 2 pints per sq ft. Repeat at 2- to 4-week intervals. Apply as a drench or heavy spray at a rate of 1 to 2 pints per sq ft. Repeat at 2- to 4-week intervals.
triflumizole (Terraguard) 50W	See label	Can be used as a cutting soak or soil drench.
<b>Daylily Leaf Streak (<i>Aureobasidium microstictum</i>)</b>		
chlorothalonil (Daconil Ultrex) 82.5WDG	1.4 lb/100 gal	Apply early in the spring as new growth emerges and before disease symptoms appear. Make three to four applications at 14-day intervals.
mancozeb (Dithane) 75 DF, (Fore) 80 WSP (Protect DF)	1.5 lb/100 gal 1 to 2 lb/100 gal	Apply early in the spring as new growth emerges and before disease symptoms appear. Make three to four applications at 14-day intervals.
thiophanate-methyl (Cleary 3336) F	12 to 16 fl oz/100 gal	Apply early in the spring as new growth emerges and before disease symptoms appear. Make three to four applications at 14-day intervals.
<b>Daylily Rust (<i>Puccinia hemerocallidis</i>)</b>		
Alternately apply a systemic fungicide from Category 1 with a protective fungicide from Category 2 to protect new foliage as it emerges. Re-treat at 7- to 14-day intervals.		
<b>Category 1 Systemics</b>		
azoxystrobin (Heritage)	1 to 4 oz/100 gal	
flutolanil (Contrast)	3 oz/100 gal	
triadimefon (Bayleton)	1 PVA packet/550 to 1,100 gal	Bayleton cannot be used on plants being grown for sale or other commercial use.
(Strike) 25 WDG	4 oz/100 gal	Strike is for commercial greenhouse and nursery use only.
trifloxystrobin (Compass)	2 to 4 oz/100 gal	
<b>Category 2 Protectants</b>		
chlorothalonil (Daconil Ultrex)	1.4 lb/100 gal	
mancozeb (Fore)	1.5 lb/100 gal	
<b>Downy Mildew (<i>Bremia</i>, <i>Pseudoperonospora</i>, <i>Peronospora</i>, <i>Plasmopara</i> spp.)</b>		
azoxystrobin (Heritage)	1 to 2 oz/100 gal (bedding plants) 2 to 4 oz/100 gal (rose)	Apply every 7 to 14 days prior to infection. Do not apply 2-oz rate on less than 14-day intervals. May damage snapdragons; use 1 oz rate and rotate. Apply every 7 to 21 days on rose during periods of active plant growth and prior to dormancy.
copper hydroxide (Champ WG) (Nu-Cop) 50DF (CuPRO 2005)	0.5 lb/100 gal 1 lb/100 gal 0.75 to 2.0 lb/100 gal	Begin at first sign of disease, and repeat at 7- to 14-day intervals. Do not tank mix copper formulations with Aliette. Avoid contact with metal surfaces. Discoloration of blooms may occur on certain plant varieties- check label. To avoid phytotoxicity, do not use any copper compound on alysium.
copper octanoate (Camelot O)	0.5-2.0 gal/100 gal	Begin at first sign of disease, and repeat at 7- to 10-day intervals. Camelot O may cause copper toxicity on some plant species.
copper sulfate pentahydrate (Phyton 27)	See label	See label. To avoid phytotoxicity, do not use any copper compound on alysium.
cyazofamid (Segway)	2.1 to 3.5 fl oz/100 gal	Apply on 14 to 21 day intervals using another registered fungicide with a different mode of action. Apply sufficient volume to wet all foliage until runoff (normally 50 to 100 gallons per acre).
dimethomorph (Stature DM)	6.4 to 12.8 oz/100 gal	Apply at first sign of disease. Apply to obtain complete coverage of flowers, foliage, and stems. Repeat at 10- to 14-day intervals throughout the production cycle. For use on greenhouse and nursery-grown ornamentals.
dimethomorph + ametoctradin (Orvego)	11 to 14 fl oz/100 gal	Apply on 10 to 14 day intervals using another registered fungicide with a different mode of action. Apply sufficient volume to wet all foliage until runoff (normally 50 to 100 gallons per acre).
fosetyl-AI (Aliette) 80WDG	1.25 to 4 lb/100 gal (bedding plants) 2.5 lb/100 gal (roses)	Systemic. Apply prior to disease development. Repeat as necessary, but do not make more than one application every 14 days.
mancozeb (Dithane) 75 DF (Protect DF)	1.5 lb/100 gal 1 to 2 lb/100 gal	Repeat at 7- to 10-day intervals. Reapply in 7 to 21 days.
mandipropamid (Micora)	4 to 8 fl oz/100 gal	This product can also be used on vegetables sold to the retail market in GH with permanent flooring. Apply prior to disease development. Repeat at 7- to 14-day intervals. Make no more than two sequential applications.
mefenoxam Subdue MAXX)	0.5 to 1 fl oz/100 gal	Apply Subdue MAXX as a foliar spray or soil drench treatment.

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DISEASE Pesticide and Formulation	Rate of Formulation (per 100 gallons)	Schedule and Remarks
(Subdue Gr)	See label for rates	Apply Subdue GR as a soil surface or soil/planting media incorporation treatment.
phosphorous acid (Alude, Reliant)	See label	Apply prior to disease development. Spray to thoroughly wet all foliage. Repeat at 14- to 21-day intervals.
<b>Downy Mildew (continued)</b>		
potassium phosphite (Vital)	4 pt/100 gal	Apply as a foliar spray prior to disease onset, and repeat at 14-day intervals.
pyraclostrobin + boscalid (Pageant Intrinsic)	8 to 12 oz/100 gal	Apply prior to disease development. Repeat at 7- to 10-day intervals. Make no more than two sequential applications. Do not expose petunia or impatiens in flower or wintercreeper or nine bark to spray or drift as injury may occur.
thiophanate-methyl + mancozeb (Zyban) WSB	24 oz (4 bags)/100 gal	Apply at first sign of disease, and repeat at 7-day intervals.
<b>Entomosporium Leaf Blight</b>		
azoxystrobin (Heritage) 50WDG	1 to 4 oz/100 gal	Spray at budbreak, and repeat at 7- to 28-day intervals as needed. To avoid fungicide resistance, make no more than three sequential applications of Heritage before rotating with nonstrobilurin products.
chlorothalonil (Daconil Ultrex) 82.5 WDG	1.4 lb/100 gal	Begin applications at budbreak, and continue every 7 to 14 days.
chlorothalonil + propiconazole (Concert II)	22 to 35 fl oz/100 gal	Apply as a full coverage spray. Reapply at 14 to 21 day intervals. Refer to label for specific rate and application instructions.
chlorothalonil + thiophanate-methyl (Spectro 90)	1 to 2 lb/100 gal	Spray at a minimum of 7-day intervals. Apply when foliage is dry.
myclobutanil (Eagle) 20EW (Eagle) 40WP (Systhane) 40 WSP	6 to 12 fl oz/100 gal 3 to 6 oz/100 gal 4 oz/100 gal	Spray every 10 to 14 days.
triadimefon (Bayleton) 50WSP (Strike) 25WDG	1 PVA packet/137.5 to 275 gal 8 to 16 oz/100 gal	In early spring as growth starts, spray every 14 to 21 days until growth is fully expanded. May be phototoxic with repeated applications. Bayleton is not for plants offered for sale or other commercial use.
triticonazole (Trinity) 19SC	12 fl oz/100 gal	Spray every 7 to 14 days. Use preventively. Begin applications when conditions favor fungal infection and before disease symptom development.
<b>Fireblight (<i>Erwinia amylovora</i>)</b>		
copper hydroxide (Champ WG) (Nu-Cop) 50DF (CuPRO 2005)	0.5 lb/100 gal 1 lb/100 gal 0.75 to 2.0 lb/100 gal	Begin at first sign of disease, and repeat at 7- to 14-day intervals. Do not tank mix copper formulations with Aliette. Avoid contact with metal surfaces. Discoloration of blooms may occur on certain plant varieties- check label.
copper hydroxide + mancozeb (Junction)	1.5 to 3.5 lb/100 gal	See label for timing of application.
copper sulfate pentahydrate (Phyton 27)	See label	See label. To avoid phytotoxicity, do not use any copper compound on alyssum.
fosetyl-AI (Aliette)	2.5 lb/100 gal	See label for timing of application.
streptomycin sulfate (Agri-mycin 17)	0.5 lb/100 gal	See label.
<b>Flower Blight. See Petal Blight.</b>		
<b>Fungal Leaf Spots (<i>Alternaria</i>, <i>Cercospora</i>, <i>Cylindrosporium</i>, <i>Phyllosticta</i>, <i>Septoria</i>) Consult product labels for specific fungi controlled</b>		
azoxystrobin (Heritage)	1 to 4 oz/100 gal	Repeat every 7- to 28-days. Apply at the first sign of disease as new growth buds out.
chlorothalonil (Daconil Ultrex) (Daconil WeatherStik)	1.4 lb/100 gal 1.375 pt/100 gal	Reapply at 7- to 14-day intervals.
chlorothalonil + propiconazole (Concert II)	9 to 35 fl oz/100 gal	Apply as a full coverage spray. Reapply at 14 to 21 day intervals. Refer to label for specific rate and application instructions.
chlorothalonil + thiophanate-methyl (Spectro) 90WDG	1 to 2 lb/100 gal	Repeat applications at 7- to 21-day intervals depending on plant treated; see label.
copper hydroxide (Champ WG) (Nu-Cop) 50DF (CuPRO 2005)	0.5 lb/100 gal 1 lb/100 gal 0.75 to 2.0 lb/100 gal	Begin at first sign of disease, and repeat at 7- to 14-day intervals. Do not tank mix copper formulations with Aliette. Avoid contact with metal surfaces. Discoloration of blooms may occur on certain plant varieties- check label.
copper hydroxide + mancozeb (Junction)	1.5 to 3.5 lb/100 gal	Reapply at 7- to 14-day intervals.
copper octanoate (Camelot O)	0.5-2.0 gal/100 gal	Begin at first sign of disease, and repeat at 7- to 10-day intervals. Camelot O may cause copper toxicity on some plant species.
copper sulfate pentahydrate (Phyton 27)	See label	
cyprodinil + fludioxonil (Palladium)	2 to 6 oz/100 gal	Spray on a 7 to 14 day interval while conditions are conducive to disease development. After two applications, alternate with another fungicide with a different MOA for two applications. Cautionary statement on label for applications to Geraniums, Impatiens and New Guinea Impatiens.
mancozeb (Dithane) 75 DF, (Fore) 80 WSP, Mancozeb DG) (Pentathlon LF) (Protect DF)	1.5 lb/100 gal 1.2 qt/100 gal 1 to 2 lb/100 gal	Repeat application at 7- to 10-day intervals. Addition of a spreader sticker will improve performance.
metconazole (Tourney)	1 to 4 oz/100 gal	Repeat in 14 to 28 days when conditions favor disease

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myclobutanil (Eagle) 40WP (Systhane) 40WSP	3 to 6 oz/100 gal 4 oz/100 gal	Apply as a protectant every 10 to 14 days.
<b>Fungal Leaf Spots (continued)</b>		
pyraclostrobin + boscalid (Pageant Intrinsic)	8 to 12 oz/100 gal	Apply prior to disease development. Repeat at 7- to 14-day intervals. Make no more than two sequential applications. Do not expose petunia, or impatiens in flower or wintercreeper, or nine bark to spray or drift as injury may occur.
tebuconazole (Torque)	4 to 8 fl oz/100 gal	Begin applications 14 to 21 days prior to when disease is expected, or at very first sign of disease.
thiophanate-methyl (AllBan Flo) (Cleary's 3336) F (SysTec 1998) FL (Zyban) WSB	10 to 14.5 fl oz/100 gal 12 to 16 fl oz/100 gal 20 fl oz/100 gal 24 oz (4 bags) /100 gal	Apply at first sign of disease. Repeat application at 7- to 14-day intervals.
triadimefon (Bayleton, Strike)	See label	
triticonazole (Trinity) 19SC	4 to 8 fl oz/100 gal	Spray every 7 to 14 days. Use preventively. Begin applications when conditions favor fungal infection and before disease symptom development. Use of an adjuvant/spreader sticker can aid in control.
<b>Fusarium Root and Crown Rot</b>		
azoxystrobin (Heritage)	Directed spray: 1 to 4 oz/100 gal Drench: 0.2 to 0.9 oz/100 gal	Repeat every 7 to 21 days. Apply 1 to 2 pt of solution per sq ft every 7 to 28 days.
cyprodinil + fludioxonil (Palladium)	2 to 4 oz/100 gal	For stem diseases ensure full spray coverage of all stems and inner areas of the plant to the soil/media. Apply on a 7 to 14 day interval while conditions are conducive to disease development. After two applications, alternate with another fungicide with a different MOA for two applications.
fludioxonil (Medallion)	1 to 2 oz/100 gal	Wet entire medium. Reapply at 21- to 28-day intervals. May cause phytotoxicity when applied to impatiens, New Guinea impatiens, and geraniums.
thiophanate-methyl (AllBan Flo) (Cleary's 3336) G	7.5 to 20 fl oz/100 gal 22 to 30 lb/1,000 sq ft	Apply as drench or heavy spray after transplanting. Repeat at 2- to 4-week intervals. For preventative control, incorporate into media prior to planting or as a broadcast, or make an over the top application after seeding or transplanting. For curative control, apply when disease first appears. Repeat every 21 to 28 days.
(Cleary 3336) F	Drench: 8 to 16 fl oz/100 gal	Apply after seeding or transplanting at a rate to thoroughly soak growing medium. Repeat every 21 to 28 days.
(SysTec 1998) FL	10 to 20 fl oz/100 gal	Apply as drench or heavy spray after transplanting. Repeat at 2- to 4-week intervals.
pyraclostrobin + boscalid (Pageant Intrinsic)	12 to 18 oz/100 gal	Apply prior to disease development. Repeat at 7- to 14-day intervals. Make no more than two sequential applications. Do not expose petunia, or impatiens in flower or wintercreeper, or nine bark to spray or drift as injury may occur.
triflumizole (Terraguard) 50W	4 to 8 oz/100 gal	Apply soil drenches at weekly intervals. Use higher rate under heavy disease pressure.
triticonazole (Trinity) 19SC	8 to 12 fl oz/100 gal	Apply every 7 to 14 days. Use preventively. Begin applications when conditions favor fungal infection and before disease symptom development. The stem areas of the plant must be thoroughly covered using spray to runoff.
<b>Gray Mold. See Botrytis Blight.</b>		
<b>Iris Leaf Spot (<i>Didymellina macrospora</i>/<i>Mycosphaerella macrospora</i>)</b>		
azoxystrobin (Heritage)	2 to 4 oz/100 gal	Apply every 7 to 21 days.
chlorothalonil (Daconil Ultrex) (Daconil WeatherStik)	1.4 lb/100 gal 1.375 pt/100 gal	Apply to new growth at 7- to 14-day intervals in spring.
mancozeb (Dithane) 75 DF, (Fore) 80 WSP, Mancozeb DG) (Pentathlon LF) (Protect DF)	1.5 lb/100 gal 0.8 to 1.6 qt/100 gal 1 to 2 lb/100 gal	Addition of a spreader sticker will improve performance. Repeat applications on 7- to 10-day intervals. Apply at 7- to 21-day intervals.
myclobutanil (Eagle) 20EW (Eagle) 40WP (Systhane) WSP	12 fl oz/100 gal 6 oz/100 gal 8 oz/100 gal	Apply on a 10- to 14-day schedule to new growth in spring.
<b>Kabatina Twig Blight</b>		
thiophanate-methyl (Cleary 3336) F	16 to 24 fl oz/100 gal	Apply at 7- to 14-day intervals. Disease not easily controlled. Fall applications may reduce disease the following year.
<b>Leaf and Flower Gall (<i>Exobasidium</i> spp.)</b>		
triadimefon (Bayleton) 50WSP (Strike) 25W	1 PVA packet (11 oz/550 gal) 4 oz/100 gal	Begin applications at bud break, and apply at 10-day intervals. Bayleton cannot be used on plants grown for sale or other commercial use. Strike is for use in commercial nurseries, garden centers, and greenhouses only.
ferbam (Granuflo)	1 to 1.5 lb/100 gal	Apply to plants, flowers, and litter around plants at 3- to 4-day intervals during bloom.
<b>Petal or Flower Blight of Azalea, Rhododendron, or Camellia (<i>Ovulinia</i> spp., <i>Ciborinia camelliae</i>, <i>Sclerotinia camelliae</i>)</b>		
mancozeb (Dithane) 75 DF, (Fore) 80 WSP, (Mancozeb DG) (Protect DF)	1.5 lb/100 gal 1 to 2 lb/100 gal	Beginning when flowers start to show color, spray two or three times each week during bloom. Direct spray into flowers and thoroughly spray ground under bushes.
myclobutanil (Eagle) 40WP (Systhane) 40WSP	3 to 6 oz/100 gal 4 oz/100 gal	Beginning when flowers start to show color, spray every 10 to 14 days.
propiconazole (Banner MAXX)	5 to 8 fl oz/100 gal	Spray every 21 days during bloom.

**Table 10-13. Commercial Landscape and Nursery Crops Disease Control**

DISEASE Pesticide and Formulation	Rate of Formulation (per 100 gallons)	Schedule and Remarks
tebuconazole (Torque)	4 to 8 fl oz/100 gal	Apply 2 to 3 times per week into the flowers as they open and develop.
<b>Petal or Flower Blight of Azalea, Rhododendron, or Camellia (continued)</b>		
thiophanate-methyl (AllBan Flo) (Cleary 3336) F (OHP 6672) 50WP, (T-Storm) 50WSB (SysTec 1998) FL, (T-Storm Flowable), OHP 6672 (4.5L)	10.75 to 20 oz/100 gal 8 to 16 fl oz/100 gal 8 to 16 oz/100 gal 20 fl oz/100 gal	Apply as flowers open. Repeat every 7 to 14 days.
triadimefon (Bayleton) 50WSP  (Strike) 25WDG	1 PVA packet (11 oz/137.5 to 275 gal) 8 to 16 oz/100 gal	Make one application as first flower buds show color. Spray later varieties as they show color at 7- to 14-day intervals. Bayleton cannot be used on plants being grown for sale or other commercial use. Strike is for use in commercial nurseries, garden centers, and greenhouses only.
<b>Phomopsis Twig Blight</b>		
azoxystrobin (Heritage)	1 to 4 oz/100 gal	Apply at the first sign of disease, as new growth buds out. Repeat every 7 to 28 days.
cyprodinil + fludioxonil (Palladium)	2 to 4 oz/100 gal	For stem diseases ensure full spray coverage of all stems and inner areas of the plant to the soil/media. Apply on a 7 to 14 day interval while conditions are conducive to disease development. After two applications, alternate with another fungicide with a different MOA for two applications.
mancozeb (Dithane) 75 DF, (Fore) 80 WSP, (Mancozeb DG) (Pentathlon LF) (Protect DF)	1.5 lb/100 gal 0.8 to 1.6 qt/100 gal 1 to 2 lb/100 gal	Addition of a spreader sticker will improve performance. Repeat application on 7- to 10-day intervals.
propiconazole (Banner MAXX)	5 to 8 fl oz/100 gal	For junipers, make first application as soon as new growth is observed. Repeat application every 14 to 21 days during period of active plant growth.
pyraclostrobin + boscalid (Pageant Intrinsic)	8 to 12 oz/100 gal	Apply prior to disease development. Repeat at 7- to 14-day intervals. Make no more than two sequential applications. Do not expose petunia, or impatiens in flower or wintercreeper, or nine bark to spray or drift as injury may occur.
thiophanate-methyl (AllBan Flo)  (Cleary 3336) F (T-Storm) 50WSB (SysTec 1998) FL, (T-Storm Flowable), OHP 6672 (4.5L)	14.5 to 20 fl oz/100 gal 16 to 24 fl oz/100 gal 24 oz/100 gal 20 fl oz /100gal	Repeat at 10- to 14-day intervals.  Apply when symptoms first appear. Re-treat every 7 to 14 days as needed during disease period. Apply in spring; repeat every 7 to 10 days.
thiophanate-methyl + mancozeb (Zyban)	6 bags (36 oz/75 gal)	Apply at 7- to 10-day intervals.
<b>Phytophthora and Pythium Root Rot</b>		
cyazofamid (Segway)	3 to 6 fl oz/100 gal	Apply at 14 to 21 day intervals using another registered fungicide with a different mode of action. Irrigate with at least ½ inch of water if rainfall does not occur within 24 hrs. For container plants, check label for recommended maximum drench volume based on pot diameter.
dipotassium phosphonate + dipotassium phosphate (Biophos)	256 fl oz/100 gal	Apply as a soil drench or foliar spray as a preventative.
dimethomorph (Stature DM) 50W	6.4 to 12.8 oz/100 gal	Apply at 10- to 14-day intervals through production cycle. When applied as a drench, use enough solution to wet root zone of the plant. No more than two applications of Stature DM can be applied consecutively in a crop. <b>Not effective on Pythium root rot.</b>
dimethomorph + ametoctradin (Orvego)	11 to 14 fl oz	NOT LABELED FOR PYTHIUM. Apply on 10 to 14 day intervals using another registered fungicide with a different mode of action. Apply sufficient volume to wet all foliage until runoff (normally 50 to 100 gallons per acre).
etridiazole (Truban) 30WP  (Terrazole) 35WP	3 to 10 oz/100 gal/400 sq ft 3.5 to 10 oz/100 gal	Apply in sufficient volume to saturate the soil mixture. Water in immediately after application. Repeat at 4- to 12-week intervals.
etridiazole + thiophanate-methyl (Banrot) 40WP (Banrot) 8G	6 to 12 oz/100 gal See label	Apply in sufficient volume to saturate the soil mixture. Irrigate immediately with additional water equal to at least half the volume of the fungicide drench. Re-treat at 4- to 12-week intervals. For use in nursery crops. See label.
fluopicolide (Adorn)	1 to 4 fl oz/100 gal	MUST ALWAYS BE TANK MIXED WITH THE LABELED RATE OF ANOTHER FUNGIIDE WITH A DIFFERENT MODE OF ACTION. Apply before disease development. Use higher rate when treating plants with high potential for disease. Reapply after 14 to 28 days.
fosetyl-AI (Aliette) 80WP	See label	Can be applied as a preventative foliar or drench application. Can be incorporated into the soil for control of Phytophthora species.
mandipropamid (Micora)	4 to 8 fl oz/100 gal	This product can also be used on vegetables sold to the retail market in GH with permanent flooring. Apply prior to disease development. Repeat at 7- to 14-day intervals. Make no more than two sequential applications.
mefenoxam (Fenox ME, Mefenoxam 2, Subdue MAXX, Subdue GR)	See label	Can be applied as a drench or soil surface spray or soil incorporation treatment (granular). Consult label for specific crops and applications. Repeat at 2- to 3-month intervals. Do not apply rates of 1.25 fl oz per 100 gal more often than every 3 months.
phosphorous acid (Alude, Fosphite, Reliant)	See label for rates	Apply as a soil drench or foliar spray as a preventive.
potassium phosphite (Vital)	See label	Apply as a soil drench or foliar spray as a preventive.
propamocarb (Banol)	See label	Do not use for field-grown ornamentals.
<b>Powdery Mildew</b>		
azoxystrobin (Heritage) 50WDG	1 to 4 oz/100 gal	Apply only as a preventative. Spray every 7 to 28 days as needed. To avoid fungicide resistance, make no more than

**Table 10-13. Commercial Landscape and Nursery Crops Disease Control**

DISEASE Pesticide and Formulation	Rate of Formulation (per 100 gallons)	Schedule and Remarks
		two sequential applications of Heritage before rotating with nonstrobilurin products. Do not apply to apple, flowering cherry, or crabapple. See label.
<i>Bacillus subtilis</i> (Rhapsody, Cease)	2 to 8 qt/100 to 300 gal	Begin applications when conditions favor disease development prior to the onset of disease. Thorough coverage is essential. Repeat at 3- to 10-day intervals.
<b>Powdery Mildew (continued)</b>		
chlorothalonil (Daconil Ultrex) 82.5 WDG	1.4 lb/100 gal	Spray at 7- to 14-day intervals. Applications made during bloom may damage flowers.
chlorothalonil + propiconazole (Concert II)	22 to 35 fl oz/100 gal	Apply as a full coverage spray. Reapply at 14 to 21 day intervals. Refer to label for specific rate and application instructions.
copper octanoate (Camelot O)	0.5-2.0 gal/100 gal	Begin at first sign of disease, and repeat at 7- to 10-day intervals. Camelot O may cause copper toxicity on some plant species.
copper sulfate pentahydrate (Phyton 27)	See label	
cyprodinil + fludioxonil (Palladium)	2 to 6 oz/100 gal	Spray on a 7 to 4 day interval while conditions are conducive to disease development. After two applications, alternate with another fungicide with a different MOA for two applications.
metconazole (Tourney)	1 to 4 oz/100 gal	Repeat in 14 to 28 days when conditions favor disease
myclobutanil (Eagle) 20EW (Eagle) 40WP (Systhane) 40WSP	8 fl oz/100 gal 3 to 6 oz/100 gal 4 oz/100 gal	Apply at 10- to 14-day intervals.
potassium bicarbonate (Kaligreen)	1 to 3 lb/100 gal	Apply at 7- to 10-day intervals.
propiconazole (Banner MAXX)	5 to 12 fl oz/100 gal	See label for appropriate rate and application intervals. For application in field nurseries and landscape plantings.
pyraclostrobin + boscalid (Pageant Intrinsic)	6 to 12 oz/100 gal	Apply prior to disease development. Repeat at 7- to 10-day intervals. Make no more than two sequential applications. Do not expose petunia or impatiens in flower or wintercreeper or nine bark to spray or drift as injury may occur.
tebuconazole (Torque)	4 to 8 fl oz/100 gal	Apply every 14 for a total of three applications at the first sign of disease.
thiophanate-methyl (AllBan Flo) (Cleary 3336) F (OHP 6672) 50WP, (T-Storm) 50WSB (SysTec 1998) FL (T-Storm Flowable), OHP 6672 (4.5L)	10 to 20 oz/100 gal 12 to 24 fl oz/100 gal 8 to 16 oz/100 gal  10 fl oz/100 gal 20 fl oz/100 gal	Apply when disease first appears and repeat every 7-14 days. Rotations with other effective products are recommended. Apply when disease first appears and repeat every 7-14 days. Rotations with other effective products are recommended. Apply when disease first appears and repeat every 7-14 days as needed during disease period. Apply as heavy spray or drench at a rate of 1 to 2 pints per sq ft. Repeat at 2- to 4-week intervals. Apply as heavy spray or drench at a rate of 1 to 2 pints per sq ft. Repeat at 2- to 4-week intervals.
thiophanate-methyl + mancozeb (Zyban) WSB	24 oz (4 bags) /100 gal	Apply at first sign of disease. Repeat at 7-day intervals.
triadimefon (Bayleton) 50WSP  (Strike) 25WDG	1 PVA packet (11 oz/550 to 1,100 gal) 2 to 4 oz/100 gal	Spray as needed. Bayleton cannot be used on plants for sale or other commercial use. Strike is for greenhouse and nursery use only.
trifloxystrobin (Compass O)	2 to 4 oz/100 gal	Apply to point of drip before disease is detected. Apply at 7- to 14-day intervals. Rotate to another nonstrobilurin product after each application.
triticonazole (Trinity) 19SC	6 to 12 fl oz/100 gal	Apply every 7 to 14 days. Use preventively. Begin applications when conditions favor fungal infection and before disease symptom development. Use of an adjuvant/spreader sticker can aid in control.
<b>Rhizoctonia Aerial Blight (<i>Rhizoctonia solani</i>)</b>		
chlorothalonil (Daconil Ultrex)	1.4 lb/100 gal	Spray to runoff. Repeat at 7- to 14-day intervals until conditions no longer favor disease.
cyprodinil + fludioxonil (Palladium)	2 to 6 oz/100 gal	Spray on a 7 to 14 day interval while conditions are conducive to disease development. After two applications, alternate with another fungicide with a different MOA for two applications.
fludioxonil (Medallion)	1 to 2 oz/100 gal	Spray to runoff. Repeat at 7- to 14-day intervals until conditions no longer favor disease.
flutolanil (Contrast) 70WSP (Prostar) 70WP	3 to 12 oz/100 gal	Apply at 14- to 21-day intervals.
iprodione (Chipco 26019 N/G) (18 Plus, Iprodione Pro 2SE)	1.0 to 2.5 qt/100 gal 1.0 to 2.5 qt/100 gal	Spray plants to ensure thorough coverage Repeat at 7- to 14-day intervals. Do not make more than four applications per crop per year.
polyoxin D zinc salt (Endorse 2.5 WP)	1.1 to 2.2 lb/100 gal	Apply as a foliar spray every 7 to 10 days. Apply prior to disease development and when conditions are conducive for disease.
pyraclostrobin + boscalid (Pageant Intrinsic)	12 to 18 oz/100 gal	Apply prior to disease development. Repeat at 7- to 14-day intervals. Make no more than two sequential applications. Do not expose petunia or impatiens in flower or wintercreeper or nine bark to spray or drift as injury may occur.
thiophanate-methyl (Cleary 3336) F	12 to 16 fl oz/100 gal	Apply when disease symptoms first appear. Repeat at 7- to 14-day intervals during disease period.
triflumizole (Terraguard) 50W	4 to 8 oz/100 gal	Make initial application prior to or at first sign of disease. Use the higher rate under heavy disease pressure. Repeat at 7- to 14-day intervals.
<b>Rhizoctonia Stem and Root Rot (<i>Rhizoctonia solani</i>)</b>		
azoxystrobin (Heritage) 50WDG	directed spray: 1 to 4 oz/100 gal drench: 0.2 to 0.9 oz/100 gal	Apply as a directed spray every 7 to 21 days as needed. To avoid fungicide resistance, make no more than three sequential applications of Heritage before rotating with nonstrobilurin products. Apply 1 to 2 pt of solution per sq ft surface area every 7 to 28 days as a preventative drench treatment. Do not exceed 2 oz/100 gal on impatiens or pansy.
chlorothalonil + thiophanate-methyl	1 to 2 lb/100 gal	Retreat at 7-day intervals. Apply as a spray only. Do not apply more than once to green or variegated Pittosporum

**Table 10-13. Commercial Landscape and Nursery Crops Disease Control**

DISEASE Pesticide and Formulation	Rate of Formulation (per 100 gallons)	Schedule and Remarks
(Spectro) 90WDG		due to risk of phytotoxicity. Apply when foliage is dry.
cyprodinil + fludioxonil (Palladium)	2 to 4 oz/100 gal	For stem diseases ensure full spray coverage of all stems and inner areas of the plant to the soil/media. Apply on a 7 to 14 day interval while conditions are conducive to disease development. After two applications, alternate with another fungicide with a different MOA for two applications.
etridiazole + thiophanate-methyl (Banrot) 40W	16 to 12 oz/400 sq ft	Apply in sufficient volume to saturate the soil mixture. Irrigate immediately. Repeat at 4- to 12-week intervals if necessary.
<b>Rhizoctonia Stem and Root Rot (continued)</b>		
fludioxonil (Medallion) 50W	1 to 2 oz/100 gal	Apply as a drench at seeding or transplanting. Apply sufficient mix to wet the upper one-half of the growing medium. Make only one application to seedling crop. If needed, re-treat transplants 21 to 28 days after initial application. Do not apply as a seed or soil drench to impatiens or New Guinea impatiens. May cause stunting or chlorosis on some geranium cultivars. See label for maximum amounts that can be applied per year.
flutolanil (Contrast) 70WSP (Prostar) 70WP	3 to 6 oz/100 gal	Apply drench according to label. Repeat 21 to 28 days after initial application. Make no more than four applications per year to ornamental plantings.
iprodione  (Chipco 26019 N/G) (18 Plus, Iprodione Pro 2SE)	6.5 oz/100 gal 13 fl oz/100 gal	Apply 1 to 2 pints per sq ft at seeding or transplanting. Do not apply as a drench on impatiens or pothos. Repeat every 14 days. Do not make more than six applications per year. Do not use on Spathiphyllum.
metconazole (Tourney)	1 to 4 oz/100 gal	Repeat in 14 to 28 days when conditions favor disease
PCNB (Terraclor) 75WP	4 to 8 oz/100 gal	See label for amount to apply. One repeat application can be made 4 to 6 weeks later, if necessary.
polyoxin D zinc salt (Endorse 2.5 WP)	1.1 to 2.2 lb/100 gal/acre	Apply as a foliar spray every 7 to 10 days. Apply as a drench every 14 to 28 days.
pyraclostrobin + boscalid (Pageant Intrinsic)	12 to 18 oz/100 gal	Apply prior to disease development. Repeat at 7- to 14-day intervals. Make no more than two sequential applications. Do not expose petunia or impatiens in flower or wintercreeper or nine bark to spray or drift as injury may occur.
thiophanate-methyl (AllBan Flo) (Cleary 3336) F  (OHP-6672) 50WP	7.5 to 20 oz/100 gal 8 to 16 fl oz/100 gal  12 to 16 oz/100 gal	Repeat at 4- to 8-week intervals. Apply as a soil drench or directed spray to thoroughly soak growing media through the root zone after seeding or transplanting at 21- to 28-day interval. Apply 1 to 3 pt/sq ft after transplanting to thoroughly soak growing medium. Repeat every 21 to 28 days.
trifloxystrobin (Compass)	0.5 oz/100 gal	Apply as a drench to wet upper half of the growing media. Apply at seeding, transplanting, and at 21- to 28-day intervals thereafter. May injure petunia, violet, and New Guinea impatiens.
triflumizole (Terraguard) 50W	4 to 8 oz/100 gal	Apply as soil drench at 2- to 4-week intervals. Use higher rate under heavy disease pressure.
<b>Rust (also see Daylily Rust)</b>		
azoxystrobin (Heritage)	1 to 4 oz/100 gal commercial rose production: 1.6 to 8 oz	Apply at 7- to 28-day intervals. Do not make more than three sequential applications of Heritage before alternating with a nonstrobilurin fungicide. Should not be applied to certain plant species; see label.
chlorothalonil (Daconil Ultrex)  (Echo) 90DF	1.4 lb/100 gal; 1 lb for roses 1.4 lb/100 gal; 0.875 oz for roses	Apply when foliage and flowers are dry. Repeat at 7- to 14-day intervals. Apply to hydrangea foliage only. Avoid application during bloom period on plants where flower injury is unacceptable.
chlorothalonil + propiconazole (Concert II)	22 to 35 fl oz/100 gal	Apply as a full coverage spray. Reapply at 14 to 21 day intervals. Refer to label for specific rate and application instructions. Higher rate listed for <i>Melampsora occidentalis</i> --use 69 fl oz/100gal.
chlorothalonil + thiophanate-methyl (Spectro) 90	1 to 2 lb/100 gal	Apply when foliage and flowers are dry, or nearly dry. Re-treat at 7-day intervals. Do not exceed 50.6 lb per acre during one season for field-grown ornamentals.
flutolanil (Contrast) 70 WSP	3 to 6 oz/100 gal	Repeat at 14- to 21-day intervals.
mancozeb (Dithane, Mancozeb) (Protect DF)	1.5 lb/100 gal 1 to 2 lb/100 gal	Begin at first sign of disease. Repeat at 7- to 10-day intervals. Apply at 7- to 21-day intervals. To improve performance, add 2 to 4 oz of a spreader-sticker.
metconazole (Tourney)	1 to 4 oz/100 gal	Repeat in 14 to 28 days when conditions favor disease
myclobutanil (Eagle 40WP) (Eagle 20WE (Systhane) 40WSP	3 to 6 oz/100 gal 6 to 12 oz/100 gal 4 oz/100 gal	Apply on a protectant application schedule at 10- to 14-day intervals.
neem oil (Triact 70)	1 gal/100 to 200 gal See label	Apply at 7- to 14-day spray intervals. Trial first on open blooms. To control existing disease, apply on a 7-day schedule until disease pressure is eliminated. Not for impatiens, carnation, or hibiscus.
propiconazole (Banner MAXX)	See label	See label. Do not use in greenhouses.
pyraclostrobin + boscalid (Pageant Intrinsic)	12 to 18 oz/100 gal	Apply prior to disease development. Repeat at 7- to 14-day intervals. Make no more than two sequential applications. Do not expose petunia or impatiens in flower or wintercreeper or nine bark to spray or drift as injury may occur.
tebuconazole (Torque)	4 to 8 fl oz/100 gal	Apply every 14 for a total of three applications at the first sign of disease.
thiophanate-methyl (AllBan Flo) (Cleary 3336) F  (OHP 6672) 50WP, (T-Storm) 50WSB OHP 6672 (4.5L)	10.75 to 20 oz/100 gal 12 to 16 fl oz/100 gal  12 to 16 oz/100 gal  20 fl oz/100 gal	For use on crabapples. Do not use treated crabapples for food. Apply late Spring or at first sign of disease. Repeat every 7-14 days as needed during disease period. Apply 8 oz as a drench or directed spray after seeding, or apply 12 to 16 oz after transplanting. Repeat at 21- to 28-day intervals. Apply late Spring or at first sign of disease. Repeat every 7-14 days as needed during disease period.
thiophanate-methyl + mancozeb (Zyban) WSB	See label	Apply as heavy spray or drench at a rate of 1 to 2 pints per sq ft. Repeat at 2- to 4-week intervals. For use on crabapples.

**Table 10-13. Comercial Landscape and Nursery Crops Disease Control**

DISEASE Pesticide and Formulation	Rate of Formulation (per 100 gallons)	Schedule and Remarks
triadimefon (Bayleton) (Strike)	See label	Spray to the point of drip as needed. See label for spray interval. Bayleton is not for use on plants being grown for sale.
triflumizole (Terraguard) 50W	2 to 8 oz/100 gal	Apply prior to, or at first sign of disease. Repeat at 7- to 14-day intervals.
<b>Scab (<i>Cladosporium</i>, <i>Fusicladium</i>, <i>Spilocea</i>, <i>Venturia</i>)</b>		
mancozeb (Dithane, Fore, Mancozeb)	1.5 lb/100 gal	Begin spraying at first sign of disease, and repeat at 7- to 10-day intervals.
metconazole (Tourney)	1 to 4 oz/100 gal	Repeat in 14 to 28 days when conditions favor disease
<b>Scab (continued)</b>		
myclobutanil (Systhane) 40WSP	4 oz/100 gal	Spray every 10 to 14 days.
propiconazole (Banner MAXX)	See label	See label. Do not use in greenhouses.
pyraclostrobin + boscalid (Pageant Intrinsic)	8 to 12 oz/100 gal	Apply prior to disease development. Repeat at 7- to 10-day intervals. Make no more than two sequential applications. Do not expose petunia or impatiens in flower or wintercreeper or nine bark to spray or drift as injury may occur.
thiophanate-methyl (AlBan Flo) (Cleary 3336) F (SysTec 1998) FL	10.75 to 20 fl oz/100 gal 12 to 16 fl oz/100 gal 20 fl oz/100 gal	Spray at bud break. Repeat three to four times at 7- to 14-day intervals.
thiophanate-methyl + mancozeb (Zyban) WSB	24 oz (4 bags)	Repeat at 7-day intervals.
triticonazole (Trinity) 19SC	6 to 12 fl oz/100 gal	Apply every 7 to 14 days. Use preventively. Begin applications when conditions favor fungal infection and before disease symptom development.
<b>Sclerotinia Stem Rot (<i>Sclerotinia sclerotiorum</i>)</b>		
chlorothalonil (Daconil Ultrex) 82.5 WDG	1.4 lb/100 gal	Repeat at 7- to 14-day intervals when conditions favor disease.
cyprodinil + fludioxonil (Palladium)	2 to 4 oz/100 gal	For stem diseases ensure full spray coverage of all stems and inner areas of the plant to the soil/media. Apply on a 7 to 14 day interval while conditions are conducive to disease development. After two applications, alternate with another fungicide with a different MOA for two applications.
metconazole (Tourney)	1 to 4 oz/100 gal	Repeat in 14 to 28 days when conditions favor disease
PCNB (Revere) 10G (Terraclor) 75W	20 lb/1,000 sq ft 6 to 12 fl oz/100 gal	Apply 1 wk prior to planting; spread on soil surface and mix into soil at a 4-in. depth. See label for amount to apply. One repeat application may be made 4 to 6 weeks later.
pyraclostrobin + boscalid (Pageant Intrinsic)	12 to 18 oz/100 gal	Apply prior to disease development. Repeat at 7- to 10-day intervals. Make no more than two sequential applications. Do not expose petunia or impatiens in flower or wintercreeper or nine bark to spray or drift as injury may occur.
triticonazole (Trinity) 19SC	8 to 12 fl oz/100 gal	Apply every 7 to 14 days. Use preventively. Begin applications when conditions favor fungal infection and before disease symptom development. The stem areas of the plant must be thoroughly covered using spray to runoff.
<b>Shot Hole (<i>Blumeriella</i>, <i>Coccomyces</i> fungal and bacterial)</b>		
copper hydroxide + mancozeb (Junction)	1.5 to 3.5 lb/100 gal	Begin at first sign of disease. Repeat at 7- to 14-day intervals.
mancozeb (Pentathlon DF) (Protect DF)	1 to 2 lb/100 gal	Begin applications at first sign of disease. Apply at 7- to 10-day intervals. Begin applications at first sign of disease. Apply at 7- to 21-day intervals.
thiophanate-methyl (Cleary 3336) F	12 to 16 fl oz/100 gal	Begin when disease first appears, and repeat every 7 to 14 days.
<b>Southern Stem Blight (<i>Sclerotium rolfsii</i>)</b>		
azoxystrobin (Heritage)	directed spray: 1 to 4 oz/100 gal drench: 0.2 to 0.9 oz/100 gal	Apply every 7 to 21 days. Can be used in outdoor nurseries, retail nurseries, residential and commercial landscape areas. Apply 1 to 2 pt solution per square foot surface area every 7 to 28 days, prior to infection. Apply to container-grown ornamentals only.
cyprodinil + fludioxonil (Palladium)	2 to 4 oz/100 gal	For stem diseases ensure full spray coverage of all stems and inner areas of the plant to the soil/media. Apply on a 7 to 14 day interval while conditions are conducive to disease development. After two applications, alternate with another fungicide with a different MOA for two applications.
flutolanil (Contrast) 70WSP (Prostar) 70WP	3 to 6 oz/100 gal	Drench at 21- to 28-day intervals. Uses 1 pt per sq ft or 2 pt for depths greater than 4 in. See label for container rates. For use in outdoor container and field-grown stock. Make no more than 4 applications per year to nursery ornamental plantings.
PCNB (Terraclor) 75WP	3.25 to 6.5 lb/1,000 sq ft	Apply in sufficient water to ensure uniform ground coverage prior to planting, and thoroughly incorporate to a depth of 6 to 7 in. For use in nursery and landscape plantings.
tebuconazole (Torque)	4 to 8 fl oz/100 gal	Apply every 14 for a total of three applications at the first sign of disease.
triticonazole (Trinity) 19SC	8 to 12 fl oz/100 gal	Apply every 7 to 14 days. Use preventively. Begin applications when conditions favor fungal infection and before disease symptom development. The stem areas of the plant must be thoroughly covered using spray to runoff.
<b>Voluetella Blight</b>		
chlorothalonil (Daconil Ultrex) 82.5 WDG (Daconil WeatherStik)	1.4 lb/100 gal 1.375 pt/100 gal	Reapply at 7- to 14-day intervals.
copper hydroxide  (Champ WG) (Nu-Cop) 50DF (CuPRO 2005)	0.5 lb/100 gal 1 lb/100 gal 0.75 to 2.0 lb/100 gal	Begin at first sign of disease, and repeat at 7- to 14-day intervals. Do not tank mix copper formulations with Aliette. Avoid contact with metal surfaces. Discoloration of blooms may occur on certain plant varieties- check label.

**Table 10-13. Commercial Landscape and Nursery Crops Disease Control**

DISEASE Pesticide and Formulation	Rate of Formulation (per 100 gallons)	Schedule and Remarks
copper hydroxide + mancozeb (Junction)	1.5 to 3.5 lb/100 gal	Begin at first sign of disease, and repeat at 7- to 14-day intervals.
copper sulfate pentahydrate (Phyton 27)	See label	See label. To avoid phytotoxicity, do not use any copper compound on alyssum.
mancozeb (Dithane) 75 DF, (Fore) 80 WSP, Mancozeb DG (Pentathlon LF) (Pentathlon DF) (Protect DF)	2.0 lb/50 gal/5,000 sq ft of bed 0.8 to 1.6 pt/100 gal 1 to 2 lb/100 gal 3 to 4 lb/100 gal/10,000 sq ft of bed	Start at first sign of disease, and apply at 10- to 14-day intervals. Use a drenching spray. Start at first sign of disease, and apply at 10- to 14-day intervals. Begin at first sign of disease, and repeat at 7- to 10-day intervals. Use a drenching spray. Start at first sign of disease, and apply at least 5 applications at 10- to 14-day intervals.
<b>Volutella Blight (continued)</b>		
thiophanate-methyl + mancozeb (Zyban) WSB	24 oz (4 bags)/100 gal	Apply at 7-day intervals while disease is prevalent.

Prepared by K. L. Ivors, former extension specialist, Plant Pathology. Revised by D. M. Benson.

#### Further Information

**Boxwood blight links** <http://plantpathology.ces.ncsu.edu/pp-ornamentals/>

**All Plant Pathology Disease Notes for Ornamentals** can be accessed from [http://www.ces.ncsu.edu/depts/pp/notes/Ornamental/ornamental\\_contents.html](http://www.ces.ncsu.edu/depts/pp/notes/Ornamental/ornamental_contents.html).

*Holly Diseases and Their Control in the Landscape*. Plant Pathology Ornamental Disease Information Note 7, <http://www.ces.ncsu.edu/depts/pp/notes/oldnotes/od7.htm>

*Nematodes and Their Control in Woody Ornamentals in the Landscape*. Plant Pathology Information Note 63, <http://www.ces.ncsu.edu/depts/pp/notes/oldnotes/no63.htm>

*Phytophthora Root Rot and Its Control on Established Woody Ornamentals*. Plant Pathology Ornamental Disease Information Note 13, <http://www.ces.ncsu.edu/depts/pp/notes/oldnotes/odin13/od13.htm>

*Rose Diseases and Their Control in the Home Garden*. Plant Pathology Ornamental Disease Information Note 2, <http://www.ces.ncsu.edu/depts/pp/notes/Ornamental/odin002/odin002.htm>

*Juniper Diseases*. Plant Pathology Ornamental Disease Information Note 15, <http://www.ces.ncsu.edu/depts/pp/notes/oldnotes/od15.htm>

*Entomosporium Leaf Spot on Redtip*. Plant Pathology Ornamental Disease Information Note 11,

<http://www.ces.ncsu.edu/depts/pp/notes/Ornamental/odin011/odin011.htm>

*Rhododendron Diseases*. Plant Pathology Ornamental Disease Information Note 12, <http://www.ces.ncsu.edu/depts/pp/notes/oldnotes/od12.htm>

*Azalea Diseases*. Plant Pathology Ornamental Disease Information Note 16.

Copies of these publications are available from your local Cooperative Extension Center