

Floral Crops: Diseases

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The conditions under which many floral and foliage crops are produced, i.e., high humidity, low light intensity, and frequent watering, are favorable for the development of fungal and bacterial diseases. If insects are uncontrolled in the greenhouse, viruses can become a major problem. Nematodes may be introduced on infected plant material or unsterilized soil.

There are three principles in the management of floral crop health. The first principle is to prevent pathogens from entering production systems. Applications of this principle include use of disease-free propagating materials, noncontaminated or decontaminated containers, soil-less media and irrigation water, etc. The second principle is to create environments that are working against pathogens. Some common practices of this principle are to (i) use of disease-resistant or tolerant plant species and varieties, (ii) remove diseased plants and planting materials from production beds once

they are noticed, to reduce disease potential and dissemination risk, (iii) irrigate crops in early morning instead of evening to shorten the wet period on foliage that is essential for many pathogen germination, infection, and growth, and (iv) use of biopesticides such as Actino-Iron. The third principle is to control the disease when it does arise. The keys to successfully implementing this principle include early detection of a disease, correct diagnosis of its cause and selection of the right chemicals. Fungicides should be only used for fungal diseases, so should bactericides for bacterial diseases, oomycetocides for downy mildew, Phytophthora and Pythium diseases. The rest of this section provides general recommendations for control of major floral crop diseases. It is important that growers carefully consult and strictly follow the label when applying a fungicide, bactericide, oomycetocide or nematocide for disease control.

| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
|---|---|---|
| African Violet Botrytis blight (Gray mold) | Decree 0.7-1.5 lb; fenhexamid | Spray 7- to 14-day intervals. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| African Violet Phytophthora root rot | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt phosphite | Apply every 7 days. |
| | Banol (66.5%) 20.0-30.0 fl oz; propamocarb hydrochloride | Treat soil at 3-week to 3-month intervals. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Drench 1.0-2.0 pt/sq ft and repeat at a 28-day interval if necessary. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz; pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Stature (43.5% SC) 6.0-13.0 fl oz; dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| | Segway (34.5% SC) 2.0-6.0 fl oz; cyazoflamid | Apply at 14- to 28-day intervals. |
| | Subdue Maxx 0.5-1.0 fl oz; mefenoxam | Apply in 100 gal of water over 400-800 sq ft (1.0 pt/sq ft). For soil depth greater than 4 inches apply 1.5-2.0 pts solution/sq ft. Repeat at 1- to 2-month intervals. Irrigate to thoroughly wet soil after application. For Subdue 5G do not apply rate of 9 oz more often than once every 6 weeks. |
| African Violet Powdery mildew | Concert II (41.4%) 22.0 to 35.0 fl oz propiconazole and chlorothalonil | Apply at 14 to 21 day intervals |
| | Strike (25% WDG) 2.0-4.0 oz; triadimefon | Apply at 7- to 14-day intervals. |
| | Systhane (40% WSP) 4 oz; myclobutanil | Apply at 10- to 14-day intervals. |
| | Triact 70 0.5-1.0 gal; neem oil | Apply every 14 days. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7 to 14 day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply every 14 to 28 days |
| Ageratum Botrytis blight (Gray mold) | Chipco 26019 (50% WP) 1.0-2.0 lb Sextant (23.3%) 1.0-2.5 lb; iprodione | Apply at 7- to 14-day intervals. |
| | Decree 0.70-1.5 lb fenhexamid | Spray 7- to 14-day intervals. |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
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| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Ageratum Botrytis blight (Gray mold) (continued) | Exotherm (Terminil) 3.5 oz/1000 sq ft; chlorothalonil | Fumigate every 7 to 14 days. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| Ageratum Powdery mildew | Concert II (41.4%) 22.0 to 35.0 fl oz propiconazole and chlorothalonil | Apply at 14 to 21 day intervals |
| | Strike (25% WDG) 2.0-4.0 oz; triadimefon | Apply at 7- to 14-day intervals. |
| | Systhane (40% WSP) 4.0 oz; myclobutanil | Apply at 10- to 14-day intervals. |
| | Triact 70 0.5-1.0 gal; neem oil | Apply every 14 days. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7 to 14 day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply every 14 to 28 days |
| Ageratum Root Rot (<i>Pythium</i>) | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt phosphite | Apply every 7 days. |
| | Banol (66.5%) 20.0-30.0 fl oz; propamocarb hydrochloride | Treat soil at 3-week to 3-month intervals. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Stature (43.5% SC) 6.0-13.0 fl oz; dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| | Segway (34.5% SC) 2.0-6.0 fl oz; cyazoflamid | Apply at 14- to 28-day intervals. |
| Subdue Maxx 0.5-1.0 fl oz; mefenoxam | Drench at seeding (soil 2-3 inches deep). Mix Subdue with 100 gal of water and apply 1 pt of solution/sq ft. Transplanting mix 0.5-2.0 fl oz with 100 gal of water and apply 1 pt solution/sq ft or 1.5-2.0 pt for soil depth greater than 4 inches. Do not apply rates of 1.5-2.0 fl oz more often than once every six weeks. | |
| Terrazole (35% WP) 3.0-10.0 oz; etridiazole | Apply on 400 sq ft or saturate the soil medium, such as 1/2 pt/6-inch container. | |
| Ageratum Root rot (<i>Rhizoctonia</i>) | Chipco 26019 (50% WP) 0.4 lb Sextant (23.3%) 1.0-2.5 lb iprodione | Apply 1.0- to 2.0 pt/sq ft every 14 days. |
| | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed. |
| | Hurricane (48%) 1.5 oz; fludioxonil and mefenoxam | Drench to completely wet root zone at 21- to 28-day intervals |
| | Medallion (50% WP) 1 packet; fludioxonil | Drench at 3- to 4-week intervals. |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Drench to completely wet root zones at 7- to 14-day intervals |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz Cyprodinil and fludioxonil | Apply at 7- to 14-day intervals |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14-day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals |
| Annual Vinca (Madagascar periwinkle) Phytophthora blight | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt phosphite | Apply every 7 days. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Spray plants at a 28-day interval. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz; pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
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| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Annual Vinca (Madagascar periwinkle) Phytophthora blight (continued) | Stature (43.5% SC) 6.0-13.0 fl oz dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| | Segway (34.5% SC) 2.0-6.0 fl oz cyazoflamid | Apply at 14- to 28-day intervals. |
| | Subdue Maxx 0.5-1.0 fl oz; mefenoxam | Drench at seeding (soil 2 to 3 inches deep). Mix Subdue with 100 gal of water and apply 1 pt of solution/sq ft. Transplanting mix 0.5-2.0 fl oz with 100 gal of water and apply 1 pt solution/sq ft or 1.5- 2.0 pt for soil depth greater than 4 inches. Do not apply rates of 1.5-2.0 fl oz more often than once every six weeks. |
| Azalea (Rhododendron) Botrytis blight (Gray mold) | Broadform 4.0 to 8.0 fl oz fluopyram and trifloxystrobin | Spray at 7 to 14 day intervals. |
| | Chipco 26019 (50% WP) 1.0-2.0 lb; iprodione | Spray every 10 to 14 days. |
| | Daconil Weather Stik 2.0 pt Concorde (54% SST) 1.3 pt; chlorothalonil | Spray every 7 to 10 days during wet weather. Apply at early bloom. |
| | Exotherm (Termil) 3.5 oz/1000 sq ft chlorothalonil | Fumigate every 7 to 14 days. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| Azalea Cylindrocladium root rot | Cleary 3336-WP 0.8 lb; thiophanate methyl | Drench Cleary 3336 on the surface of growing medium to prevent disease development. Repeat at 2- to 4-week intervals during disease pressure. |
| | Concert II (41.4%) 22.0 to 35.0 fl oz propiconazole and chlorothalonil | Apply every 14 to 21 days |
| | Fore Rainshield NT Fore WSP Rainshield Dithane T/O Rainshield NT Dithane WF Junction (15% DF); 1.5 lb mancozeb | Apply in a full coverage spray every 7 to 10 days while flowers are opening spray ground under bushes and into open flowers. |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days |
| | Spectro TM (90% WDG) 1.0 to 2.0 lb chlorothalonil and thiophanate-methyl | Apply every 14 days |
| | Terragard, 50 W; triflumizole | Soil drench 6.0-8.0 oz or 1-1 1/3 tps/gal on propagation beds. On established plants apply a drench at 6.0-12.0 oz or 1.0-2.0 tsp/gal. |
| | Torque (38.7%) 4.0 to 10.0 fl oz; tebuconazole | Apply every 14 to 21 days |
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| Azalea Ovulinia flower blight | Daconil Weather Stik 2.0 pt Concorde (54% SST) 1.1 pt; chlorothalonil | Spray every 7 to 10 days. Apply at new leaf emergence. |
| | Strike (25% WDG) 8.0-16.0 oz; triadimefon | Begin applications at the expanded bud stage. |
| | Cleary 3336-WP 0.5 lb; thiophanate methyl | Apply as flowers open. Repeat every 4 to 6 days as needed during disease periods. |
| | Fore Rainshield NT Fore WSP Rainshield Dithane T/O Rainshield NT Dithane WF Junction (15% DF); 1.5 lb mancozeb | Apply in a full coverage spray every 7 to 10 days while flowers are opening also spray ground under bushes. |
| Azalea Powdery mildew | Banner Maxx 2.0-4.0 fl oz; propiconazole | Apply at 2- to 3-week intervals. |
| | Concert II (41.4%) 22.0 to 35.0 fl oz propiconazole and chlorothalonil | Apply at 14 to 21 day intervals |
| | Cygnus (50%) 1.6-3.2 oz; Kresoxim-methyl | Apply every 10 to 14 days. |
| | Strike (25% WDG) 2.0-4.0 oz; triadimefon | Apply to run-off when mildew first appears. |
| | Systhane (40% WSP) 4.0 oz; myclobutanil | Apply at 10- to 14-day intervals. |
| | Triact 70 0.5-1.0 gal; neem oil | Apply every 14 days. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7 to 14 day intervals |
| Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply every 14 to 28 days | |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
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| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Azalea Phytophthora shoot blight | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Aliette (80% WDG) 2.5-5.0 lbs; fosetyl-AI | Apply as a spray to wet, repeat at monthly intervals. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; phosphite | Apply every 7 days. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Spray plants at a 28-day interval. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Segway (34.5% SC) 2.0-6.0 fl oz cyazoflamid | Apply at 14- to 28-day intervals. |
| Azalea Phytophthora root and crown rot | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Aliette (80% WDG) 0.4-0.8 lb; fosetyl-AI | Apply as a drench with 100 gal of water/400 sq ft (2 pt solutions/sq ft) or 0.5-0.8 lb (8.0-12.8 oz)/cubic yard of potting soil at transplanting. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; phosphite | Apply every 7 days. |
| | Banol (66.5%) 20.0-30.0 fl oz; propamocarb hydrochloride | See African Violet. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Drench 1.0-2.0 pt/sq ft and repeat at a 28-day interval if necessary. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz; pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Stature (43.5% SC) 6.0-13.0 fl oz; dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| | Segway (34.5% SC) 2.0-6.0 fl oz; cyazoflamid | Apply at 14- to 28-day intervals. |
| | Subdue Maxx 0.6-1.3 fl oz; mefenoxam | Apply 1.0 pt solution/sq ft. For soil depth greater than 4 inches apply 1.5-2.0 pts solution/sq ft. |
| Azalea Septoria leaf spot | Terrazole (35% WP) 8.0 oz; etridiazole | Container & Bed grown Plants: Mix 8 oz with 100 gal of water/400 sq ft or apply in sufficient amount to saturate the soil mixture such as 0.5 pt/6-inch pot. Irrigate immediately with additional water equal to at least half the volume of the fungicidal drench for improved soil penetration of the fungicide. Repeat at 4-week intervals if necessary. |
| | Cleary 3336-F 12.0-16.0 fl oz or 1 tsp/gal thiophanate methyl | Repeat at a 10- to 14-day interval throughout the growing season. |
| Bedding various flowering plants | Soil Gard (12% G) 1.0-1.5 lb/cubic yd microbial / (biocontrol) | Mix with soilless media before seeding/plants. |
| Bedding Damping-off, <i>Rhizoctonia</i> , <i>Pythium</i> | Captan (50% WP) 2.0-4.0 lb; captan | Apply at 7- to 10-day intervals. |
| | Terrazole (35% WP) 3.5-10.0 oz; etridiazole | Apply at 4- to 12-week intervals. |
| Begonia Botrytis flower spot (Gray mold) | Broadform 4.0 to 8.0 fl oz fluopyram and trifloxystrobin | Spray at 7 to 14 day intervals. |
| | Cleary 3336-F 12.0-16.0 fl oz; thiophanate methyl | Spray every 10 to 14 days. |
| | Exotherm (Termil) 3.5 oz/1000 cu ft; chlorothalonil | Fumigate every 7 to 14 days. |
| | Fore Rainshield NT Fore WSP Rainshield Dithane T/O Rainshield NT Dithane WF Junction (15% DF) 1.5 lb; mancozeb | Apply in a full coverage spray every 7 to 10 days while flowers are opening spray ground under bushes and into open flowers. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
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| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Begonia Powdery mildew | Concert II (41.4%) 22.0 to 35.0 fl ozpropiconazole and chlorothalonil | Apply at 14 to 21 day intervals |
| | Rubigan 3.0-5.0 fl oz; fenarimol | Apply at 10- to 14-day intervals. |
| | Strike (25% WDG) 2.0-4.0 oz | Spray every 7 to 14 days. Follow label instructions. Spray triadimefon to run-off when mildew first appears. |
| | Systhane (40% WSP) 4.0 oz; myclobutanil | Apply at 10- to 14-day intervals. |
| | Triact 70 0.5-1.0 gal; neem oil | Apply every 14 days. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7 to 14 day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply every 14 to 28 days |
| Begonia Pythium root rot | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Aliette (80% WDG) 1.25-4.0 lb; fosetyl-Al | Apply as a foliar spray. Do not exceed one application every 30 days. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; phosphite | Apply every 7 days. |
| | Banol (66.5%) 20.0-30.0 fl oz; propamocarb hydrochloride | See African Violet. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Drench 1.0-2.0 pt/sq ft and repeat at a 28-day interval if necessary. |
| | Terrazole (35% WP) 3.0-10.0 oz; etridiazole | Apply on 400 sq ft or saturate the soil medium, such as 0.5 pt/6-inch container. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz; pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Segway (34.5% SC) 2.0-6.0 fl oz; cyazoflamid | Apply at 14- to 28-day intervals. |
| | Stature (43.5% SC) 6.0-13.0 fl oz; dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| | Subdue Maxx 0.6-1.3 fl oz; mfenoxam | See African Violet. |
| Black-eyed Susan (rudbeckia) Septoria leaf spot | Daconil WeatherStik 2.0 pt Concord (54% SST) 2.0 pt; chlorothalonil | Apply at 7- to 10-day intervals. |
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| Black-eyed Susan Downy mildew | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; phosphite | Apply every 7 to 10 days. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Spray plants at a 28-day interval if necessary. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz; pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Segway (34.5% SC) 2.0-6.0 fl oz cyazoflamid | Apply at 14- to 28-day intervals. |
| | Stature (43.5% SC) 6.0-13.0 fl oz dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| Cactus Root rot (<i>Rhizoctonia</i>) | Cleary 3336-F 12.0-16.0 fl oz; thiophanate methyl | Apply as drench (1.0-2.0 pt/sq ft). |
| | Chipco 26019 (50% WP) 0.4 lb; iprodione | Apply 1.0-2.0 pt/sq ft every 14 days. |
| | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed. |
| | Hurricane (48%) 1.5 oz; fludioxonil and mfenoxam | Drench to completely wet root zone at 21- to 28-day intervals |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Drench to completely wet root zones at 7- to 14-day intervals |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz Cyprodinil and fludioxonil | Apply at 7- to 14-day intervals |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14-day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
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| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Caladium Various tuber rots | Cleary 3336-F 12.0-16.0 fl oz 2.0 tsp/gal Fungo 50 AGC 12.0-16.0 oz; thiophanate methyl | Dip tubers in solution prior to planting. |
| | Chipco 26019 (50% WP) 0.4 lb Sextant (23.3%) 1.0 lb; iprodione | Dip tubers in solution prior to planting. |
| Caladium Pythium root rot | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Banol (66.5%) 20.0-30.0 fl oz; propamocarb hydrochloride | Treat soil every 3 weeks to 3 months. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Drench 1.0-2.0 pt/sq ft and repeat at a 28-day interval if necessary. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz; pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Segway (34.5% SC) 2.0-6.0 fl oz; cyazoflamid | Apply at 14- to 28-day intervals. |
| | Stature (43.5% SC) 6.0-13.0 fl oz; dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| Subdue Maxx 0.5-1.0 fl oz; mefenoxam | See African Violet. | |
| Calendula powdery mildew rust | Banner Maxx 2.0-4.0 fl oz; propiconazole | Apply every 14 to 21 days. |
| | Concert II (41.4%) 22.0 to 35.0 fl oz propiconazole and chlorothalonil | Apply at 14 to 21 day intervals |
| | Rubigan 3.0-5.0 fl oz; fenarimol | Apply at 10- to 14-day intervals. |
| | Strike (25% WDG) 2.0-4.0 oz; triadimefon | Apply as a spray at 14- to 21-day intervals. |
| | Sythane (40% WSP) 4.0 oz; myclobutanil | Apply at 10- to 14-day intervals. |
| | Triact 70 0.5-1.0 gal; neem oil | Apply every 14 days. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7 to 14 day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply every 14 to 28 days |
| Calibrachoa Phytophthora crown rot | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; phosphite | Apply every 7 days. |
| | Banol (66.5%) 20.0-30.0 fl oz; propamocarb hydrochloride | Treat soil at 3-week to 3-month intervals. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Drench 1.0-2.0 pt/sq ft and repeat at a 28-day interval if necessary. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz; pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Segway (34.5% SC) 2.0-6.0 fl oz cyazoflamid | Apply at 14- to 28-day intervals. |
| | Stature (43.5% SC) 6.0-13.0 fl oz dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| Subdue Maxx 0.5-1.0 fl oz; mefenoxam | Apply in 100 gal of water over 400-800 sq ft (1.0 pt/sq ft). For soil depth greater than 4 inches apply 1.5-2.0 pts solution/sq ft. Repeat at 1- to 2-month intervals. Irrigate to thoroughly wet soil after application. For Subdue 5G do not apply rate of 9 oz more often than once every 6 weeks. | |
| Calibrachoa Black root rot (thielaviopsis) | Cleary 3336 12.0-16.0 fl oz; thiophanate methyl | Drench at 1.0-2.0 pts/sq ft. |
| Carnation (Dianthus) Alternaria leaf spot and petal blight | Daconil Weather Stik 1.4 pt Concorde (54% SST) 1.4 pt; chlorothalonil | Apply every 7 to 14 days. |
| | Chipco 26019 (50% WP) 1.0-2.0 lb Sextant (23.3%) 1.0-2.5 lb; iprodione | Apply as a spray every 10 to 14 days. |
| | Maneb 80 (80% WP) or Maneb Plus Zinc F4 Fungicide (37% F) 1.0-1.5 lb; maneb | Begin when new growth starts. Repeat weekly. |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
|--|---|---|
| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Carnation Botrytis flower spot (Gray mold) | Chipco 26019 (50% WP) Sextant (23.3%) 1.0-2.5 lb; iprodione | Spray every 10 to 14 days. |
| | Cleary 3336-WP 0.8 lb; thiophanate methyl | Spray every 7 to 14 days. |
| | Exotherm (Termil) 3.5 oz/1000 cu ft; chlorothalonil | Fumigate every 7 to 14 days. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| Carnation Fusarium stem and root rot | Cleary 3336-WP 0.8 lb Fungo 50 AGC 12.0-16.0 oz; thiophanate methyl | Heavy spray or drench during cool, moist conditions. |
| Carnation Rhizoctonia stem rot | Chipco 26019 0.4 lb iprodione | Apply 1.0-2.0 pt/sq ft every 14 days. |
| | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed. |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Apply at 7- to 14-day intervals |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz Cyprodinil and fludioxonil | Apply at 7- to 14-day intervals |
| | Terraclor (75% WP) 0.5 lb; pentachloronitrobenzene | Apply 1.0 pt of solution/sq ft or 100 gal to 800 to 1000 sq ft. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14-day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals |
| Chrysanthemum Botrytis blight (Gray mold) | Broadform 4.0 to 8.0 fl oz fluopyram and trifloxystrobin | Spray at 7 to 14 day intervals. |
| | Chipco 26019 (50% WP) 1.0-2.0 lb Sextant (23.3%) 1.0-2.5 lb iprodione | Apply every 10 to 14 days. |
| | Cleary 3336-WP 0.8 lb; thiophanate methyl | Spray every 10 to 14 days under normal weather. |
| | Cleary 3336-F (4.5 F) 10.0 fl oz or 0.75 tsp/gal; thiophanate methyl | Apply as foliar spray every 7 to 14 days. |
| | Cygnus (50%) 1.6-3.2 oz; Kresoxim-methyl | Apply every 10 to 14 days. |
| | Daconil Weather Stik 2.0 pt Concorde (54% SST) 2.0 pt; chlorothalonil | |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| Chrysanthemum Bacterial blight | Camelot 3.0 pt copper salts | Apply every 7 days. |
| Chrysanthemum Powdery mildew | Concert II (41.4%) 22.0 to 35.0 fl oz propiconazole and chlorothalonil | Apply at 14 to 21 day intervals |
| | Rubigan 3.0-5.0 fl oz; fenarimol | Apply at 10- to 14-day intervals. |
| | Strike (25% WDG) 2.0-4.0 oz; triadimefon | Spray to run-off when mildew first appears. |
| | Triact 70 0.5-1.0 gal; neem oil | Apply every 14 days. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7 to 14 day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply every 14 to 28 days |
| Chrysanthemum Puccinia horiana white rust | Strike (25% WDG) 2.0-4.0 oz; triadimefon | Control of this rust consists of avoiding wetting of the foliage when watering and spraying with Bayleton when disease is first observed. If not controlled, cut back plants to the ground, gather all plant material and debris and incinerate. Spray Bayleton to run-off when rust first appears. |
| | Systhane (40%WSP) 4.0 oz myclobutanil | Apply at 10- to 14-day intervals. |
| Chrysanthemum Mycosphaerella ray blight | Banner Maxx 2.0-4.0 fl oz; propiconazole | Apply at 14-day intervals. |
| | Daconil Weather Stik 1.4 pt Concorde (54% SST) 1.4 pt; chlorothalonil | Apply at transplant of cuttings. |
| | Chipco 26019 (50% WP) 1.0-2.0 lb or 1.0-2.0 tbs/gal Sextant (23.3%) 1.0-2.5 lb; iprodione | Apply as a spray every 10 to 14 days. |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
|---|---|--|
| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Chrysanthemum Pythium root rot | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; phosphite | Apply at 7-day intervals. |
| | Banol (66.5%) 20.0-30.0 fl oz; propamocarb hydrochloride | Treat soil every 3 weeks to 3 months. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Drench 1.0-2.0 pt/sq ft and repeat at a 28-day interval if necessary. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz; pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Subdue Maxx 0.5-1.0 fl oz; mefenoxam | See African Violet. |
| | Terrazole (35% WP) 4.0 oz; etridiazole | Retreat bedding plants with etridiazole at 4- to 8-week intervals. Retreat container plants at 4- to 12-week intervals. |
| | Segway (34.5% SC) 2.0-6.0 fl oz; cyazoflamid | Apply at 14- to 28-day intervals. |
| Stature (43.5% SC) 6.0-13.0 fl oz; dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. | |
| Chrysanthemum Rhizoctonia root rot | Captan (50% WP) 2.0-4.0 lb; captan | Apply at 7- to 10-day intervals. |
| | Cleary 3336-WP 0.8 lb; thiophanate methyl | Apply 1.0-2.0 pt/sq ft every 14 days. |
| | Chipco 26019 (50% WP) 0.4 lb Sextant (23.3%) 1.0-2.5 lb; iprodione | Apply 1.0-2.0 pt/sq ft every 14 days. |
| | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed. |
| | Hurricane (48%) 1.5 oz; fludioxonil and mefenoxam | Drench to completely wet root zone at 21- to 28-day intervals |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Drench to completely wet root zones at 7- to 14-day intervals |
| | Medallion (50% WP) 1 packet; fludioxonil | Drench at 3- to 4-week intervals. |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz; Cyprodinil and fludioxonil | Apply at 7- to 14-day intervals |
| | Soil Gard (12% G) 1.0-1.5 lb/cubic yd microbial / (biocontrol) | Mix with soilless media before seeding/plants. |
| | Terrazole (35% WP) 3.5-10.0 oz; etridiazole | Apply at 4- to 12-week intervals. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14-day intervals |
| Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals | |
| Chrysanthemum Septoria leaf spot | Cleary 3336-WP 0.8 lb; thiophanate methyl | Apply at weekly intervals when a new shoot growth begins. Cover lower leaf surfaces completely. Apply thiophanate methyl at 10- to 14-day intervals. |
| | Daconil Weather Stik 1.4 pt; chlorothalonil | Spray chlorothalonil every 7 to 14 days. Apply at transplanting of cuttings. |
| Cineraria Powdery mildew (<i>Erysiphe cichoracearum</i>) | Concert II (41.4%) 22.0 to 35.0 fl oz propiconazole and chlorothalonil | Apply at 14 to 21 day intervals |
| | Strike (25% WDG) 2.0-4.0 oz or 0.5-1.0 tsp/gal; triadimefon | Spray to run-off when mildew first appears. |
| | Triact 70 0.5-1.0 gal; neem oil | Spray every 14 days. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7 to 14 day intervals |
| Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply every 14 to 28 days | |
| Cyclamen Botrytis leaf blight (Gray mold) | Chipco 26019 (50% WP) 1.0-2.0 lb Sextant (23.3%) 1.0-2.5 lb | Spray every 10 to 14 days. |
| | Cleary 3336-WP 0.8 lb; thiophanate methyl | Apply every 10 to 14 days and reduce humidity. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| Daylily Leaf streak | Cleary 3336 WP 1.5 lb Fungo 50 AGC 12.0-16.0 oz; thiophanate methyl | Repeat at 7- to 14-day intervals. |
| | Systhane (40% WSP) 4.0 oz; myclobutanil | |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
|--|---|--|
| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Daylily Rust | Synthane (40% WSP) 4.0 oz; myclobutanil | Repeat every 7 to 14 days. |
| | Daconil Weather Stik 2.0 pt Concorde (54% SST) 1.4 pt; chlorothalonil | |
| | Banner Maxx 2.0-4.0 fl oz; propiconazole | Apply at 2- to 3-week intervals. |
| | Heritage 1.0-4.0 oz; azoxystrobin | Apply every 1 to 4 weeks. |
| Foliage Plants Pythium root rot | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Aliette (80% WDG) 0.4-0.8 lb; fosetyl-Al | Apply as a drench with 100 gal of water/400 sq ft (2.0 pt solutions/sq ft) or 0.5-0.8 lb (8.0-12.8 oz)/cu yd of potting soil at transplanting. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; phosphite | Spray every 7 days. |
| | Banol (66.5%) 20.0-30.0 fl oz; propamocarb hydrochloride | Treat soil every 3 weeks to 3 months. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Drench 1.0-2.0 pt/sq ft and repeat at a 28-day interval if necessary. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz; pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Segway (34.5% SC) 2.0-6.0 fl oz cyazoflamid | Apply at 14- to 28-day intervals. |
| | Stature (43.5% SC) 6.0-13.0 fl oz dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| | Subdue Maxx 0.5-1.0 fl oz; mefenoxam | |
| Terrazole (35% WP) 12.0 oz; etridiazole | Use well-drained growing medium, sanitation, above ground benches. Avoid overhead watering. Drench at 4-week intervals. | |
| Geranium Botrytis leaf blight (Gray mold) | Chipco 26019 (50% WP) 1.0-2.0 lb Sextant (23.3%) 1.0-2.5 lb; iprodione | Spray every 10 to 14 days. |
| | Compass 2.0-4.0 oz | Spray every 7- to 14 days. |
| | Decree 0.7-1.5 lb; fenhexamid | Spray at 7- to 14-day intervals. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| Geranium Bacterial blight | | Purchase clean stock plants. Practice good sanitation procedures. |
| | Camelot 3.0 pt; copper salts | Apply every 7 days. |
| Geranium Pythium blackleg or black rot | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Chipco 26019 (50% WP) 0.4 lb Sextant (23.3%) 1.0-2.5 lb; iprodione | Apply 1.0-2.0 pt/sq ft every 14 days. |
| | Cleary 3336-WP 0.8 lb; thiophanate methyl | Apply as a drench or heavy spray (1.0-2.0 pt/sq ft) after transplanting into containers or propagation beds. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz; pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Segway (34.5% SC) 2.0-6.0 fl oz; cyazoflamid | Apply at 14- to 28-day intervals. |
| | Stature (43.5% SC) 6.0-13.0 fl oz; dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| Terrazole (35% WP) 3.0-10.0 oz; etridiazole | Apply 0.5 pt/6-inch container. Sterilize rooting media, pots, and benches with steam-flow sanitation program. | |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
|--|---|--|
| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Geranium Rhizoctonia root and stem rot | Chipco 26019 (50% WP) 0.4 lb Sextant (23.3%) 1.0-2.5 lb; iprodione | Apply 1.0-2.0 pt/sq ft every 14 days. |
| | Cleary 3336-WP 0.8 lb; thiophanate methyl | Apply as a drench or heavy spray (1.0-2.0 pt/sq ft) after transplanting into containers or propagation beds. |
| | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed. |
| | Hurricane (48%) 1.5 oz; fludioxonil and mefenoxam | Drench to completely wet root zone at 21- to 28-day intervals. |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Drench to completely wet root zones at 7- to 14-day intervals. |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz Cyprodinil and fludioxonil | Apply at 7- to 14-day intervals. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14-day intervals. |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals. |
| Geranium Rust | Sythane (40% WSP) 4.0 oz; myclobutanil | Apply at 10- to 14-day intervals. |
| | Daconil Weather Stik 1.4 pt Concorde (54% SST) 1.4 pt; chlorothalonil | Apply during cool, moist conditions. |
| | Strike (25% WDG) 2.0-4.0 oz; triadimefon | Spray at first sign of disease. |
| | Triact 70 0.5-1.0 gal; neem oil | Apply every 14 days. |
| Geranium Powdery mildew | Concert II (41.4%) 22.0 to 35.0 fl oz propiconazole and chlorothalonil | Apply at 14 to 21 day intervals |
| | Cygnus (50%) 1.6-3.2 oz; Kresoxim-methyl | |
| | Strike (25% WDG) 2.0-4.0 oz; triadimefon | Spray to run-off when mildew first appears. |
| | Sythane (40% WP) 4.0 oz; myclobutanil | Apply at 10- to 14-day intervals. |
| | Triact 70 0.5-1.0 gal; neem oil | Apply every 14 days. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7 to 14 day intervals |
| Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply every 14 to 28 days | |
| Gerbera Botrytis blight (Gray mold) | Cleary 3336-WP (50% WP) 0.8 lb Fungo 50 AGC 12.0-16.0 oz; thiophanate methyl | Spray every 10 to 14 days to run-off. |
| | Decree 0.7-1.5 lb; fenhexamid | Apply at 7- to 14-day intervals. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| Gerbera Powdery mildew (<i>Erysiphe cichoracearum</i>) | Concert II (41.4%) 22.0 to 35.0 fl oz propiconazole and chlorothalonil | Apply at 14 to 21 day intervals |
| | Strike (25% WDG) 2.0-4.0 oz or 0.5-1.0 tsp/gal; triadimefon | Spray to run-off when mildew first appears. |
| | Triact 70 0.5-1.0 gal; neem oil | Apply every 14 days. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7 to 14 day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply every 14 to 28 days |
| Gerbera Root/stem rot (non-water molds) | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed. |
| | Medallion (50% WP) 1 packet; fludioxonil | Drench at 3- to 4-week intervals. |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Apply at 7- to 14-day intervals |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz Cyprodinil and fludioxonil | Apply at 7- to 14-day intervals |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14-day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
|--|---|---|
| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Gerbera Root/stem rot (Pythium and Phytophthora) | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; phosphite | Apply every 7 days. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; z fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Drench 1.0-2.0 pt/sq ft and repeat at a 28-day interval if necessary. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz; pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Segway (34.5% SC) 2.0-6.0 fl oz; cyazoflamid | Apply at 14- to 28-day intervals. |
| | Stature (43.5% SC) 6.0-13.0 fl oz; dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| Terrazole (35% WP) 3.0-10.0 oz; etridiazole | Apply as a drench at 0.5 pt/6-inch pot at 4- to 12-week intervals. | |
| Gladiolus Botrytis blight | Daconil Weather Stick 2.0 pts Concorde (54% SST) 1.4 pt; chlorothalonil | Apply as a spray with a sticker-spreader on a 10-day interval. |
| | Cleary 3336-WP 0.8 lb Fungo 50 AGC 12.0-16.0 oz; thiophanate methyl | Apply as a spray plus sticker-spreader just as first flowers show color. Repeat at 10- to 14-day intervals. |
| | Fore Rainshield NT Fore WSP Rainshield Dithane T/O Rainshield Dithane WF Junction (15% DF) 1.5 lb; mancozeb | Apply at a 7- to 14-day interval. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| | | |
| Gerbera Fusarium basal rot (<i>Fusarium oxysporium</i> <i>F. gladioli</i>) | Cleary 3336-F 12.0-16.0 fl oz Fungo 50 AGC 12.0-16.0 oz thiophanate methyl | Soak cleaned corms for 15 to 30 minutes in a warm dip (80° to 85°F.) within 48 hours of digging. Dry corms after treatment. |
| Gerbera Leaf and flower spot (<i>Curvularia lunata</i>) | Cleary 3336-WP 0.8 lb Fungo 50 AGC 12.0-16.0 oz; thiophanate methyl | Apply as a spray with a sticker-spreader on a 10-day interval. |
| | Chipco 26019 (50% WP) 1.0-2.0 lb Sextant (23.3%) 1.0-2.5 lb; iprodione | Spray every 10 to 14 days. |
| | Maneb 80 (80% WP) 1.5 lb; maneb | Begin when flower spikes develop. Repeat 2 to 3 times at weekly intervals. |
| Impatiens Rhizoctonia stem rot | Chipco 26019 (50% WP) 1.0-2.0 lb iprodione | Do not use iprodione as a drench treatment on Impatiens. Apply as a foliar spray on a 7- to 14-day interval. |
| | Cleary 3336-F 12.0-16.0 fl oz or 1.0 tsp/2 gal water Fungo 50 AGC 12.0-16.0 oz; thiophanate methyl | Apply as a drench or heavy spray at the rate of 1.0-2.0 pts/sq ft. |
| | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Apply at 7- to 14-day intervals |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz; Cyprodinil and fludioxonil | Apply at 7- to 14-day intervals |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14-day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals |
| Impatiens necrotic spot virus | Transmitted by thrips feeding | See insect control section on thrips control. |
| Impatiens Downy mildew | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; Phosphite Pagent (38.0%WDG) 4.0-18.0 oz; Pyraclostrobin + boscalid Stature (43.5% SC) 6.0--13.0 fl oz; dimethomorph | Apply at 10- to 14-day intervals |
| | Fenstop 7.0-14.0 fl oz; fenamidone Segway (34.5%SC) 3.5 fl oz; cyazoflamid | Spray with protection of plants up to 4 weeks. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Subdue Maxx 1.0 fl oz | Spray or drench with control up to 3 months. |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
|--|---|---|
| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Impatiens Soft rot | | Disinfect tools when cutting rhizomes. Avoid overwatering. Rotate with resistant plants if damage is severe. |
| Kalanchoe Botrytis blight | Decree 0.7-1.5 lb; fenhexamid | Spray at 7- to 14 day intervals. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| Impatiens Powdery mildew | | See African violet. |
| Leucanthemum Phytophthora root rot | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; phosphite | Apply every 7 days. |
| | Banol (66.5%) 20.0-30.0 fl oz; propamocarb hydrochloride | Treat soil at 3-week to 3-month intervals. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Drench 1.0-2.0 pt/sq ft and repeat at a 28-day interval if necessary. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz; pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Segway (34.5% SC) 2.0-6.0 fl oz; cyazoflamid | Apply at 14- to 28-day intervals. |
| | Stature (43.5% SC) 6.0-13.0 fl oz; dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| | Subdue Maxx 0.5-1.0 fl oz; mefenoxam | Apply in 100 gal of water over 400-800 sq ft (1.0 pt/sq ft). For soil depth greater than 4 inches apply 1.5-2.0 pts solution/sq ft. Repeat at 1- to 2-month intervals. Irrigate to thoroughly wet soil after application. For Subdue 5G do not apply rate of 9 oz more often than once every 6 weeks. |
| Leucanthemum Rhizoctonia root rot | Chipco 26019 (50% WP) 0.4 lb Sextant (23.3%) 1.0-2.5 lb; iprodione | Apply 1.0–2.0 pt/sq ft every 14 days. |
| | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed. |
| | Hurricane (48%) 1.5 oz; fludioxonil and mefenoxam | Drench to completely wet root zone at 21- to 28-day intervals |
| | Medallion (50% WP) 1 packet; fludioxonil | Drench at 3- to 4-week intervals. |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Drench to completely wet root zones at 7- to 14-day intervals |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz Cyprodinil and fludioxonil | Apply at 7- to 14-day intervals |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14 day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals |
| Lily Botrytis blight | Chipco 26019 (50% WP) 1.0-2.0 lb; iprodione | Spray every 10 to 14 days. |
| | Cleary 3336-WP 0.8 lb; thiophanate methyl | Spray every 10 to 14 days. |
| | Daconil Weather Stik 2.0 pt Concorde (54% SST) ;chlorothalonil | Spray every 7 to 14 days. Apply at prebloom. |
| | Decree 0.7-1.5 lb; fenhexamid | Apply at 7- to 14-day intervals. |
| | Exotherm (Termil) 3.5 oz/1000 cu ft; chlorothalonil | Fumigate every 7 to 14 days. |
| | Fore Rainshield NT Fore WSP Rainshield Dithane T/O Rainshield Dithane WF Junction (15% DF) 1.5 lb; mancozeb | Spray at a 7- to 14-day interval. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
|--|--|--|
| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Lily Penicillium and Fusarium bulb rot | Cleary 3336-F 12.0-16.0 fl oz Fungo 50 AGC 12.0-16.0 oz thiophanate methyl | Soak cleaned bulbs for 15 to 30 minutes in warm dip (80° to 85°F), preferably within 48 hours after digging. |
| Lily Root rot complex (<i>Pythium</i> spp. and <i>Rhizoctonia solani</i>) | See Chrysanthemum. | |
| Narcissus Bulb rot | See Gladiolus Fusarium basal rot. | |
| Pansy Botrytis blight | Broadform 4.0 to 8.0 fl oz fluopyram and trifloxystrobin | Spray at 7 to 14 day intervals. |
| | Cleary 3336-F (4.5 F) 10.0 fl oz Cleary 3336-WP (50% WP) 0.8 lb; thiophanate methyl | Apply every 10 to 14 days. |
| | Daconil Weather Stik 2.0 pt; chlorothalonil | Spray every 7 to 10 days. |
| | Decree 0.7-1.5 lb; fenhexamid | Spray at 7- to 14-day intervals. |
| | Fore Rainshield NT Fore WSP Rainshield Dithane T/O Rainshield NT Dithane WF Junction (15% DF) 1.5 lb; mancozeb | |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| Pansy Root rot (<i>Rhizoctonia</i>) | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed. |
| | Medallion (50% WP) 1 packet; fludioxonil | Drench at 3- to 4-week intervals. |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Apply at 7- to 14-day intervals |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz Cyprodinil and fludioxonil | Apply at 7- to 14 day intervals |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14-day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals |
| Pansy <i>Sclerotinia</i> , <i>Fusarium</i> , and <i>Thielaviopsis</i> | Cleary 3336-F 12.0-16.0 fl oz Fungo 50 AGC 12.0-16.0 oz; thiophanate methyl | Apply as a drench at 1.0-2.0 pts/sq ft. |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days |
| | Palladium (62.5% WDG) 2.0 to 4.0 oz cyprodinil and fludioxonil | Apply at 7- to 14-da intervals |
| Pansy Phytophthora root/crown rot | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; phosphite | Apply every 7 days. |
| | Banol (66.5%) 20.0-30.0 fl oz; propamocarb hydrochloride | Treat soil at 3-week to 3-month intervals. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | FenStop 7.0-14.0 fl oz; fenamidone | Drench 1.0-2.0 pt/sq ft and repeat at a 28-day interval if necessary. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| | Pageant (38.0% WDG) 4.0-18.0 oz pyraclostrobin + boscalid | Apply at 7- to 14-day intervals, but not to petunias and impatiens. |
| | Segway (34.5% SC) 2.0-6.0 fl oz; cyazoflamid | Apply at 14- to 28-day intervals. |
| | Stature (43.5% SC) 6.0-13.0 fl oz; dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| Subdue Maxx 0.5-1.0 fl oz; mfenoxam | Apply in 100 gal of water over 400 to 800 sq ft (1.0 pt/sq ft). For soil depth greater than 4 inches apply 1.5-2.0 pts solution/sq ft. Repeat at 1- to 2-month intervals. Irrigate to thoroughly wet soil after application. For Subdue 5G do not apply rate of 9 oz more often than once every 6 weeks. | |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
|---|--|---|
| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Petunia Phytophthora root/ crown rot | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; phosphite | Apply every 7 days. |
| | Subdue Maxx 0.5-1.0 fl oz; mefenoxam | Apply in 100 gal of water over 400-800 sq ft (1.0 pt/sq ft). For soil depth greater than 4 inches apply 1.5-2.0 pts solution/sq ft. Repeat at 1- to 2-month intervals. Irrigate to thoroughly wet soil after application. For Subdue 5G do not apply rate of 9 oz more often than once every 6 weeks. |
| | FenStop 7.0-14.0 fl oz fenamidone | Drench 1.0-2.0 pt/sq ft and repeat at a 28-day interval if necessary. |
| | Banol (66.5%) 20.0-30.0 fl oz; propamocarb hydrochloride | Treat soil at 3-week to 3-month intervals. |
| | Adorn (39.5%) 1.0-4.0 fl oz; fluopicolide | Apply at 14- to 28-day intervals but no more than twice per crop cycle. |
| | Disarm (40.3% SC) 1.0-6.0 fl oz; fluoxastrobin | Apply at 14- to 28-day intervals. |
| | Segway (34.5% SC) 2.0-6.0 fl oz; cyazoflamid | Apply at 14- to 28-day intervals. |
| | Stature (43.5% SC) 6.0-13.0 fl oz; dimethomorph | Apply at 10- to 14-day intervals. Constant agitation required. |
| Petunia Fungus root rot (<i>Rhizoctonia</i> and <i>Fusarium</i>) | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed. |
| | Hurricane (48%) 1.5 oz; fludioxonil and mefenoxam | Drench to completely wet root zone at 21- to 28-day intervals |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscali | Drench to completely wet root zones at 7- to 14-day intervals |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz Cyprodinil and fludioxonil | Apply at 7- to 14-day intervals |
| | Terrazole (35% WP) 3.5-10.0 oz; etridiazole | Apply every 4 to 12 weeks. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14-day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals |
| Petunia Botrytis blight | Broadform 4.0 to 8.0 fl oz; fluopyram and trifloxystrobin | Spray at 7 to 14 day intervals. |
| | Cleary 3336-F (4.5 F) 10.0 fl oz Cleary 3336-WP (50% WP) 0.8 lb; thiophanate methyl | Apply every 10 to 14 days. |
| | Daconil Weather Stik 2.0 pt; chlorothalonil | Spray every 7 to 10 days. |
| | Decree 0.7-1.5 lb; fenhexamid | Spray at 7- to 14-day intervals. |
| | Fore Rainshield NT Fore WSP Rainshield Dithane T/O Rainshield NT Dithane WF Junction (15% DF) 1.5 lb; mancozeb | |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| | Poinsettia Botrytis blight | Broadform 4.0 to 8.0 fl oz fluopyram and trifloxystrobin |
| Chipco 26019 (50% WP) 1.0-2.0 lb; iprodione | | Spray every 10 to 14 days. |
| Cleary 3336-WP 0.8 lb Fungo 50 AGC 12.0-16.0 oz; thiophanate methyl | | Spray every 10 to 14 days. |
| Daconil Weather Stik 2.0 pt Concorde (54% SST) 1.4 pt; chlorothalonil | | |
| Exotherm (Termil) 3.5 oz/1000 cu ft; chlorothalonil | | Fumigate every 7 to 14 days. Do not apply when foliage is wet or when temperature is above 75°F. |
| Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | | Apply every 7 to 14 days as needed |
| Poinsettia Root rot complex (<i>Rhizoctonia solani</i> , <i>Pythium</i> spp., and <i>Thielaviopsis basicola</i>) | | Cleary 3336-WP (50% WP) 1.0 lb Fungo 50 AGC 12.0-16.0 oz; thiophanate methyl + Terrazole (35% WP) 3.0-10.0 oz or 0.5 pt/6-inch pot; etridiazole |
| | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed. |
| | Hurricane (48%) 1.5 oz; fludioxonil and mefenoxam | Drench to completely wet root zone at 21- to 28-day intervals |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscali | Drench to completely wet root zones at 7- to 14-day intervals |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz Cyprodinil and fludioxonil | Apply at 7- to 14-day intervals |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14-day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
|--|---|---|
| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Poinsettia Rhizoctonia leaf blight | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed. |
| | Fungo 50 AGC 12.0-16.0 oz Cleary 3336-WP 0.8 lb; thiophanate methyl | Spray every 10 to 14 days. |
| | Medallion (50% WP) 1-2 packet; fludioxonil | Spray only before bract formation and at 7- to 10-day intervals in greenhouses and closed structures. |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Apply at 7- to 14-day intervals |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz Cyprodinil and fludioxonil | Apply at 7- to 14-day intervals |
| | Terraguard 50W 4.0-8.0 oz; triflumizole | Controls Rhizoctonia as a drench at 3- to 4-week intervals. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14-day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals |
| Rose Botrytis blight, black spot | Broadform 4.0 to 8.0 fl oz fluopyram and trifloxystrobin | Spray at 7 to 14 day intervals. |
| | Cleary 3336-WP (50% WP) 0.8 lb Fungo 50 AGC 12.0-16.0 oz; thiophanate methyl | Apply as a spray at 10- to 14-day intervals. |
| | Chipco 26019 (50% WP) 1.0-2.0 lb Sextant (23.3%) 1.0-2.5 lb; iprodione | Apply as a spray at 10- to 14-day intervals. |
| | Cygnus (50%) 1.6-3.2 oz; Kresoxim-methyl | |
| | Daconil Weather Stik 2.0 pt Concorde (54% SST) 1.3 pt; chlorothalonil | Repeat at 7- to 14-day intervals. |
| | Decree 0.7-1.5 lb; fenhexamid | Apply every 7 to 14 days. |
| | Torque (38.7) 4.0 to 10.0 fl oz; tebuconazole | Apply every 14 to 21 days as needed |
| Rose Powdery mildew | Concert II (41.4%) 22.0 to 35.0 fl oz propiconazole and chlorothalonil | Apply at 14 to 21 day intervals |
| | Cygnus (50%) 1.6-3.2 oz; Kresoxim-methyl | |
| | Strike (25% WDG) 2.0-4.0 oz; triadimefon | Spray to run-off when mildew first appear. |
| | Sythane (40% WSP) 4.0 oz; myclobutanil | Apply at 10- to 14-day intervals. |
| | Terraguard 50W 4.0-16.0 oz; triflumizole | Apply at 7- to 14-day intervals as needed. Use higher rate on existing initial infection. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7 to 14 day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply every 14 to 28 days |
| Snapdragon Botrytis blight | Chipco 26019 (50% WP) 1.0-2.0 lb Sextant (23.3%) 1.0-2.5 lb; iprodione | |
| | Daconil Weather Stik 2.0 pt Concorde (54% SST) 1.4 pt; chlorothalonil | Repeat on a 7- to 14-day interval. |
| | Decree 0.7-1.5 lb; fenhexamid | Apply every 7 to 14 days. |
| | Exotherm (Termil) 3.5 oz/1000 cu ft; chlorothalonil | Fumigate every 7 to 14 days. |
| | Fungo 50 AGC 12.0-16.0 oz Cleary 3336-WP 0.8 lb; thiophanate methyl | Spray every 10 to 14 days. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| Snapdragon Downy mildew | Alude 1.0-2.0 qt Vital 2.0-4.0 pt; phosphite | Apply every 7 days. |
| | Micora (23.3%) 8.0 fl oz; mandipropamid | Apply every 7 to 14 days |
| | Orvego (46.2%) 14.0 fl oz; ametoctradin and dimethomorph | Apply at 10 to 14 day intervals |
| Snapdragon Rust | Banner Maxx, 2-4 fl oz propiconazole | Apply every 14 to 21 days. |
| | Strike (25% WDG) 2.0-4.0 oz; triadimefon | Spray to run-off when rust first appears. |
| | Sythane (40% WSP) 4.0 oz; myclobutanil | Apply at 10- to 14-day intervals. |
| | Triact 70 0.5-1.0 gal; neem oil | Apply every 14 days. |
| | Cygnus (50%) 3.2-6.4 oz; Kresoxim-methyl | |

| Table 6.1 - Common Diseases and Chemical Control Options (continued) | | |
|--|--|---|
| Plant Disease | Fungicide & Formulation; Rate/100 gal | Remarks |
| Snapdragon Powdery mildew | Concert II (41.4%) 22.0 to 35.0 fl oz propiconazole and chlorothalonil | Apply at 14 to 21 day intervals |
| | Cygnus (50%) 1.6-3.2 oz; Kresoxim-methyl | |
| | Strike (25% WDG) 2.0-4.0 oz; triadimefon | Spray to run-off when mildew first appears. |
| | Systhane (40% WSP) 4.0 oz; myclobutanil | Apply at 10- to 14-day intervals. |
| | Triact 70 0.5-1.0 gal; neem oil | Apply every 14 days. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7 to 14 day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply every 14 to 28 days |
| Snapdragon Rhizoctonia root rot | Chipco 26019 (50% WP) 0.4 lb Sextant (23.3%) 1.0-2.5 lb; iprodione | Apply 1.0-2.0 pt/sq ft every 14 days. |
| | Cleary 3336-F (4.5 F) 20.0 fl oz; thiophanate methyl | |
| | Empress (23.3%) 2.0 to 6.0 fl oz; Pyraclostrobin | Repeat application at 7- to 28-day intervals as needed. |
| | Hurricane (48%) 1.5 oz; fludioxonil and mefenoxam | Drench to completely wet root zone at 21- to 28-day intervals |
| | Medallion (50% WP) 1 packet; fludioxonil | Drench at 3- to 4-week intervals. |
| | Pageant (38%) 12.0 to 18.0 oz; pyraclostrobin and boscalid | Drench to completely wet root zones at 7- to 14-day intervals |
| | Palladium (63.5% WDG) 2.0 to 4.0 oz; Cyprodinil and fludioxonil | Apply at 7- to 14-day intervals |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7- to 14-day intervals |
| | Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply at 14- to 28-day intervals |
| Tulip Botrytis blight (Gray mold) | Chipco 26019 (50% WP) 1.0-2.0 lb Sextant (23.3%) 1.0-2.5 lb; iprodione | Spray every 10 to 14 days. |
| | Fore Rainshield NT Fore WSP Rainshield Dithane T/O Rainshield NT Dithane WF Junction (15% DF) 1.5 lb; mancozeb | Spray at a 7- to 14-day interval. |
| | Pageant (38%) 12.0-18.0 oz; pyraclostrobin and boscalid | Apply every 7 to 14 days as needed |
| | | |
| Tulip Fusarium and Penicillium bulb rot | Cleary 3336-F 12.0-16.0 fl oz Fungo 50 AGC 12.0-16.0 oz; thiophanate methyl | Soak cleaned bulbs for 15 to 30 minutes in warm dip (80° to 85°F). Dry bulbs after treatment. |
| Zinnia Alternaria blight | Chipco 26019 (50% WP) 1.0-2.0 lb Sextant (23.3%) 1.0-2.5 lb iprodione | Spray every 10 to 14 days. |
| | Fore Rainshield NT Fore WSP Rainshield Dithane T/O Rainshield NT Dithane WF Junction (15% DF) 1.5 lb; mancozeb | Spray every 10 to 14 days. |
| | Maneb 80 (80% WP) or Maneb Plus Zinc F4 Fungicide (37%) 1.0-1.5 lb; maneb | Spray every 10 to 14 days. |
| | | |
| Zinnia Bacterial blight | | Purchase clean stock plants. Practice good sanitation procedures. |
| Zinnia Powdery mildew | Concert II (41.4%) 22.0 to 35.0 fl oz propiconazole and chlorothalonil | Apply at 14 to 21 day intervals |
| | Cygnus (50%) 1.6-3.2 oz; Kresoxim-methyl | Apply at 10- to 14-day intervals. |
| | Daconil Weather Stik 1.4 pt; chlorothalonil | Treat at 7- to 10-day intervals at first sign of disease. |
| | Rubigan 3.0-5.0 fl oz; fenarimol | Spray every 10 to 14 days. |
| | Strike (25% WDG) 2.0-4.0 oz; triadimefon | Spray every 7- to 10 days. |
| | Systhane (40% WSP) 4.0 oz; myclobutanil | Apply at 10- to 14-day intervals. |
| | Terraguard 50W 4.0-8.0 oz; triflumizole | Foliar spray at weekly intervals. |
| | Triact 70 0.5-1.0 gal; neem oil | Apply every 14 days. |
| | Trinity (19.2%) 8.0 to 12.0 fl oz; triticonazole | Apply at 7 to 14 day intervals |
| Tourney (50% WDG) 1.0 to 4.0 oz; metconazole | Apply every 14 to 28 days | |

Floral Crops: Organic Controls for Insect Pests

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| Table 6.2 - Organic Chemicals, Predators, and Pathogens | | |
|---|---|--|
| Product | Insects Controlled | Remarks |
| Products or pathogens | | |
| Azadirachtin | Beetles, Aphids, Caterpillars, Others | Sold under various trade names |
| <i>Bacillus thuringiensis</i> | Leaf-feeding caterpillars | Known as BT, sold under many trade names. A strain of this bacterium controls fungus gnats. |
| <i>Beauveria bassiana</i> | Beetles, Aphids, Others | Various trade names |
| <i>Capsicum oleoresin</i> extract, garlic and soybean oils | Thrips and mites | Sold as Captiva Prime |
| <i>Chromobacterium subsugae</i> strain PRRA4-1 | caterpillars, whiteflies, aphids, thrips, azalea lacebug, lygus and mites | Sold as Grandevo WDG. See label for rates for specific pests. |
| d-limonene | Imported fire ants | Provides quick kill for workers. |
| Entomopathogenic nematodes (<i>Steinernema</i> and <i>Heterorhabditis</i>) | Fungus gnats, shore flies, western flower thrips, root mealybugs, borers, root feeders | Rates are on product label; soil temperature should exceed 60 F. Apply late in the day, irrigate immediately. |
| Entomopathogenic fungi <i>Beauveria bassiana</i> , <i>Metarhizium anisopliae</i> (Met52EC), <i>Isaria fumosoroseus</i> (NoFly WP, Preferal) | whiteflies, thrips, aphids, mealybugs, fungus gnats, vine weevils, psyllids, plant bugs, beetles, leafhoppers | See label for proper material for target pest. Beauveria is sold under several trade names. Follow label for mixing directions, application timing and intervals and if a foliar spray or drench. NoFly WP can be applied with a cold fogger. |
| Insecticidal soap | Works well on soft bodied insects, in particular aphids, mites, lacebugs, mealybugs | This product is sold under many trade names and is a fatty acid soap. |
| <i>Isaria fumosorosea</i> Apopka Strain 97 | Aphids, thrips, whiteflies, weevils, psyllids, leafminers, spider mites, mealybugs | See label. Foliar and soil applications. Sold as Preferal. |
| Kaolin clay | Beetles, Aphids, Caterpillars, Others | Various trade names |
| <i>Paecilomyces fumosoroseus</i> Strain FE 9901 | Whiteflies, aphids and thrips | Sold as NoFly WP |
| Pyrethrins | Broad spectrum, works on a wide variety of insects and mites. | Usually sold mixed with other botanical insecticides. Some formulations combined with canola oil. Some products are labeled for flowers, fruits, vegetables, and herbs. Check label prior to applying. |
| Spinosad | Many insect pests, including thrips, lepidopterous larvae, and leaf beetles | Entrust is for organic production. |
| Predators | | |
| Lady beetles | Feed on aphids and other soft bodied insects | Lady beetles may leave to find other prey. <i>Cryptolaemus</i> for mealybug, <i>Delphastus</i> for whitefly. <i>Stethorus</i> for spider mites. |
| Lacewings | Aphids, scales, mealybugs, other soft bodied insects | Immature <i>Chrysoperla carnea</i> are called aphid lions. |
| Predatory bugs | thrips | <i>Orius</i> for all stages of western flower thrips |
| Predatory midges | Aphids, thrips, fungus gnat larvae | <i>Aphidoletes aphidimiza</i> for aphids |
| Predatory mites | Whitefly, spider mites, thrips, fungus gnat larvae | <i>Amblyseius swirskii</i> for whiteflies and thrips; <i>Phytoseilus persimilis</i> for red and 2-spotted spider mites; <i>Hypoaspis</i> for fungus gnat larvae; <i>Amblyseius californicus</i> for 2-spotted spider mite and carmine mite; <i>Amblyseilus cucumeris</i> for western flower thrips; <i>Amblyseilus andersoni</i> for red and 2-spotted spider mites. |
| Parasitic wasps | Leafminers, whiteflies | <i>Diglyphus isaea</i> for leafminers; <i>Encarsia formosa</i> and <i>Eretmocerus eremicus</i> for whiteflies. |
| Rove beetle | Fungus gnat larvae | Rove beetle for fungus gnat larvae |

Floral Crops: Insects

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Relatively few kinds of insects and related pests occur on greenhouse and floral crops, but they attack a wide range of plants, can be highly destructive, and are difficult to control.

Many insecticide and miticide formulations are available to growers, but specific uses may be quite limited for any one crop, and plant varieties vary greatly in susceptibility to chemical injury. Your local Extension faculty may be able to help you obtain the technical information you need.

■ Proper Use of Pesticides

Insecticides are poisonous, and their use in the greenhouse can present a serious danger to both the applicator and plant material if handled carelessly or improperly. Restricted pesticides must be applied only by certified pesticide applicators.

Pesticides no longer being sold are listed to insure proper usage of existing material in the user's possession. Products withdrawn for marketing reasons can reappear under new brand names.

In order to use a pesticide safely and effectively, the product label should be read thoroughly before using. By law, pesticides must be used in accordance with label directions.

Effective application of pesticides depends on: proper timing, favorable treatment conditions of temperature, humidity, moisture, and time of day; plant condition; and thorough coverage, especially the undersides of leaves and in dense or low-growing foliage. Thorough wetting is especially important on waxy foliage and waxy insects such as mealybugs and scales. Most insecticides do not act efficiently at temperatures below 50-55°, and may cause plant injury if used when the temperature is above 90°, especially when coupled with high humidity. Overhead irrigation or watering should be avoided for at least 12 hours after applying pesticide treatments. Plants should be well watered, with foliage allowed to dry, before applying chemicals.

Non-chemical control methods should not be overlooked, particularly preventative measures such as making sure not to introduce infested plants into production areas. Weeds and excess plants left around can harbor pests and may be sources of infestation. Parasites (*Encarsia formosa* for whiteflies) and predators (*Cryptolaemus montrouzieri* for mealybugs) can be introduced for biological control. Others are listed in the Organic Controls chapter.

PLANT INJURY

Phytotoxicity is a term referring to plant injury caused by chemicals, particularly pesticides. Greenhouse plants seem to be especially prone to this problem, in part because of the wide variety of plants often grown or held in one common area. Signs of phytotoxicity include: 1) tip or marginal burn of leaves; 2) chlorosis in spots, at tips, or on

margins of the leaves; 3) leaf distortion, including curling, twisting, or cupping; 4) stunting or growth reduction in the size of entire plants or certain parts; and 5) abnormal or excessive growth of certain plant parts. Flower parts and bracts are especially sensitive. Treatments may cause root injury resulting in decline, stunting, and damage to older leaves.

The following suggestions will reduce phytotoxic potential:

- 1) Do not apply pesticides to plants under stress; 2) Avoid spraying under extremely hot, sunny, or humid conditions; 3) Apply sprays in the mornings between 6:00 a.m. and 10:00 a.m; 4) Avoid treating when temperature extremes or severe fluctuations are likely; 5) Apply pesticides when foliage is dry and conditions are conducive to drying; 6) Use wettable powders rather than emulsifiable concentrates; 7) Do not mix pesticides without prior experience; check compatibility; 8) Keep nozzles of aerosols or mist blowers at least 18-24" from plants being treated; 9) Never spray insecticides in equipment that has been used for applying herbicides (tanks, pumps, hoses, guns); 10) Clean sprayer, tank, pump, hose, and gun after each use; 11) Do not let spray mixes stand in the sprayer; do not expose spray concentrates to extreme heat or freezing; 12) Read **ALL** of the label directions every time you use each pesticide.

FORMULATIONS AND APPLICATION METHODS

Pesticides are available in various formulations: as concentrates for spraying, granular soil treatments, or aerosols. In some cases, only one or a few application methods may be registered for use of a specific pesticide.

Dilute sprays are applied with pressurized tank sprayers or high-pressure powered spraying machines. Formulations to be used may be wettable powders (WP), emulsifiable concentrates (E or EC), soluble powders (SP), liquids or liquid concentrates (L, LC), or flowables (F). Wettable powders are less likely to cause phytotoxicity problems.

Concentrate sprays are applied with motor-driven or electric mist sprayers and deliver droplets 5 to 20 times as concentrated as dilute sprayers.

Rates of application from aerosol bombs, generators, and foggers are based on air volume in closed greenhouses in terms of amount of pesticide/cubic feet. It is important to close the greenhouse tightly for the recommended length of time followed by adequate prescribed ventilation.

COMPATIBILITY AND COVERAGE

Care should be taken in mixing different chemicals. Mixing different formulations such as wettable powders and emulsifiable concentrates is not recommended. Never mix herbicides or fungicides, and never use a sprayer that has been used to apply herbicides for insecticide or fungicide application.

For especially waxy foliage, the addition of a wetting agent or spreader-sticker may be desirable when applying sprays. However, it is unnecessary if two or more pesticides are added together, since a

greater amount of wetting agent or emulsifier will be present in the tank. The use of two (2) or more emulsifiable concentrates mixed together in the same quantity of water results in twice as much or more solvent applied to the plants and may cause plant injury. Read the pesticide label carefully for compatibility statements and mixing precautions. Highly alkaline water (pH 8.0 or higher) may cause rapid breakdown of many pesticide chemicals.

SAFETY AND TOXICITY

Pesticides are readily absorbed through the skin, as well as being poisonous by ingestion, by inhalation, or by contact in the eyes. Penetration of the skin occurs immediately on contact and is most hazardous when handling undiluted concentrates. It is essential to wear protective clothing, proper gloves, boots, and adequate face shields and respirators or gas masks as directed on the label. Frequent changes to clean clothing and protective devices are essential. With some chemicals, potential eye damage warrants a danger or warning category on the label even though oral and dermal toxicities are in the caution range.

The signal word on the pesticide label (“caution,” “warning,” or “danger - poison”) and the LD50 values are helpful as guides to relative toxicities of pesticides. The LD50’s given below in Tables 6.3 and 6.4 are for technical grade material.

| Signal Word | Toxicity Category | LD50 mg/kg | |
|--|----------------------|------------|-------------|
| | | Oral | Dermal |
| DANGER, POISON (skull and crossbones) | Highly toxic | 0-50 | 0-200 |
| WARNING | Moderately toxic | 51-500 | 201-2000 |
| CAUTION | Slightly toxic | 501-5000 | 2001-20,000 |
| CAUTION (optional) | Relatively non-toxic | over 5000 | over 20,000 |

SPECIAL PRECAUTIONS FOR POLLINATORS

Some insecticides may be acutely or chronically toxic to bees. Read the label for special precautions. Certain labels contain special precaution section titled “Protection of Pollinators”. A bee hazard icon may warn applicators of special application restrictions to protect pollinators.

| Pesticide | Toxicity LD50 (mg/kg) | |
|-------------------------------|-----------------------|---------|
| | oral | dermal |
| Abamectin | 650 | >2,000 |
| Acephate | 866-945 | >10,250 |
| Azadirachtin | >5,000 | >2,000 |
| <i>Bacillus thuringiensis</i> | none | none |
| Cyfluthrin | 900 | >5,000 |
| Fenoxycarb | 16,800 | >2,000 |
| Fluvalinate | 261-282 | >20,000 |
| Metaldehyde | 250-1,000 | — |
| Methiocarb | 10-35 | >5,000 |
| Permethrin | >430-4,000 | >2,000 |

How to Use These Recommendations

Once the pest problem has been identified, consult Table 6.5. Find the pest or pest group (arranged alphabetically) to determine which control measures are available, the formulations that are registered, and remarks. Then consult Table 6.6 for specific use and precautionary information on the control measure chosen. Be sure to check the potential phytotoxicity statements. If in doubt about a crop, treat a small sample area. Observe sprayed plants for several days for indications of plant injury.

After using the recommendations here, read and follow the directions on the pesticide label prior to mixing and application.

| Pesticide | Signal Word | Foliar Spray | Aerosol | Smoke Fog Vapor | Soil | Remarks ¹ |
|---|-------------|--------------|---------|-----------------|----------|--|
| Aphids (https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/444/444-220/ENTO-350.pdf) | | | | | | |
| Abamectin | warning | 0.15EC | — | — | — | See label |
| Acephate | caution | 75SP, 97 | 3A | — | — | Aerosol is labeled for most crops. See label for phytotoxicity |
| Acetamiprid | caution | 70WSP, 30SG | — | — | — | See label |
| Afidopyropen | caution | 0.83DC | — | — | — | Do not reapply within 7 days of last application |
| Azadirachtin | caution | EC | — | — | — | All crops |
| <i>Beauveria bassiana</i> | caution | 22WF, ES | — | — | — | All crops |
| Cyantraniliprole | warning | — | — | — | SC | See label. Soil drench or irrigation system application |
| Cyfluthrin | warning | 20WP | — | — | — | See label |
| Dinotefuran | caution | 20SG | — | — | 20SG, 2G | Soil application as drench, granules |
| Fenoxycarb | caution | 25WP | 0.6A | — | — | All crops |
| Fenpropathrin | warning | 2.4EC | 1A | — | — | See label |
| Fonicamid | caution | SG | — | — | — | See label for rate range |

| Table 6.5 - Guide to Pesticide and Formulations Recommended by Pest or Pest Group (continued) | | | | | | |
|--|-------------|--------------|---------|-----------------|----------|--|
| Pesticide | Signal Word | Foliar Spray | Aerosol | Smoke Fog Vapor | Soil | Remarks ¹ |
| Aphids (https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/444/444-220/ENTO-350.pdf) continued | | | | | | |
| Flupyradifurone | caution | 1.67SC | — | — | — | See label; only one application per crop cycle |
| Fluvalinate | caution | 2AF | — | — | — | All crops; see label for phytotoxicity |
| Imidacloprid | caution | II | — | — | 1%G,60WP | See label |
| Insecticidal soap | warning | — | — | — | — | See label |
| Kinoprene | warning | II | — | — | — | All crops |
| Methiocarb | warning | 75WP | — | — | — | See label |
| Pymetrozine | caution | 50WG | — | — | — | All crop; spray and drench applications |
| Pyrethrin | caution | — | A | — | — | See label |
| Pyriproxyfen | caution | — | — | — | — | See label |
| Pyriproxyfen | caution | .86L | — | — | — | See label |
| Spinetoram + Sulfoxaflor | caution | SC | — | — | — | See label for precautions and restrictions |
| Spirotetramat | caution | 240SC | — | — | 240SC | Soil application as drench |
| Thiamethoxam | caution | 25WG | — | — | 25WG | See label |
| Tolfenpyrad | warning | EC | — | — | — | See label for phytotoxicity |
| Ultra-fine oil | caution | — | — | — | — | See label |
| Caterpillars, Cutworms, Loopers, Armyworms | | | | | | |
| Acetamiprid | caution | 70WSP, 30SG | — | — | — | See label for pest species |
| Azadirachtin | caution | EC | — | — | — | All crops |
| <i>Bacillus thuringiensis (BT)</i> | caution | WP | — | — | — | Consult label of this and other brands of BT available for specific pest uses. |
| Bifenthrin | warning | .667F | A | — | — | Greenhouse-grown ornamentals |
| Carbaryl | caution | 50W, 80S | — | — | — | All crops |
| Chlorantraniliprole | — | SC | — | — | — | See label |
| Chlorfenapyr | caution | 2S | — | — | — | All crops |
| Cyantraniliprole | warning | SC | — | — | — | See label |
| Cyfluthrin | warning | 20WP | — | — | — | See label |
| Diflubenzuron | caution | 25WSB | — | — | — | Armyworm listed on label |
| Fenpropathrin | warning | 2.4EC | 1A | — | — | For beet armyworm; see label |
| Fluvalinate | caution | 2AF | — | — | — | All crops |
| Novaluron | caution | 10SC | — | — | — | Armyworm listed on label |
| Permethrin | caution | 3.2EC | — | — | — | All crops |
| Pyridalyl | caution | 35WP | — | — | — | See label for insect species |
| Spinosad | caution | 11.6SC | — | — | — | All crops |
| Tebufenozide | caution | 2S | — | — | — | All crops |
| Tolfenpyrad | warning | EC | — | — | — | See label for phytotoxicity. For early instars only. |
| Centipedes (see Millipedes) (https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/3104/3104-1574/3104-1574_jpg.pdf) | | | | | | |
| Bifenthrin | warning | .667F | — | — | — | See label |
| Cyclamen Mite | | | | | | |
| Chlorfenapyr | caution | 2S | — | — | — | All crops |
| Fenazaquin | warning | 200SC | — | — | — | All crops |
| Spiromesifen | caution | 4F | — | — | — | Also labeled for broad mite |
| Fungus Gnats (Adults) | | | | | | |
| Bifenthrin | caution | — | A | — | — | All crops |
| Fenpropathrin | warning | — | 1A | — | — | All crops |

| Table 6.5 - Guide to Pesticide and Formulations Recommended by Pest or Pest Group (continued) | | | | | | |
|--|-------------|--------------|---------|-----------------|----------|--|
| Pesticide | Signal Word | Foliar Spray | Aerosol | Smoke Fog Vapor | Soil | Remarks ¹ |
| Fungus Gnats (Adults) | | | | | | |
| Insecticidal soap | warning | — | — | — | — | See label, formulations vary |
| Permethrin | caution | 3.2EC | — | — | — | See label for sensitive plants |
| Resmethrin | caution | 2EC | 1A | — | — | All crops |
| Ultra-fine oil | caution | — | — | — | — | See label |
| Fungus Gnats (Larvae) (https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/3104/3104-1579/3104-1579_PDF.pdf) | | | | | | |
| Acetamiprid | caution | 70WSP, 30SG | — | — | — | See label |
| <i>Bacillus thuringiensis</i> (BT) | non-toxic | — | — | — | AS | All crops |
| Cyromazine | caution | 75WP | — | — | — | All crops |
| Diflubenzuron | caution | — | — | — | 25WSB | See label |
| Fenpropathrin | warning | — | 1A | — | — | All crops |
| Fenoxycarb | caution | 25WP | — | — | — | All crops |
| Flupyradifurone | caution | 1.67SC | — | — | — | See label. Only one application per crop cycle |
| Kinoprene | warning | II | — | — | — | All crops |
| Pyriproxyfen | caution | .86EC | — | — | — | See label |
| Leafminers | | | | | | |
| Abamectin | warning | 0.15EC | — | — | — | Flower crops, foliage plants |
| Acetamiprid | caution | 70WSP, 30SG | — | — | — | See label |
| Azadirachtin | caution | EC | — | — | — | All crops |
| Bifenthrin | warning | .667F | A | — | — | See label |
| Cyfluthrin | warning | 20WP | — | — | — | See label |
| Cyromazine | caution | 75WP | — | — | — | All crops |
| Diflubenzuron | caution | 25WSB | — | — | — | See label |
| Dinotefuran | caution | 20SG | — | — | 20SG | Soil application as drench |
| Fenpropathrin | warning | — | 1A | — | — | All crops |
| Fenoxycarb | caution | 25WP | — | — | — | Lepidopterous leaf miners only all crops |
| Novaluron | caution | 10SC | — | — | — | Serpentine, citrus leafminers only |
| Permethrin | caution | 3.2EC | — | — | — | Chrysanthemum only |
| Spinosad | caution | 11.6SC | — | — | — | All crops |
| Leafrollers | | | | | | |
| Acephate | caution | 75SP, 97 | 3A | — | — | Labeled on roses |
| Bifenthrin | warning | .667 F | A | — | — | Greenhouse-grown ornamentals |
| Cyfluthrin | warning | 20WP | — | — | — | See label |
| Fenpropathrin | warning | — | 1A | — | — | All crops |
| Mealybugs (Foliar) | | | | | | |
| Acephate | caution | 75SP, 97 | 3A | — | — | Labeled on foliage plants, orchids, anthurium, cacti, poinsettia |
| Acetamiprid | caution | 70WSP, 30SG | — | — | — | See label |
| Azadirachtin | caution | EC | — | — | — | All crops |
| <i>Beauveria bassiana</i> | caution | 22WP, ES | — | — | — | All crops |
| Bifenthrin | warning | 667F | A | — | — | Greenhouse-grown ornamentals |
| Buprofezin | caution | 70WSP | — | — | — | All crops |
| Cyfluthrin | warning | 20WP | — | — | — | See label |
| Dinotefuran | caution | 20SG | — | — | 20SG, 2G | Soil application as drench, granule |

| Table 6.5 - Guide to Pesticide and Formulations Recommended by Pest or Pest Group (continued) | | | | | | |
|--|-------------|--------------|---------|-----------------|----------|--|
| Pesticide | Signal Word | Foliar Spray | Aerosol | Smoke Fog Vapor | Soil | Remarks ¹ |
| Mealybugs (Foliar) | | | | | | |
| Fenpropathrin | warning | 2.4EC | 1A | — | — | See label |
| Flonicamid | caution | SG | — | — | — | See label for rate range |
| Flupyradifurone | caution | 1.67SC | — | — | — | See label. Only on application per crop cycle |
| Fluvalinate | caution | 22.3F | — | — | — | See label |
| Imidacloprid | caution | II | — | — | 1%G | See label |
| Insecticidal soap | warning | — | — | — | — | Concentration varies with formulation; see label |
| Kinoprene | warning | II | — | — | — | See label |
| Methiocarb | warning | 75WP | — | — | — | See label |
| Permethrin | caution | 3.2EC | — | — | — | See label for sensitive plants |
| Pyrethrin | caution | — | A | — | — | See label |
| Pyrifluquinazon | caution | — | — | — | — | See label |
| Spinetoram + Sulfoxaflor | caution | SC | — | — | — | See label for precautions and restrictions |
| Spirotetramat | caution | 240SC | — | — | 240SC | Soil application as drench |
| Thiamethoxam | caution | 25WG | — | — | 25WG | See label |
| Mealybugs (Root) | | | | | | |
| Kinoprene | warning | II | — | — | — | All crops |
| Millipedes | | | | | | |
| Bifenthrin | warning | .667F | — | — | — | See label |
| Scale Insects (https://www.pubs.ext.vt.edu/2909/2909-1414/scale-insects/index.html) | | | | | | |
| Acephate | caution | 75SP, 97 | 3A | — | — | See crops listed on label |
| Acetamiprid | caution | 70WSP, 30SG | — | — | — | See label |
| Buprofezin | caution | 70WSP | — | — | — | All crops |
| Cyantraniliprole | warning | SC | — | — | — | See label. Soft scales only. |
| Cyfluthrin | warning | 20WP | — | — | — | See label directions |
| Dinotefuran | caution | 20SG | — | — | 20SG, 2G | Soil application as drench, granules |
| Fenoxycarb | caution | 25WP | 0.6A | — | — | All crops, soft scales only |
| Fenpropathrin | warning | — | 1A | — | — | See label |
| Insecticidal soap | warning | — | — | — | — | Formulations vary; see label |
| Kinoprene | warning | II | — | — | — | All crops |
| Pyriproxyfen | caution | .86EC | — | — | — | See label |
| Spinetoram + Sulfoxaflor | caution | SC | — | — | — | See label for precautions and restrictions |
| Thiamethoxam | caution | 25WG | — | — | 25WG | Labeled for soft scales |
| Tolfenpyrad | warning | EC | — | — | — | See label for phytotoxicity |
| Shore Flies | | | | | | |
| Cyromazine | caution | 75WP | — | — | — | All crops |
| Diflubenzuron | caution | — | — | — | 25WSB | See label |
| Fenoxycarb | caution | 25WP | 0.6A | — | — | All crops |
| Pyriproxyfen | caution | .86EC | — | — | — | See label |
| Slugs, Snails | | | | | | |
| Metaldehyde | caution | — | — | — | bait | All crops |
| Methiocarb | warning | 75WP | 1A | — | — | See label |
| Sowbugs | | | | | | |
| Cyfluthrin | warning | 20WP | — | — | — | See label |
| Spider Mites (https://www.pubs.ext.vt.edu/2909/2909-1414/spider-mites/index.html) | | | | | | |
| Abamectin | warning | 0.15EC | — | — | — | See label |

| Table 6.5 - Guide to Pesticide and Formulations Recommended by Pest or Pest Group (continued) | | | | | | |
|--|-------------|--------------|---------|-----------------|----------|--|
| Pesticide | Signal Word | Foliar Spray | Aerosol | Smoke Fog Vapor | Soil | Remarks ¹ |
| Spider Mites (https://www.pubs.ext.vt.edu/2909/2909-1414/spider-mites/index.html) | | | | | | |
| Acequinocyl | caution | 15SC | — | — | — | See label. Two-spotted spider mite. |
| Azadirachtin | caution | 70 | — | — | — | All crops |
| Bifenazate | caution | 50SP | — | — | — | All crops |
| Bifenthrin | warning | .667 F | A | — | — | Greenhouse-grown ornamentals. |
| Chlorfenapyr | caution | 2S | — | — | — | All crops |
| Clofentezine | caution | 5SC | — | — | — | All crops |
| Cyflumetofen | caution | 1.67SC | — | — | — | See label |
| Etoazole | caution | 5WDG | — | — | — | See label for resistance management |
| Fenazaquin | warning | 200SC | — | — | — | All crops. |
| Fenbutatin oxide | danger | 50WP | — | — | — | All crops |
| Fenpropathrin | warning | 2.4EC | 1A | — | — | See label |
| Fenpyroximate | warning | 5SC | — | — | — | Labeled for other mite species |
| Fluvalinate | caution | 22.3F | — | — | — | See label |
| Hexythiazox | caution | 50DF | — | — | — | See label |
| Insecticidal soap | warning | 25EC | — | — | — | Formulations vary; see label |
| Milbectin | caution | EC | — | — | — | Outdoor use only, eg. flowers, bedding plants, foliage plants. |
| Pyrethrin | caution | — | A | — | — | See label |
| Pyridaben | danger | 75WP | — | — | — | See label |
| Spinosad | caution | SC | — | — | — | See label for rate range |
| Spiromesifen | caution | 4F | — | — | — | See label for species |
| Ultra-fine oil | caution | — | — | — | — | See label for rate |
| Springtails (https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/ENTO/ENTO-23/ENTO-262.pdf) | | | | | | |
| Bifenthrin | warning | .667F | — | — | — | See label |
| Thrips (https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/444/444-281/ENTO-373.pdf) | | | | | | |
| Abamectin | caution | 0.15EC | — | — | — | All crops |
| Acephate | caution | 75WP, 97 | 3A | — | — | All crops |
| Acetamiprid | caution | 70WSP, 30SG | — | — | — | See label |
| Azadirachtin | caution | EC | — | — | — | All crops |
| Beauveria bassiana | caution | 22WP, EC | — | — | — | All crops |
| Bifenthrin | warning | .667 F | — | — | — | See label |
| Chlorfenapyr | caution | 2S | — | — | — | All crops |
| Cyantraniliprole | warning | SC | — | — | — | See label |
| Cyfluthrin | warning | 20WP | — | — | — | See label |
| Diazinon | caution | 2FM | .5A | — | — | See label |
| Dinotefuran | caution | 20SG | — | — | 20SG, 2G | Soil application as drench, granules |
| Fenoxycarb | caution | 25WP | A | — | — | All crops |
| Fenpropathrin | warning | — | 1A | — | — | |
| Flonicamid | caution | SG | — | — | — | See label for rate range |
| Fluvalinate | caution | 2AF | — | — | — | All crops |
| Imidacloprid | caution | II | — | — | 1%G,60WP | See label |
| Lambda-cyhalothrin | caution | 10WSP | — | — | — | All crops |
| Methiocarb | warning | 75WP | — | — | — | All crops |
| Novaluron | caution | 10SC | — | — | — | See label for listed species |

| Table 6.5 - Guide to Pesticide and Formulations Recommended by Pest or Pest Group (continued) | | | | | | |
|---|-------------|--------------|---------|-----------------|-----------|--|
| Pesticide | Signal Word | Foliar Spray | Aerosol | Smoke Fog Vapor | Soil | Remarks ¹ |
| Thrips (https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/444/444-281/ENTO-373.pdf) | | | | | | |
| Pyridalyl | caution | 35WP | — | — | — | See label for special instructions |
| Pyriproxyfen | caution | 1.80SC | — | — | — | See label. Chili thrips only. |
| Resmethrin | caution | — | 2A | — | — | All crops |
| Spinetoram + Sulfoxaflor | caution | SC | — | — | — | See label for precautions and restrictions |
| Spinosad | caution | 11.6SC | — | — | — | All crops |
| Spirotetramat | caution | 240SC | — | — | 240SC | Soil application as drench |
| Thiamethoxam | caution | 25WG | — | — | 25WG | See label |
| Tolfenpyrad | warning | EC | — | — | — | See label for phytotoxicity |
| Whiteflies (https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/444/444-280/ENTO-378.pdf) | | | | | | |
| Abamectin | caution | 0.15E | — | — | — | See label |
| Acephate | caution | 75SP | 3A | — | — | All crops |
| Acetamiprid | caution | 70WSP, 30SG | — | — | — | See label |
| Afidopyropen | caution | 0.83DC | — | — | — | Do not reapply within 7 days of last application |
| Azadirachtin | caution | EC | — | — | — | All crops |
| <i>Beauveria bassiana</i> | caution | 22WP, ES | — | — | — | See label |
| Bifenthrin | warning | .667 F | A | — | — | Greenhouse-grown ornamentals |
| Buprofezin | caution | 70WSP | — | — | — | All crops |
| Cyantraniliprole | warning | SC | — | — | SC | See label. Foliar and soil applications |
| Cyfluthrin | warning | 20WP | — | — | — | See label |
| Diflubenzuron | caution | 25WSB | — | — | — | See label |
| Dinotefuran | caution | 20SG | — | — | 20SG, 2G | Soil application as drench, granules |
| Fenazaquin | warning | 200SC | — | — | — | All crops, see label for phytotoxicity |
| Fenoxycarb | caution | 25WP | 0.6A | — | — | All crops |
| Fenpropathrin | warning | 2.4EC | 1A | — | — | See label |
| Fonicamid | caution | SG | — | — | — | See label for rate range |
| Flupyradifurone | caution | 1.67SC | — | — | — | See label. Only one application per crop cycle |
| Fluvalinate | caution | 2F | — | — | — | All crops |
| Imidacloprid | caution | II | — | — | 1%G, 60WP | See label |
| Insecticidal soap | caution | L | — | — | — | See label |
| Kinoprene | caution | II | — | — | — | See label |
| Novaluron | caution | 10SC | — | — | — | See label for listed species |
| Permethrin | caution | 3.2EC | — | — | — | See label for sensitive plants |
| Pymetrozine | caution | 50WG | — | — | — | All crops; spray and drench applications |
| Pyrethrin | caution | — | A | — | — | See label |
| Pyridaben | danger | 75WP | — | — | — | See label |
| Pyriproxyfen | caution | 1.80SC | — | — | — | See label |
| Pyriproxyfen | caution | .86EC | — | — | — | See label |
| Resmethrin | caution | 2A 2EC | — — | — F | — — | All crops See label |
| Spinetoram + Sulfoxaflor | caution | SC | — | — | — | See label for precautions and restrictions |
| Spiromesifen | caution | 4F | — | — | — | See label for species |

¹Be sure to check precautions for phytotoxicity for each pesticide in table.

| Table 6.6 - Guide to Pesticide Usage Cross Reference to Other Common Trade Names | | | | | |
|--|--------------------|----------------------|----------------------|----------------------|--|
| Pesticide | Formulation | 50 Gal | 10 Gal | 3 Gal | Precautions & Remarks |
| Abamectin (Avid, Sirocco) aphids, leafminers, eriophyid and spider mites, thrips, whiteflies | 0.15EC | 2.0-4.0 fl oz | 0.75-1.5 T | 0.75-1.5 t | Generic products exist. See label. Sirocco also contains bifenazate. See label for rate. 12-hr REI. SIGNAL WORD - WARNING |
| Acephate (Orthene) aphids, leafroller, mealybugs, scale crawler, thrips, whitefly | 75SP 97 Aerosol | See label for rates. | See label for rates. | See label for rates. | Repeated applications may cause phytotoxicity. See label for rate and species list. Generics exist. Tame / Orthene TR is an aerosol combo product. 1300 Orthene TR is also available as an aerosol. 24-hr REI. SIGNAL WORD - CAUTION |
| Acephate mealybugs | 3% aerosol | — | — | — | Apply 5-10 seconds/100 sq ft. Do not use under high temperature and humidity conditions or where gas heating systems are unvented. See label for sensitive plant list. 24-hr REI. SIGNAL WORD - CAUTION |
| Acequinocyl (Shuttle) spider mites | 15SC | 3.2-6.4 fl oz | 1.25-2.5 T | 1.25-2.5 t | Do not use on miniature roses or impatiens. Use low rate on standard roses. See label for resistance management. 12-hr REI. SIGNAL WORD - CAUTION |
| Acetamiprid (Tristar) aphids, mealybug, leafhopper, whiteflies, thrips, scales, fungus gnat larvae, leafminers, caterpillars | 70WSP, 30SG | See label for rates. | See label for rates. | See label for rates. | See label for restrictions. 70WSP in water soluble packets. 12-hr REI. SIGNAL WORD - CAUTION |
| Afidopyropen (Ventigra) aphids, whiteflies | 0.83DC | See label for rates | See label for rates | See label for rates | See label for resistance management, restrictions, and precautions. 12-hr REI. SIGNAL WORD - CAUTION |
| Azadirachtin (Trilogy, Azatin and others) aphids, caterpillars, leafminers, mealybugs, thrips, whiteflies | various | See label for rates. | See label for rates. | See label for rates. | Product is available at several concentrations and sold under many trade names. 4-hr REI. SIGNAL WORD - CAUTION |
| Bacillus thuringiensis (BT) (Gnatrol) fungus gnats | AS | 1.0-4.0 pts | 3.0-13.0 oz | 2.0-8.0 T | Consult label for proper rate. Use 3 weekly applications for heavy infestations. 4-hr REI. SIGNAL WORD - CAUTION |
| Bacillus thuringiensis (BT) (Dipel) caterpillars, loopers, budworm, omnivorous leafroller, armyworm | various | See label for rates. | See label for rates. | See label for rates. | Many formulations exist. Check rate and use labeled rate only. Use full coverage foliar spray when larvae are small. Use lower rate for light infestations. 4-hr REI. SIGNAL WORD - CAUTION |
| Beauveria bassiana (BotaniGard, Mycotrol, Naturalis O) aphids, mealybugs, thrips, whiteflies | 22WP, ES | See label for rates. | See label for rates. | See label for rates. | A mycoinsecticide. See label for rate for each pest. |
| Bifenazate (Floramite, Sirocco) spider mites | 50SP | 1.0-2.0 oz | — | — | See label for species controlled. Do not use in successive applications. Sold in water soluble bags. Sirocco also contains abamectin. See label for rate. 12-hr REI. SIGNAL WORD - CAUTION |
| Bifenthrin (Attain) armyworms, caterpillars, mealybugs, leafrollers, plant bugs, scale, mites, whiteflies | 0.5%/A | 1 lb can/3000 sq ft | | | Generic products exist. See label for total release directions. 12-hr REI. SIGNAL WORD - CAUTION |
| Abbreviations: AF - aquaflo; W, WP - wettable powder; E, EC - emulsifiable concentrate; L - liquid; ME - microencapsulated; SP - sprayable or soluble powder; SC - spray concentrate; D - Dust; G - granular; A - aerosol; F - fog; SG - smoke generator; V - vapor; lb - pound; pt - pint; oz - ounce; fl oz - fluid ounce; cu ft - cubic feet; c - cup; T - tablespoon; t - teaspoon; gal - gallon(s) | | | | | |
| Useful Equivalents 1 lb WP/100 gal = 1 T/1 gal; 2.0 T = 1 fl oz; 1 pt EC/100 gal = 1 t/1 gal; 16 fl oz = 1 pt; 3 t = 1 T; 2 pt = 1 qt | | | | | |

| Table 6.6 - Guide to Pesticide Usage Cross Reference to Other Common Trade Names continued | | | | | |
|--|-----------------|--------------------------------------|----------------------|----------------------|---|
| Pesticide | Formulation | 50 Gal | 10 Gal | 3 Gal | Precautions & Remarks |
| Bifenthrin (Talstar One, Astro) whiteflies, mealybugs, spider mites, leafroller, armyworms | 0.667F | 4.0-20.0 oz | 0.8-4.0 oz | 2.0-6.0 t | Apply as full-coverage foliar spray. Repeat as necessary. Do not handle plants till dry. Rate depends on pest. 12-hr REI. SIGNAL WORD - CAUTION |
| Buprofezin (Talus) leafhoppers, mealybugs, planthoppers, scales, whiteflies | 70WSP | — | — | — | Consult label for proper rate. Sold in water-soluble bags. 12-hr REI. SIGNAL WORD - CAUTION |
| Carbaryl (Exposed) blister beetle, flea beetle, leafhoppers, leafrollers, mealybugs, plant bugs, thrips | 10D | | | | Apply a light covering of dust barely visible when completed. Treat when plants are dry and humidity is low. Use caution for greenhouse treatments if conditions are not suitable. 12-hr REI. Caution: "Sevin" may contain other active ingredients than carbaryl. SIGNAL WORD - WARNING |
| | 50W | 1.0 lb | 6.6 T | 6.0 T | |
| | 80SL | 10.0 oz | 4.0 T | 3.75 T | |
| Chlorfenapyr (Pylon) spider mites, cyclamen mites, thrips, caterpillars, foliar nematodes | 2S Aerosol | 1.3-2.6 fl oz See label for rates | 1.5-3.0 t | 0.5-1.0 t | Labeled for greenhouse ornamentals. See label for thrips rate. 12-hr REI. SIGNAL WORD - CAUTION |
| Clofentezine (Ovation) spider mites | 5SC | 1.0 oz | — | — | One application per crop cycle. Apply at first sign of mite activity. 12-hr REI. SIGNAL WORD - CAUTION |
| Cyflumetofen (Sultan) spider mites | 18.7SC | 6.85 fl. oz | — | — | See label. 12-hr REI. SIGNAL WORD - CAUTION |
| Cyantraniliprole (Mainspring) Lace bugs, leaf-feeding caterpillars, soft scales, thrips and whiteflies | SC | — | — | — | See label for rates. Foliar spray or drench. 4-hr REI. SIGNAL WORD - WARNING |
| Cyfluthrin (Decathlon, Tempo, Discus) caterpillars, lace bug, aphids, leafrollers, mealybugs, thrips, whiteflies, sowbugs | 20WP | 3.0-4.5 T | 2.0-3.0 t | 0.75-1.0 t | Addition of a spreader-sticker may improve control. Discus contains imidacloprid. See label. 12-hr REI. SIGNAL WORD - WARNING |
| Cyromazine (Citation) Leafminers, fungus gnats, shore flies | 75WP | 1.33 oz | — | — | Apply as foliar spray or drench; will not control adults. Sold in water-soluble pouches. SIGNAL WORD - CAUTION |
| Diffubenzuron (Adept, Dimilin) armyworms, fungus gnats, leafminers, shore flies, whiteflies | 25SC | — | — | — | Read label before using as a drench. Under cover uses are registered. Sold in water soluble bags. Rates differ for foliar feeders. Do not use on poinsettia, hibiscus or Reiger begonia 12-hr REI. SIGNAL WORD - CAUTION |
| Dinotefuran (Safari) aphids, scale, Japanese beetles, leafminers, mealybugs, thrips, whiteflies | 20SG 2G | See label for rates. | See label for rates. | See label for rates. | For foliar insects. Apply as foliar spray or soil applications as drenches. See label for scale species. See label for vegetable transplant use. Do not apply while bees are foraging, or to flowers where bees may forage (See "Bee advisory" box on label). 12-hr REI. SIGNAL WORD - CAUTION |
| Etoxazole (TetraSan, Beethoven TR) | 5WDG Aerosol | See label for rates. | — | — | Etoxazole is sold in water soluble packets. 12-hr REI. SIGNAL WORD - CAUTION |

Abbreviations: AF - aquaflo; W, WP - wettable powder; E, EC - emulsifiable concentrate; L - liquid; ME - microencapsulated; SP - sprayable or soluble powder; SC - spray concentrate; D - Dust; G - granular; A - aerosol; F - fog; SG - smoke generator; V - vapor; lb - pound; pt - pint; oz - ounce; fl oz - fluid ounce; cu ft - cubic feet; c - cup; T - tablespoon; t - teaspoon; gal - gallon(s)

Useful Equivalents 1 lb WP/100 gal = 1 T/1 gal; 2.0 T = 1 fl oz; 1 pt EC/100 gal = 1 t/1 gal; 16 fl oz = 1 pt; 3 t = 1 T; 2 pt = 1 qt

| Table 6.6 - Guide to Pesticide Usage Cross Reference to Other Common Trade Names continued | | | | | |
|---|----------------------|---------------------------------------|-------------------------------------|---------------------|---|
| Pesticide | Formulation | 50 Gal | 10 Gal | 3 Gal | Precautions & Remarks |
| Fenazaquin (Magus) mites, whiteflies | 200SC | 6.0-12.0 fl oz | 2.2-4.5 T | 2.0 t -1.5 T | Maintain agitation during mixing. One application per crop cycle. Do not apply to roses. 12-hr REI. SIGNAL WORD - WARNING. |
| Fenbutatin oxide (Promite, Meraz) mites | 50WP | 1.0 lb soluble bag in 100.0-200.0 gal | — | — | Do not add oil. Apply to foliage only on mums and pre-bract on poiseettias. 24-hr REI. SIGNAL WORD - DANGER |
| Fenoxycarb (Preclude) | 0.6A | 5-10seconds/ 100 sq ft | — | — | See label for dosage for specific pest; WP sold in 1.0 oz pouches. Insect growth regulator. 12-hr REI. Signal Word - CAUTION |
| Fenoxycarb (Precision) whiteflies, soft scales, fungus gnats, shore flies, lepidopterous leaf miners, and thrips | 25WP | 1.0-4.0 fl oz | — | — | |
| Fenpropathrin (Tame) aphids, beet armyworm, leafhoppers, mealybugs, mites, whiteflies, Japanese beetle | 2.4EC, 1A Aerosol | 2.67-8.0 oz | 1.0-3.0 T | 1.0-3.0 t | See label for dosage for specific pest, and for mixing instructions. Aerosol formulation contains acephate. 24-hr REI. SIGNAL WORD - WARNING |
| Fenpyroximate (Akari) spider mites | 5SC | 8.0-12.0 oz | 3.0-4.5 T | 1.0-1.5 T | See label for resistance management. 12-hr REI. SIGNAL WORD - WARNING |
| Flonicamid (Aria) aphids, mealybugs, thrips, whiteflies | SG | See label for rates | | | Each packet contains 20g of product. Registered for greenhouse and interiorscapes. 12-hr REI. SIGNAL WORD - CAUTION |
| Flupyradifurone (Altus) aphids, mealybugs, whiteflies | 1.67SC | — | See label for soil and foliar rates | — | Apply as a foliar spray or soil drench. 12-hr REI. SIGNAL WORD - CAUTION |
| Fluvalinate (Mavrik) aphids, thrips, mites, whiteflies, leaf-feeding caterpillars | 2AF | 2.0-5.0 fl oz | 1.0 T-2.5 T | 1.0 t-2.5 t | May repeat at 5- to 10-day intervals if needed. See label for precautions. 12-hr REI. SIGNAL WORD - CAUTION |
| Hexythiazox (Hexygon) spider mites | 50DF | See label for rates | See label for rates | See label for rates | Rates differ for high- and low-volume applications. 12-hr REI. SIGNAL WORD - CAUTION |
| Imidacloprid (Marathon) aphids, thrips and whiteflies | 1%G, 60 WP, II | See label for rates | See label for rates | See label for rates | Generic products exist. Do not over irrigate following application. Do not apply while bees are foraging, or to flowers where bees may forage (See "Bee advisory" box on label). 12-hr REI. SIGNAL WORD - CAUTION |
| Insecticidal soap (Various product names) aphids, mealybugs, mites, scale insects | 50.5EC | 4.0-10.0 pt | 0.8-2.0 pts | 8.0-20.0 T | See label. Repeated applications of high rates may cause plant damage. Numerous formulations are available. 12-hr REI. |
| | 25EC | 2.0 gal | 50.0 oz | 15.0 oz | |
| Kinoprene (Enstar) aphids, fungus gnats, mealybugs, scales, whitefly | II | 2.5-5.0 oz | 2.5-5.0 t | 0.75-1.5 t | See label for usage directions. Labeled for carnations, mums, roses. Foliage should be dry. Fogging rate - 1 oz/3,000 cu ft 4-hr REI. SIGNAL WORD - WARNING |
| | Fog | | | | |
| Lambda-cyhalothrin (Scimitar) adult leaf miners, armyworms, brown soft scale, caterpillars, mealybugs, spider mites, thrips, whiteflies | GC | 0.75-2.5 oz | — | — | Generic products exist. See label for rates. 24-hr REI. SIGNAL WORD - CAUTION |
| Abbreviations: AF - aquaflow; W, WP - wettable powder; E, EC - emulsifiable concentrate; L - liquid; ME - microencapsulated; SP - sprayable or soluble powder; SC - spray concentrate; D - Dust; G - granular; A - aerosol; F - fog; SG - smoke generator; V - vapor; lb - pound; pt - pint; oz - ounce; fl oz - fluid ounce; cu ft - cubic feet; c - cup; T - tablespoon; t - teaspoon; gal - gallon(s) | | | | | |
| Useful Equivalents 1 lb WP/100 gal = 1 T/1 gal; 2.0 T = 1 fl oz; 1 pt EC/100 gal = 1 t/1 gal; 16 fl oz = 1 pt; 3 t = 1 T; 2 pt = 1 qt | | | | | |

| Table 6.6 - Guide to Pesticide Usage Cross Reference to Other Common Trade Names continued | | | | | |
|--|---------------|--|--|--|--|
| Pesticide | Formulation | 50 Gal | 10 Gal | 3 Gal | Precautions & Remarks |
| Metaldehyde (Deadline, Metarex) slugs, snails | 3.25% pellets | 1.0 lb/1,000 sq ft | | | Apply bait only to soil surface around plants, not foliage or other plant parts. 12-hr REI. SIGNAL WORD - CAUTION |
| Methiocarb (Grandslam, Mesurol) aphids, snails, slugs, western flower thrips | 2% G 75W | 1.0 lb/ 1,000 sq ft 0.5-2.0 lbs | 1.6-6.4 oz | 0.5-2.0 T | Only Mesurol labeled for thrips. Apply bait to soil around plants or flats but not on plant foliage. Do not apply to food crops. 24-hr REI. SIGNAL WORD - DANGER |
| Novaluron (Pedestal) thrips, caterpillars, whiteflies, leafminers | 10SC | 3.0-4.0 fl oz | 4.0-5.0 tsp | 1.0-1.5 tsp | See label for precautions. Do not use on poinsettias. 12-hr REI. SIGNAL WORD - CAUTION |
| permethrin (Perm-up, Astro) leafminers, caterpillars, aphids, fungus gnats, mealybugs | 3.2EC | 10.0 oz | 2.0 oz | 1.0 T | Apply as full-coverage foliar spray. Listed rate is for leafminers; lower rate for other pests. 12-hr REI. SIGNAL WORD - CAUTION |
| Pymetrozine (Endeavor) aphids, whiteflies | 50SP | 1.25-2.5 oz | — | — | Only sold in water soluble packets. 12-hr REI. spray and drench applications SIGNAL WORD - CAUTION |
| Pyrethrin (X-clude) aphids, scale, mealybugs, spider mites, whiteflies | Aerosol | Use 5-10 second application for each 100 sq ft | Use 5-10 second application for each 100 sq ft | Use 5-10 second application for each 100 sq ft | See label. NO - REI. SIGNAL WORD - CAUTION |
| Pyridaben (Sanmite) mites, whiteflies | 75WP | 1.0-3.0 oz | — | — | Sold in 1 oz pouches. See label for dosage for specific pest. 12-hr REI. SIGNAL WORD - DANGER |
| Pyridalyl (Overture) thrips, caterpillars | 35WP | 4.0 oz | — | — | Only sold in water-soluble packets. 12-hr REI.. SIGNAL WORD - CAUTION |
| Pyrifluquinazon (Rycar) Aphids, leafhoppers, chili thrips, mealybugs, whiteflies | 20SC | — | — | — | See label. 12-hr REI. SIGNAL WORD - CAUTION |
| Pyriproxyfen (Distance, Pyrigro, Fulcrum) whiteflies, fungus gnats, shoreflies, scale | 0.86 EC | 3.0-6.0 fl oz | 0.5-1.0 fl oz | 1.0-2.0 t | See label for restrictions on application per cropping cycle. Rate differs for scale. 12-hr REI. SIGNAL WORD - CAUTION |
| Spinetoram + Sulfoxaflor (XXpire) aphids, lepidopterous larvae, mealybugs, plant bugs, thrips, whiteflies and scales | SC | 1.0-1.75 oz | — | 0.06-0.1 oz | See label for rates for target pests. 12-hr REI. SIGNAL WORD - CAUTION |
| Spinosad (Conserve) thrips, spider mites, dipterous leafminers, dipterous gall midges, lepidopterous larvae, sawfly larvae, leaf-feeding beetles. | SC | 3.0-11.0 fl oz | 1.0-11.0 T | 1.0-11.0 t | Compatible with IPM programs. See label for resistance management and rates for specific pests. 4-hr REI. SIGNAL WORD - CAUTION |
| Spiromesifen (Forbid, Judo, Savate) mites, whiteflies | 4F | 1.0-2.0 fl oz | 1.2-2.4 t | 0.38-0.75 t | See label for species and number of applications per season. Do not apply on geraniums, Peperomia, Dracoera, and 'Classy', 'Attache' or 'Vogue' varieties of roses. 12-hr REI. SIGNAL WORD - CAUTION |
| <p>Abbreviations: AF - aquaflow; W, WP - wettable powder; E, EC - emulsifiable concentrate; L - liquid; ME - microencapsulated; SP - sprayable or soluble powder; SC - spray concentrate; D - Dust; G - granular; A - aerosol; F - fog; SG - smoke generator; V - vapor; lb - pound; pt - pint; oz - ounce; fl oz - fluid ounce; cu ft - cubic feet; c - cup; T - tablespoon; t - teaspoon; gal - gallon(s)</p> <p>Useful Equivalents 1 lb WP/100 gal = 1 T/1 gal; 2.0 T = 1 fl oz; 1 pt EC/100 gal = 1 t/1 gal; 16 fl oz = 1 pt; 3 t = 1 T; 2 pt = 1 qt</p> | | | | | |

| Table 6.6 - Guide to Pesticide Usage Cross Reference to Other Common Trade Names continued | | | | | |
|---|-------------|------------------------|-----------------------|------------------------|--|
| Pesticide | Formulation | 50 Gal | 10 Gal | 3 Gal | Precautions & Remarks |
| Spirotetramat (Kontos) aphids, whiteflies, mealybugs, spider mites | 240SC | 0.8 fl oz (25.0 ml) | 0.2 fl oz (5.0 ml) | 0.07 fl oz (2.0 ml) | See label for resistance management. Registered for vegetable transplants. Will not control heavy populations of spider mites. 24-hr REI. for sprays, no REI. for drench. SIGNAL WORD - CAUTION |
| Tebufenozide (Confirm) lepidopterous larvae | 2E | 2.0-8.0 oz | 1.0-4.0 T | 1.0-4.0 t | See label regarding spray adjuvants. 4-hr REI. SIGNAL WORD - CAUTION |
| Thiamethoxam (Flagship) aphids, whiteflies, mealybugs, soft scales | 25WG | See label | — | — | See label for rate directly to soil or media. 12-hr REI. SIGNAL WORD - CAUTION |
| | .22G | See label | — | — | See label for granular product rate. 12-hr REI. SIGNAL WORD - CAUTION |
| Tolfenpyrad (Hachi-Hachi) aphids, leafhoppers, Lepidopteran early instars, scale, thrips, whitefly | 15%EC | See label | — | — | See label for phytotoxicity. Rate for cuttings (cut flowers) is lower than other plants. 12-hr REI.. SIGNAL WORD - WARNING |
| Ultra-fine spray oil (Various product names) aphids, leafminers, whiteflies, mites, scales, mealybugs | 6E | 0.5-1.0 gal | 13.0-26.0 oz | 4.0-7.5 oz | Applicator should conduct phytotoxicity tests. 4-hr REI. SIGNAL WORD - CAUTION |
| <p>Abbreviations: AF - aquaflo; W, WP - wettable powder; E, EC - emulsifiable concentrate; L - liquid; ME - microencapsulated; SP - sprayable or soluble powder; SC - spray concentrate; D - Dust; G - granular; A - aerosol; F - fog; SG - smoke generator; V - vapor; lb - pound; pt - pint; oz - ounce; fl oz - fluid ounce; cu ft - cubic feet; c - cup; T - tablespoon; t - teaspoon; gal - gallon(s)</p> <p>Useful Equivalents 1 lb WP/100 gal = 1 T/1 gal; 2.0 T = 1 fl oz; 1 pt EC/100 gal = 1 t/1 gal; 16 fl oz = 1 pt; 3 t = 1 T; 2 pt = 1 qt</p> | | | | | |

Floral Crops: Weed Control in Greenhouses

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■ Nonchemical Control

Hand-weeding and good sanitation are the safest ways to control weeds in greenhouses. Remove weeds from plugs or liners prior to planting. Use media that are free of weed seed or have been temporarily sterilized using steam or other methods. For steam sterilization of media, mix should be maintained at 180°F for at least 30 minutes. Some weed seed will not be controlled. Prevent weeds from flowering in and around the greenhouse. Allow the greenhouse to completely dry out between crops. Use concrete for the greenhouse floor. Clean up growing media that spill onto the floor.

■ Chemical Control

Most herbicides cannot be used in greenhouses due to the potential for chemical volatilization under high temperatures. Since greenhouses are enclosed structures, herbicide vapors are trapped around the crop and could cause severe injury. There are several herbicides that are registered for weed control under greenhouse benches. There are no preemergence herbicides registered for weed control in containers or flats located in a greenhouse. See the chapters on Home and Commercial Ornamentals for herbicides registered for annual and perennial flowers maintained outdoors.

| Chemical | Rate | Comments |
|---|--|---|
| Acetic Acid (Weed Pharm) | Rate Varies | Organic Control. For liverwort control, mix one part Weed Pharm to two parts water. For control of grasses and broadleaf weeds use full strength. Contact nonselective postemergence herbicide. Do not allow spray to contact desired plants. |
| Envoy Plus (clethodim) | 0.5 fl oz + 1/3 fl oz nonionic surfactant/gal | Apply to weed foliage for control of annual bluegrass, crabgrass, bermudagrass, and other grassy weeds. Make sure that no ornamental grasses or other desired grasses are in the greenhouse. Will not control sedges or any broadleaf weed. |
| Finale (glufosinate) | 1.5-4.0 fl oz/gal | Turn off air circulation fans during application. Contact nonselective herbicide with some systemic activity. No soil residual as it only has postemergence action. |
| Glyphosate (Roundup ProMax or other labeled formulations) | 1.0-2.0 fl oz/gal check label for rates | Remove desired vegetation from the greenhouse and turn off air circulation fans prior to application. Systemic postemergence herbicide for control of all weeds. No soil residual action. |
| Marengo (indaziflam) | 0.21-0.42 fl oz/1,000 sq ft | Apply to the floor of empty greenhouses for preemergence weed control. Add a labeled postemergence herbicide if there are emerged weeds. Irrigate after application and allow the area to dry before introducing plants in the greenhouse. |
| Reward (diquat) | 0.75 fl oz + labeled rate of a nonionic surfactant/gal | Avoid spray drift to crops. Contact postemergence herbicide for control of all weeds. No residual action. |
| Scythe (pelargonic acid) | 3.0%-7.0% solution | Avoid spray drift to crops. Contact postemergence herbicide for control of all weeds. No residual action. Has an odor that dissipates over time. |

