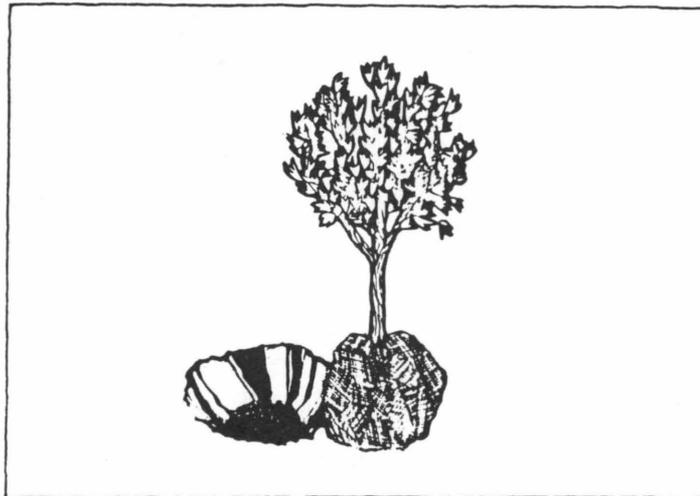


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Virginia Cooperative Extension Service

Publication 456-007  
Revised January 1988

**1988-89**  
**Pest Management Guide**  
**for**  
**NURSERY**  
**ORNAMENTALS**



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Produced by the Department of Entomology and the Department of Plant Pathology, Physiology and Weed Science, VA Tech. Coordinator: J. M. Luna, Department of Entomology

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*Keys to the Proper Use of Pesticides*

1. Read the label on each pesticide container before each use. Follow the printed instructions to the letter; heed all cautions and warnings; note precautions about residues.
2. Store pesticides in the containers in which you bought them. Put them where children and animals cannot get to them -- preferably locked-up and away from food, feed, seed and other materials that may become harmful if contaminated.
3. Dispose of empty pesticide containers in the manner specified on their labels.

SEE YOUR DOCTOR IF SYMPTOMS OF ILLNESS OCCUR DURING OR AFTER USE OF PESTICIDES

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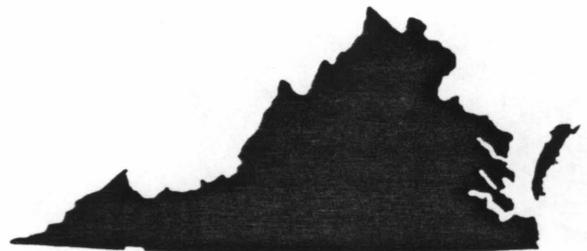
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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, and September 30, 1977, in cooperation with the U.S. Department of Agriculture. Mitchell R. Geasler, Director, Virginia Cooperative Extension Service, and Vice Provost for Extension, Virginia Polytechnic Institute and State University, Blacksburg, Virginia; Clinton V. Turner, Administrator, 1890 Extension Program, Virginia State University, Petersburg, Virginia.

Virginia Cooperative Extension Service

Publication 456-000

# PEST MANAGEMENT GUIDES FOR VIRGINIA -- 1988-89



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- Introduction, Regulations and Basic Information for the Safe  
and Effective Use of Agricultural Pesticides in Virginia -- Publication 456-001
- Pest Management Guide for Home Vegetable Gardens -- Publication 456-002
- Pest Management Guide for Home Fruit Production -- Publication 456-003
- Pest Management Guide for Home Ornamental Plants -- Publication 456-004
- Pest Management Guide for Commercial Small Fruit Production -- Publication 456-005
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# Insects of Nursery Crops and Shade Trees

*John A. Weidhaas, Jr., Extension Entomologist  
Peter B. Schultz, Research Entomologist*

These recommendations are for use by nursery producers, commercial and municipal arborists, and other Certified Applicators, Category III, who are responsible for the production, care, and protection of shade trees, shrubs, and other woody ornamental plants. Pest control is a highly complex and technical implementation of cultural and pest management practices.

There is no simple magic formula for pest control on trees and shrubs. More than 250 species of insects and mites are commonly found which damage or are potentially injurious to over 100 genera of woody ornamentals. Great diversity by insects in host preferences, seasonal development, periods of activity, habits, and susceptibility to insecticides requires careful planning and critical timing of control measures. It is a simple fact that insects and mites will occur, multiply, and cause serious losses if ignored or inadequately controlled. The most frequent cause of insect problems is the failure of nurserymen and arborists to carry out necessary control procedures properly at the right time due to pressures from other phases of production and maintenance. The consequence, without exception, is a much more difficult and costly situation.

The best way to control insects and mites is a preventive program. First, do not introduce pest problems. In nursery production, propagate or buy ONLY clean, uninfested stock plants. In municipal trees planting or private landscaping, set out ONLY insect-free plant materials. The presence of a few hardly noticeable insects or mites at planting time is a sure source of extra work and costly effort later on. Second, draw up a seasonal pest control schedule to prevent the establishment and buildup of insects and mites which may have been overlooked or can move in from nearby areas by natural migration. Third, maintain regular surveillance of established plant materials and be prepared to schedule special remedial control measures for difficult or complex pest problems which arise. Take advantage of assistance from your local Agricultural Extension Agent and the Extension Specialists at Virginia Tech.

## How to Use These Recommendations

Prepare a seasonal control schedule for your specific plant types and pest problems. Each nursery, municipality, or local area tends to have its own unique pest situation depending on routine cultural and control practices. If the pest situation is not known, conduct a thorough survey to determine which problems exist and what the control needs are. Review and study the recommendations so that a season spray schedule can be planned. Select those treatments which most conveniently fit the work plan in your own operation. For example, the use of dormant sprays on many plants will minimize or eliminate the need for spraying operations during the busier periods of the season. Another example is controlling spruce and southern red mite in the fall rather than the spring, or controlling pine needle scale in late July rather than in May. With careful study and planning these recommendations can be adapted to an effective, seasonal, preventive control program. There are numerous built-in options and alternatives. It is essential to carry out the program. There are numerous built-in options and alternatives. It is essential to carry out the program precisely. Thoroughness and proper timing are critical in obtaining effective results.

### Precautions

Be absolutely sure to read and follow ALL of the directions and precautions on the labels and accompanying brochures of the pesticides used. Every statement included is important and can prevent serious injuries or losses. Be absolutely sure that those involved in the application of pesticides are fully informed of all precautions for use and are trained in the application techniques. Formulations and amounts to mix in preparing sprays are not given here. Consult the labels for directions. It is illegal to use pesticides inconsistent with uses specified on the label. Be sure the host plants and pests to be controlled are listed on the label of the product you use.

### Toxicity and Hazard to Man and Animals

As a guide to general hazards of chemicals, know the relative toxicities of common insecticides. Also study the precautionary statements on pesticides labels. Certain chemicals may be more readily absorbed through the skin than if ingested, or vice versa. Some may be relatively non-toxic to bees and birds, but highly toxic to fish. In using pesticides, avoid application where undesirable side effects may result. In spraying it is essential to stay out of drift and direct spray. Wear protective equipment when using the more toxic materials.

### Plant Injury

Insecticides vary greatly in their phytotoxicity. Be sure to avoid treating sensitive plants. Cautions on the label usually indicate plants which should not be sprayed. Read the entire label carefully. Dimethoate is one of the more variable chemicals, causing foliage injury on elms, chrysanthemums, andromeda, some varieties of azaleas but not others, burford and Chinese holly but not Japanese or other types, honey locust, dogwood, crab apples, and maple. Carbaryl may injure tender foliage if plants are wet when treated or in the presence of high humidity; it should not be used at any time on Boston ivy or Virginia creeper. Endosulfan may injure white birch, redbud, and Anderson yew. Malathion may cause injury to certain junipers, eleagnus, hibiscus, some rose varieties, certain ferns. Methoxychlor should not be used on Chinese elm, Japanese maple, red maple or redbud. Petroleum oils for dormant or summer spraying are much safer now than earlier days, but should not be used on birch, beech, sugar and Japanese maple, hickory, walnut, butternut, douglas fir, spruces, or juniper.

It is important not to mix pesticides which are not compatible with each other, and avoid formulations not intended for use on plants. Formulations used for structural pest control should not be applied to plants.

## Control Measures for Major Pests and Pest Groups

Pest	Control	Timing of Treatment	Remarks
<b>ADELGIDS</b>			
spruce gall adelgid	lindane carbaryl malathion diazinon Thiodan	Treat just before buds break in the spring, and/or in September and early October after galls have opened.	Spring treatments should be applied before cottony egg masses are evident on buds in the spring. Cooley spruce gall adelgid on douglas fir does not produce galls; it feeds openly on the needles. Sprays can be applied in September and October.
pine bark adelgid	lindane malathion diazinon Thiodan Trithion	Treat in late April or early May and repeat 2-3 weeks later.	Use a forceful spray to penetrate cottony secretions and wash aphids from twigs and bark. Use less-toxic materials in public areas and around homes. Do not get Thiodan on birch trees. Do not re-enter areas sprayed with trithion for 48 hours without protective clothes.
hemlock woolly adelgid	diazinon	Treat in late June and/or in September or October.	Thoroughly wet entire plant including the bark of branches and the trunk. Use a forceful spray; be sure the new growth is thoroughly wet.
<b>APHIDS (general)</b>			
	malathion diazinon Thiodan Metasystox-R Dimethoate Trithion DiSyston Turcam zespemethrin mavrik Dymet oxamyl	When first seen. Some (spirea, willow twig, white pine aphid) occur in the spring. Others (crape myrtle, giant bark, willow leaf, elm leaf, linden, maple and oak) build up in mid-summer. Many (white pine aphid) may be present, migrating to hosts throughout the season and in the fall.	Apply control measures before populations become large. Aphids may infest buds, leaves, stems branches, or trunks of the host plants. Be sure to follow all label directions and precautions. Use less toxic and less hazardous materials in public areas, around homes, and where plants are to be moved or transplanted. Do not re-enter areas sprayed with MSR or Trithion for 48 hours without protective clothing. Be aware of lady beetles, aphid lions, syrphid larvae, and other predators that may reduce populations. Do not spray when plants are flowering and honey bees are active.
hickory leafstem gall aphid	malathion MetaSystox-R	Treat just as new buds are beginning to open. Timing is critical.	Because aphids begin feeding immediately as leaf buds begin to open, control is very difficult and often ineffective. Do not re-enter areas sprayed with MetaSystox-R for 48 hours without protective clothes.
<b>BAGWORM</b>			
	Sevin Orthene Dymet Turcam Dursban diazinon dimethoate	Apply treatments when bags are less than 1/2 inch. Late May in coastal Virginia, early to mid-June elsewhere. Controls not effective in mid-late summer.	Lightly misting the foliage is sufficient. Mist blower treatments are effective. Do not use the more toxic or hazardous materials in public areas or around homes. Do not re-enter areas sprayed with Trithion for 48 hours without protective clothing. Sevin may lead to mite increases; add a miticide.
	Dipel Bactospeine Thuricide	Treat when larvae are young in mid to late June. May be effective in July.	Lightly misting the foliage is sufficient. Mist blower treatments are effective.
	Remove and burn bags relatively few insects or few infested trees.	August to May for light infestation of Destroy the bags; eggs will hatch from bags thrown on the ground.	Overwintering eggs remain inside the bags until hatching in late May.

Pest	Control	Timing of Treatment	Remarks
<b>BARK BEETLES</b> general	Thiodan (Thiodan labeled only for felled logs) lindane	Treatments should be applied to prevent infestation of and breeding in the bark. Treat wood or trees with bark attached as soon as they are cut. Treat weakened or injured trees in late April and repeat 2 or 3 times at monthly intervals.	Thoroughly soak the bark of the trunk and branches. Sprays are more concentrated than usual foliar treatments; avoid excessive drip and wear protective clothing and equipment.
elm bark beetle (See Control Series 103 Dutch Elm Disease)	sanitation	immediately destroy all branches larger than 1-1/2" in diameter as soon as they begin to die or are cut to prevent infestation and breeding by beetles.	Wood should NEVER be piled or stored unless all of the bark is removed. Where possible susceptible wood should be burned or buried with at least 18 inch fill.
	methoxychlor	As late in the spring as possible before LEAF BUDS open, usually early April or late March depending on plant zone. This treatment can be supplemented with a second spray in early June.	Complete coverage of all bark is absolutely essential, especially the one year-old twigs in the tops and outer reaches of the trees. The trunk and larger branches should be soaked thoroughly. Spraying is supplementary to sanitation. (See Control series 103).
pine bark beetles: southern pine beetle, engraver beetles, turpentine beetles ( <u>ips</u> , <u>Dendroctonus</u> )	lindane	Treat unhealthy weakened or damaged trees in early April, early June, and August if near infested trees. Also effective in preventing spread if sprayed on infested trees or wood before beetles emerge, or in preventing infestations in uninfested wood that is cut but cannot be disposed of immediately	Thoroughly wet all of the bark. Healthy vigorous trees are not likely to be attacked and do not require spraying. Beetles will not reinfest or attack wood or trees dead more than one year. For felled logs, Thiodan can be used (see table listing insecticides).
	sanitation	Throughout the year, particularly during the growing season, when trees begin dying or wood is cut. Prune out large, dying or recently dead branches.	Dispose of susceptible wood, slash, and bark from stumps by utilization burning, burying where feasible. Beetles will not reinfest or attack wood or trees dead longer than one year.
shot-hole borer, fruit tree bark beetles, ash bark beetle ( <u>Scolytus</u> )	lindane	Drench the bark of healthy trees in late April and early June.	Normally, these pests are infrequent so that it is not necessary to spray all healthy trees annually. If any beetles or signs of their presence are found, treat all healthy trees in the vicinity.
<b>BORERS</b> banded ash borer	lindane Dursban	Treat trunk and main stems in late July and again in early September	control measures are preventive treatments aimed at egg-laying adults and/or newly hatched larvae prior to tunneling into the tree.

Pest	Control	Timing of Treatment	Remarks
lilac borer ash borer	lindane Thiodan Dursban	Treat trunk and branches in early May and again 6 weeks later.	Treatments also kill emerging as well as entering beetle borers. Thorough wetting and soaking of the bark is necessary. Foliage need not be treated.
dogweed borer	lindane dursban Thiodan	Treat trunk and larger branches in mid-May and repeat 2-3 times at six-week intervals.	
peach tree borer	lindane Thiodan	Treat the trunks and soil around the base in July and repeat in 6 weeks.	
rhododendron borer	lindane	Treat the trunks and larger branches in late June.	
bronze birch borer	lindane	Treat all bark surfaces, especially in the uppermost part of the tree in mid-May, early, mid- and late-June.	
two-lined chestnut borer	lindane	Treat trunk and branches, during mid-late May and mid-late June.	
azalea stem borer, dogwood twig borer	lindane	Treat one-year old stems throughout the tree in mid-May and in mid-June.	
round-headed and flat-headed tree borer	lindane	Treat bark of trunk and branches in early May, early June, and early July	
mottled willow borer (poplar and willow borer)	lindane	Treat all bark surfaces in mid-late June and in late August-early September	
oak borer	lindane	Treat trunk to ground level early June.	Larger populations are likely in even-numbered years.
locust borer	lindane	Treat the trunk and larger branches in late August to mid-September (before goldenrod is in bloom).	Sprays applied in early spring may provide adequate control if fall treatments were not made.
round-headed and flat-headed borers, bark beetles, and bark weevils in felled logs or trees only	lindane Thiodan	Thoroughly wet the bark surface immediately after trees or logs are cut.	
CICADA (periodical cicada)	Sevin	Treat bark of twigs on susceptible hosts soon after adult male singing becomes evident, usually around early May.	Cicada damage is caused by adult females inserting eggs in deep slits in twigs. Control is necessary only in the year of 13-year and 17-year brood emergence in various locations.

Pest	Control	Timing of Treatment	Remarks
DEFOLIATORS general	Sevin malathion methoxychlor <u>Bacillus thuringiensis</u> Dursban Orthene Turcam Dymet imidan diazinon (Use BT only for caterpillars)	When insects are first observed feeding. Timing varies with the species. It is critical to observe plants regularly to detect feeding as soon as it begins.	Specific uses are limited by current labeling directions. Many species, though important, are not included on present labels. Insecticide combinations marketed by formulators and distributors are available. Consult the labels for specific uses and precautions. See intro., Plant injury. Mist blowers are effective.
cankerworms	methoxychlor Sevin <u>Bacillus thuringiensis</u> diazinon Orthene Mavrik imidan Turcam	In May when the leaves are half to two-thirds full size, treatments must be applied when loopers are small.	Do not use methoxychlor on Chinese elm, Japanese or red maple, or redbud. See Intro., Plant Injury. Mist blowers are very effective.
elm leaf beetle	Sevin methoxychlor Thiodan Turcam	Treat in mid-to late May, when eggs have hatched, but larvae are small. Second generation may need treatment in mid-to-late July.	Do not use methoxychlor on chinese elm. Sevin may injure tender foliage if plants are wet when treated or humidity is high.
fall webworm	diazinon methoxychlor Dursban <u>Bacillus thuringiensis.</u> Sevin Turcam	When larvae first begin to feed in late June. Repeat in late July.	Do not use methoxychlor on Chinese elm, Japanese red maple, or redbud.
flea beetles	diazinon Mavrik Sevin	When insects are found feeding on host plants as adults or as larvae.	See precautions above for Sevin and intro, Plant injury.
grasshoppers	Dursban Sevin	When grasshoppers are found feeding.	Grasshoppers are infrequent pests but can be destructive when abundant.
gypsy moth	Sevin <u>Bacillus thuringiensis</u> methoxychlor Orthene Turcam Imidan Dimilin	When leaves have expanded but caterpillars are small, usually in mid-May.	See intro. Plant injury. Mist blowers and aerial applications are effective.
Japanese beetle	Sevin methoxychlor malathion Turcam diazinon Vydate	In late June or early July after adults have begun to congregate on selected hosts. Repeat as necessary into August.	Since adults actively fly and move continuously, they seem to be present constantly even where treatments have been applied. See Intro., Plant injury.
orange tortrix puss caterpillar	Sevin	In mid-or late summer when insects are seen.	Sprays are usually ineffective if applied when caterpillars are mature. See Intro., Plant injury.
rose chafer	Thiodan methoxychlor Sevin	During June and mid-summer when insects are found.	Adults are active flyers and move continually onto susceptible hosts.
rose slugs	Sevin methoxychlor	Throughout the growing season when young larvae are seen on plants especially in May, June.	Close inspection of plants is necessary to time treatments when larvae are young and damage is not yet severe. See Intro., Plant injury.

Pest	Control	Timing of Treatment	Remarks
sawflies	Sevin methoxychlor malathion	Timing varies in the season depending on the host plant and the sawfly species.	Label uses are limited to pines, larch, ash and spruce.
tussock moth	methoxychlor Mavrik	In mid-May or late August	Treat when larvae are small.
willow leaf beetle	Sevin methoxychlor Turcam	In May, June, and later if infestations persist. There may be several generations in a season.	Be sure to treat the undersides of the leaves.
<b>GALL INSECTS</b>	Sevin is registered for gall wasps and gall midges, but treatments are effective when insects are active, before galls appear.	Most gall insects sting or feed on the host to incite the galls. The site of attack and intensity of populations is unpredictable. Most galls are not serious or fatal.	Most gall insects leave the galls when mature. Disposing of galls is not effective in reducing the pest unless they can be cut out while they are actively growing, such as horned oak gall and gouty oak gall.
<b>LACEBUGS</b>	Sevin malathion dimethoate DiSyston methoxychlor Turcam lindane diazinon	On evergreens, overwintering eggs hatch in mid-late May. Treat in late May or early June and repeat at 3-week intervals. On deciduous hosts, adults emerge in May. Treat in late May and repeat at 3 week intervals.	Consult the label for host plants and specific pests listed under directions for use. Treatments must cover the undersides of the leaves thoroughly. Control of the first generations is most important to slow populations buildup. Examine foliage for lacebugs into fall.
<b>LEAFHOPPERS</b>	Sevin or Dursban or MetaSystox-R or resmethrin or Mavrik or oxamyl	When leafhoppers are first seen and before stipling on uppersides of leaves becomes extensive.	Thorough coverage is essential on the undersides of the leaves. Do not re-enter areas sprayed with MSR for 48 hours without protective clothing.
<b>LEAFMINERS</b> azalea leafminer	diazinon orthene dimethoate Turcam Pounce Vydate	Treat in mid-late May or when mines are first seen on the plants.	Be cautious with dimethoate on azaleas, some varieties may be susceptible to plant injury.
boxwood leafminer	diazinon malathion lindane	Treat in late April or early May when adults are active.	Numerous adults can be eliminated before eggs are laid.
	dimethoate	Treat in mid-late June after eggs have hatched.	This systemic treatment is most effective in eliminating miners. It is also effective later in the season, but mines will be present in the foliage.
holly leafminer	diazinon Dylox	Treat in mid May when adults are active on the foliage.	Helps to reduce feeding punctures on undersides of leaves but may not prevent all mines in the foliage.
	dimethoate MetaSystox-R Orthene	Treat in mid-late June after eggs have hatched.	These systemics are effective in eliminating miners, they are also effective later in the season, but mines will be present on the foliage. <b>DO NOT TREAT CHINESE OR BURFORD HOLLIES.</b> Do not re-enter areas treated with MSR for 48 hours without protective clothing.

Pest	Control	Timing of Treatment	Remarks
oak leafminer	Orthene	Treat when mines are first seen - less than 1/4 inch. Several generations occur each season.	Rake and destroy leaves in fall.
<b>LEAFROLLERS, LEAF TIERS</b>	Levin imidan diazinon	Treat when insects are first seen. On some hosts, injury occurs in early spring when new buds are opening.	Imidan is currently labeled for fruit trees and can be used on flowering fruits only. Consult the label for specific host plants listed.
<b>MEALYBUGS</b>	petroleum oil	Treat in late spring, before new growth begins.	Forceful spray streams help penetrate cracks and crevices in the bark and waxy secretions that protect the mealybugs. Spray on warm days when the temperature is not likely to go below 40 F (5 C) for 12-24 hours. Do not spray sensitive plants listed on the label.
	malathion dimethoate Dursban Turcam Enstar Sevin Orthene	Treat whenever mealybugs are first noticed. Repeat 2-3 applications if necessary until infestation is eliminated.	Forceful spray streams help penetrate cracks and crevices in the bark and waxy secretions that protect the mealybugs. See intro. - "Spray Injury".
<b>MITES</b> hemlock rust mite	petroleum oil	Treat in early spring before new growth develops.	Do not use on sensitive plants indicated on the label. Oil-ethion can be used.
	Sevin	Treat when mites are found in very early spring, in late fall or during the growing season.	Thoroughly wet the undersides of leaves with a full coverage spray.
spruce mite, southern red mite, boxwood mite	Kelthane dimethoate MetaSystox-R Omite Vendex Pentac	Treat in late April or early May and/or in September and October.	Thoroughly wet all of the foliage and stems with a full coverage spray. Do not re-enter areas treated with MSR for 48 hours without protective clothing.
honeylocust mite	Kelthane	One application in late June or early July will prevent damage. Treat when mites occur to control established infestations.	Thoroughly wet the undersides of leaves with a full coverage spray.
Two-spotted mite	Kelthane dimethoate MetaSystox-R DiSyston Plictran Pentac Vendex Omite	Treat whenever mites first appear. infestations may occur from spring to fall. Mite infestations are directly proportionate to increasingly warmer temperatures.	Thoroughly wet the foliage and stems with a full coverage spray.
<b>PLANT BUGS, PLANT HOPPERS</b>	Sevin resmethrin malathion	Treat when insects or signs of damage first appear. Treat honeylocust as soon as new growth begins.	Control is difficult because plant bugs are active flyers and move around continuously.

Pest	Control	Timing of Treatment	Remarks
PSYLLIDS (boxwood psyllid, hackberry psyllid)	Sevin lindane	Treat in late April or early May as new growth begins to develop	Addition of a wetting agent or spreader-sticker is advised.
SAWFLIES	Malathion Methoxychlor Sevin	Treat when insects are first seen. Various species can occur throughout the growing season. Treat in April for Virginia pine sawfly. Larvae are gregarious, thus broods are clustered on one branch or localized on scattered trees.	A number of damaging species are not listed on labels. Ash, larch, pines, and spruces are listed.
SCALE INSECTS General-all scales	petroleum oil (Scalecide, Volck, Superior, etc.)  oil plus 2% ethion	Treat in late March or early April before new growth develops, and when temperatures are not likely to go below 40° F (5° C) for 12-24 hours.	Do not spray oil-sensitive plants listed under precautions on the label. Be sure to follow the dosage rates given on the label for the various scale species. Oils can also be used as summer sprays when indicated on the labels.
azalea bark scale	Sevin diazinon malathion	Crawlers: June 5-30. Treat June 10 and 20.	
brown soft scale	Sevin Trithion diazinon	Treat when scale insects appear. Treat 2-3 times at 10-day intervals.	This scale insect does not winter out-of-doors in colder plant zones of Virginia.
calico scale	Sevin	Crawlers: June 1-20 Treat: June 10-15	
camellia scale	dimethoate Dylox	Crawlers: May 1-June 5; and September 15-30. Treat May 10 and 20 and/or September 10 and 20.	
cottony camellia scale	sevin malathion	Crawlers: June 1-10. Treat June 10-20	
cottony maple	Sevin	Crawlers: June 1-10	
leaf scale	orthene oxamyl diazinon	Treat: June 15-30	
cottony maple scale	Sevin	Crawlers: June 5-25. Treat June 10 and 20.	
euonymus scale	malathion dimethoate	Crawlers: first generation May 1 to June Sevin or oxamyl or lime sulfur	Be sure to cover thoroughly stems and branches near the 10; second August 1-25. ground. Treat May 10 and 20, and August 5 and 15.
European elm scale	Sevin diazinon	Crawlers: June 5-25. Treat June 10-15.	
European fruit lecanium scale	Sevin Trithion	Crawlers: June 1-20. Treat June 10-15.	Do not re-enter areas sprayed with Trithion for 48 hours without protective clothing.
fern scale	Sevin orthene diazinon	Crawlers first appear in mid-May. Treat at 2 week intervals as needed.	
florinia hemlock scale	dimethoate	Crawlers: peak May 15-June 20, some produced throughout the season. Treat May 20-25 and June 5-10.	

Pest	Control	Timing of Treatment	Remarks
fletcher scale	malathion dimethoate Sevin	crawlers in early to mid June. Treat June 15-20.	On taxus and arborvitae
Florida red scale	Sevin Orthene diazinon	Crawlers: May 5-15 Treat: May 15-30	
forbes scale	Sevin Trithion malathion	Crawlers: June 1-15. Treat June 5-10.	Label uses restricted to flowering fruits. Do not re-enter areas sprayed with Trithion for 48 hours without protective clothing.
gloomy scale	Sevin diazinon	Crawlers observed June 10-20. Treat June 20-30. Serious pest that is difficult to control.	
Japanese scale	Sevin malathion diazinon	Crawlers: June 1-Sept. 1. Treat at 2-week intervals June-Sept.	
golden oak scale	dimethoate	Crawlers: June 1-30. Treat June 10 and June 20.	
juniper scale	Sevin lime sulfur malathion	Crawlers: April 5-20 and June 5-20. Treat April 10-15 and/or June 10-15.	
latania scale	Trithion Sevin	Crawlers continuous from June through season. Treat June 25, July 10, and September 20.	Do not re-enter sprayed areas for 48 hours without protective clothing.
lacanium scale	diazinon Dursban	Crawlers: May 25 - June 25. Treat June 15-20.	Treat for oak lecanium June 1010 in coastal areas.
oak kermes	malathion Sevin	Crawlers: June 1-20. Treat June 10-15.	
obscura scale	Malathion diazinon Sevin	Crawlers on red oak during July; Treat in mid-July. Treat white oaks in mid-August.	
oystershell scale	Sevin Trithion	Crawlers: May 1-20 and July 15-25. Treat May 5-10 and/or July 20-25.	Do not re-enter areas sprayed with Trithion for 48 hours without protective clothing.
peony scale	malathion diazinon Sevin	crawlers: mid-May. Treat in late May	
pine needle scale	Sevin diazinon Dursban Trithion Supracide sulfur malathion lime	Crawlers: April 20-May 30 and July 10-20. Treat May 5-20 and/or July 15-20.	Do not re-enter areas sprayed with Trithion for 48 hours without protective clothing.
pine tortoise scale	Sevin Supracide	Crawlers: June 10-July 5. Treat June 20-25.	
rose scale	Sevin	Crawlers: late May-June 30, possible second generation in August. Treat June 5-10 and 20-25 and in mid-August.	
San Jose scale	Sevin Trithion lime sulfur diazinon	Crawlers: at least 3 generations June, July and September. Treat June 10-15, July 10-15, September 10-15.	Do not re-enter areas sprayed with Trithion for 48 hours without protective clothing.

Pest	Control	Timing of Treatment	Remarks
tea scale	dimethoate Dursban Trithion Turcam	Crawlers: Throughout season in overlapping generations. Treat 2-3 times at 10 day intervals when infested.	Do not re-enter areas sprayed with Trithion for 48 hours without protective clothing. Do not use dimethoate on Chinese or burford hollies.
wax scale	Sevin Turcam	Crawlers: June 1-25. Treat June 10-30.	Thoroughly wet foliage and bark with a full coverage spray.
white peach scale	Dursban diazinon or malathion	Crawlers: April 25-May 15, July 1-15, August 20-September 15. Treat May 1 & 10, July 5 & 15, September 1 & 10.	
<b>SPITTLE BUG</b>	Sevin (pine)	Treat in early June.	Rarely of economic importance.
<b>SLUGS AND SNAILS</b>	mesurol	Apply when pests are observed.	Do not apply in conjunction with foliar fertilizer application.
<b>TENT CATERPILLARS</b>	Sevin methoxychlor Bacillus thuringiensis diazinon Turcam	Treat in early spring as new growth is developing and when caterpillars are small.	Caterpillars leave the nests to feed on the foliage during the day. Apply full coverage spray to the entire tree.
<b>THRIPS</b>	Mavrik Orthene Pounce Vydate	Treat in June when thrips are active on new foliage	
<b>TIP MOTHS</b>	dimethoate Dylox Turcam Pounce DiSyston	Treat with Dylox in mid April, June and July when moths are flying. Treat with Dimethoate when larval activity begins in late April and in late May or early June. Treat with DiSyston soil application 2-3 weeks prior to adult activity in late March.	Spray entire tree to runoff. Two-and-three-needle pines are susceptible to tip moth. Soil systemic treatment with DiSyston requires only one application annually; for nursery use and professional applicators only. DiSyston must be incorporated into the soil.
<b>TREEHOPPERS</b> (Thornbugs)	Sevin	Treat when nymphs are seen on twigs (usually in clusters) before adults are present to begin egg-laying, usually in late summer and fall.	Apply sprays to cover the snail twigs thoroughly.
<b>TWO-BANDED JAPANESE WEEVIL, BLACK VINE WEEVIL</b>	Orthene Turcam oxamyl	Apply in July when foliar feeding is first observed as a full-coverage spray.	
<b>WEBWORMS</b> cotoneaster webworm	diazinon	Treat when larvae are first found. Timing not well established.	Apply a full coverage spray wetting foliage to the point of runoff.
juniper webworm	diazinon	Treat in late July or in August when larvae are small. Spring treatments may be applied when plants are found to be infested.	Apply a forceful spray to penetrate severely webbed foliage. Thoroughly wet the foliage to runoff.

Pest	Control	Timing of Treatment	Remarks
fall webworm	diazinon dursban <u>Bacillus</u> <u>thuringiensis</u> methoxychlor	Treat in late June or early July when larvae are small and webs just starting to form. needed treat for second generation in August or early September.	Caterpillars are gregarious and infest individual branches. Apply full coverage foliar. If spray to infested area, or entire trees in years of high populations.
mimose webworm	diazinon Dursban DiSystem Sevin	Apply foliage sprays at 4-5 day intervals until the infestation is controlled. Apply soil treatments of systemic insecticides as a preventive control measure in the spring.	
<b>WHITEFLIES</b>	resmethrin Pounce	When whiteflies are found. Treat every 3 weeks until infestation is controlled.	Registered for use only in greenhouses. Kills all stages but the eggs.
	Thiodan	When whiteflies are found.	Do not apply to chrysanthemum varieties noted on label. Do not spray on birch.
	Enstar	Make 2 applications 7 days apart	For greenhouse use only. Complete coverage of foliage is essential.
	oxamyl		Apply granules at first sign of infestation.
<b>WHITE PINE WEEVIL</b>	lindane	Apply sprays in the spring before adults lay eggs, normally prior to April 1-10.	Treat only the main terminal leaders of the tree down to the first whorl of branches. Thoroughly wet the bark.
	cut out and burn infested leaders.	prune out infested leaders during June.	Adults begin emerging from infested leaders in July.
<b>ZIMMERMAN PINE MOTH</b>	Thiodan lindane dimethoate Dylox	Treat in early to mid-April and in early September.	Apply as full coverage spray to the point of runoff.

## Directions for Pesticide Usage

CHEMICAL	FORMULATIONS	PESTS CONTROLLED	AMOUNT TO USE		PHYTOTOXICITY AND REMARKS
			In 100 gallons	In 3 gallons	
acephate (Orthene)	75% SP	gypsy moth larvae webworms, scale insects (crawlers)	2/3 lb. (hydraulic)	2 tblsp.	crabapple, huckle- berry, Gilead cottonwood, yew, Lombardy poplar; Use caution on American elm as foliar injury may occur
			1 1/3 lb. (mist)	4 tblsp.	
		aphids, bagworms, lacebugs, leafrollers	1/3 lb. (hydraulic)	2 tblsp.	
		cankerworms	1/3-2/3 lb (hydraulic)	1-2 tblsp.	
		root weevil adults	1 lb.	3 tblsp.	
<u>Bacillus thuringiensis</u>					
Thuricide	32 LV	defoliating caterpillars (see label)	Use 8 to 48 oz. per 100 gal. for hydraulic or per 10 gal for mist blowers, or per acre for aerial applications.		See label directions for amounts to use on specific pests
	48 LV		Use 5 to 44 oz. as indicated above.		Same as 32 LV
Dipel	4 L	defoliating caterpillars	Use 1/2-4 pts. as indicated above (see label)		See label directions for amounts to use on specific pests
	6 L		Use 1/3 to 2 2/3 pints, as indicated above		Same as 4 L
Diazinon (see also Dymet)	48% L (AG 500)	aphids, bagworms, clover mites, cyclamen mites, dipterous leafminers, european red mites, flea beetles, Holly bud moths, leafhoppers, obscure root weevils, omniverous leaftiers, privet mites, Scale crawlers, thrips, twospotted mites, webworms, whiteflies, mimosa webworms	1 pt.	1 tblsp.	gardenia
		apple-and-thorn skeletonizers, cotoneaster webworms, fall webworms, Hemlock woolly aphid, oak loopers, oblique banded leafrollers, pear slugs, tent caterpillars	3 pts	2 tblsp.	

CHEMICAL	FORMULATIONS	PESTS CONTROLLED	AMOUNT TO USE		PHYTOTOXICITY AND REMARKS
			In 100 gallons	In 3 gallons	
dimethoate Cygon	2E	For aphids, bagworms, mites on aborvitae; mites on cedar; midges, mites on juniper; golden oak scale; European pine shoot moth, Nantucket pine tip moth, Zimmerman pine moth on pine; Fletcher scale, mealybugs, mites on taxus.	2 qts.	4 tblsp.	azalea, andromeda, hydrangea, honey locust, dogwood, elm, viburnum maple, flowering almond, crab apple plum, peach, cherry, Chinese holly, burford holly
	2.67 E	Foliar spray for listed pests on birch	3/4 pt.	2 1/4 tsp.	
		Foliar spray for listed pests on roses	1 pt.	3 tsp.	
		Foliar spray for listed pests on azalea, boxwood, camellia; gardenia hemlock, American and English holly	1 1/2 pts.	3 tsp.	
		Foliar spray for listed pests on Arborvitae, cedar, euonymus, juniper, oak, pine, taxus	3 pts.	3 tblsp.	
	Soil drench on camellias		4 tblsp. per gal. of water per plant up to 6 ft. tall. increase rate for larger plants.		
Di-Syston (disulfoton)	15% granular	All labeled uses.	2.5 to 2.7 oz per tree or 2.5 oz. per inch of trunk diameter. Spread uniformly from trunk to drip line. Work into soil and water in thoroughly.		DO NOT USE WITH PRE-EMERGENT HERBICIDES.
Dursban (chlorpyrifos)	2E	aphids, bagworms, Eastern tent caterpillars, Fall webworms, grasshoppers, mites, orange-striped oakworms, spittle bugs, whiteflies, yellow-necked caterpillars.	1 pt.	1 tblsp.	azaleas, camellias, poinsettias, roses, variegated ivy
		cutworms, leafhoppers, mealybugs, mimosa webworms, red humped caterpillars, exposed thrips	1 pt.	2 tblsp.	
		ash, dogwood, lilac borer, scale crawlers	2 qts.	4 tblsp.	
Dylox (trichlorfon)	80% SP 40.5 LS	Nantucket pine tip moth, Zimmerman pine moth	1 1/4 lb. SP or 2 pts LS	3 3/4 tblsp. or 2 tblsp.	hydrangeas
		armyworms, bagworms, climbing cutworms, dipterous leafminers, lygus bugs, stink bugs, tarnished plant bugs budworms, webworms	1 1/4-1 3/4 lb. SP or 2-3 pts. LS	3 2/4-5 1/4 tblsp. or 2-3 tblsp.	

CHEMICAL	FORMULATIONS	PESTS CONTROLLED	AMOUNT TO USE		PHYTOTOXICITY AND REMARKS
			In 100 gallons	In 3 gallons	
Dymet Methoxychlor diazinon	20%EC 10%EC	aphids, caterpillars, bagworm, beetles	2-3 qts.	4-6 tblsp.	Caltha, celosia dracaena, chrysan- themum, gloxinia, poinsettia, copper plant.
Enstar (kinoprene)	5 E	Whiteflies, scales mealybugs, and fungus gnats	6-10 oz.	1 1/2 tsp.	poinsettia bracts, some rose varieties Labelled for green- house only
Imidan (phosmet)	50-WP	Use for elm spanworm, Sprin cankerworm, gypsy moth on deciduous shade and ornamental trees; for gypsy moth on evergreens; for birch leaf miner on birch	1 1/2 lbs.	4 1/2 tblsp.	
Kelthane (dicofol)	35WP	mites	1 1/3 lbs.	4 1/2 tblsp.	roses
lime sulfur	29% L	armored scales	10-12 gal.	39-45 fl. oz.	Apply when plants are fully dormant. Will cause yellow staining of paint, masonry.
lindane	25% WP	All labeled uses.	1 lb.	3 tblsp.	Soil drenches may injure some ornamentals
	20% L	borers	3 pts.	3 tblsp.	
		spruce gall aphids taxus weevils, pine	1 1/2-2 pts. 3-4 pts.	1 1/2-2 tblsp. 3-4 tblsp.	
		collar weevils			
		white pine weevils	2 qts.	4 tblsp.	
		engraver beetles	1 gal. per 400 gal. of water		
		Southern pine beetles.	2 qts. per 44 gal. of fuel oil. Prior to attack: 1 gal per 40-85 gals. of water.		
		turpentine beetles	1 gal. per 20 gals. of water.		
malathion (Cythion)	25W	tent caterpillars	2 lbs.	6 tblsp.	Canaerti juniper, eleagnus, hibiscus, some rose varieties, ferns
		aphids, mealybugs, spider mites, whitefly	2 1/2 lbs	7 1/2 tblsp.	
		Fletcher scale	3 lbs.	9 tblsp	
		bagworms, lace bugs pine needle scale	4 lbs.	12 tblsp.	
		black scale crawlers, juniper scale, soft scale	6 lbs.	18 tblsp.	
		57% EC	All labeled uses.	1.5 pts (hydraulic) or 1.5 gal. (mist)	1.5 tblsp. (hydraulic)

CHEMICAL	FORMULATIONS	PESTS CONTROLLED	AMOUNT TO USE		PHYTOTOXICITY AND REMARKS
			In 100 gallons	In 3 gallons	
Mavrik (fluvalinate)	2 F	All labeled uses.	4-10 fl. oz.	1 Tblsp.	See label for precautions.
MesuroI (methiocarb)	75 WP	aphids, mites	1/2 to 1 lb. (per 50 gal)	1 oz.	Apply specified dosage, per acre or equivalent
		slugs, snails	2 lb. (per 50 gal)	2 oz.	Do not apply in conjunction with foliar fertilizer.
Meta-Systox-R (oxydemeton methyl)	25% SC	aphids, birch leaf-miners, holly leaf-hoppers, mites, thrips	1-1 1/2 pts.	1-1 1/2 tblsp.	Ficus sp. and English ivy
		pine needle scale	2 pts.	2 tblsp.	
Methoxychlor (Mariate) (see also Dymet)	50 WP	All labeled uses.	2-3 lbs.	6 tblsp.	chinese elm, Japanese and red maple, redbud, privet and viburnum, repeated uses on evergreens
Omite (propargite)	30 W	two-spotted mite	1 lb.	3 tblsp.	See label
Oxamyl (Vydate)	10 G	All labeled uses.	Apply 1.4 to 1.9 lbs/1000 sq. ft (60-80 lbs/acre) See label for soil mix use.		See label for precautions
	2 L	All labeled uses.	Mix 2-4 pts/100 gal. and apply at 200 gal. per acre rate. For small areas mix 3-6 Tblsp./5-14 gal of water to treat 1000 sq. ft.		
Pentac (dienochlor)	4 F	mites	1/2 pt.	1/2 Tblsp.	See label for precautions
	50 WP	mites	4-8 oz	1 Tblsp.	
Petroleum oils Superior 70 Volck Supreme Scalecide	98%	All labeled uses; use as dormant spray only	2 gals.	1 cup	sugar maple, Japanese maple, beech, birch, black walnut butternut, hickory, redbud, juniper, douglas fir, spruce.
Pounce (permethrin)	3.2 EC	All labeled uses	4-8 oz.	1 1/2 tsp.	Do not apply to salvia or snapdragon.
Resmethrin	26EC	All labeled uses.	1 pt.	1 Tblsp.	See label for precautions.
Sevin (carbaryl)	50 W	All labeled uses.	2 lbs.	6 tblsp.	Do not apply to wet foliage or in high humidity, injury may result
	50% <u>Sprayable</u>		1 1/4 lbs.	3 3/4 tblsp.	
	SL		1 qt	3 tblsp.	

CHEMICAL	FORMULATIONS	PESTS CONTROLLED	AMOUNT TO USE		PHYTOTOXICITY AND REMARKS
			In 100 gallons	In 3 gallons	
Thiodan (Endosulfan)	50 WP	aphids, cyclamen mites, rose chafers	1 lb	3 tblsp	white birch, redbud Anderson yew
	3 EC	elm leaf beetle, whiteflies	2/3 qt.	1 1/3 Tblsp	
	3 EC	bark beetles, borers, weevils	2 2/3 gal		On felled logs only.
Trithion (carbofenthion)	4 E	All labeled uses.	1 1/2-2 pts.	1 1/2-2 Tblsp.	See label precautions
	8 E	All labeled uses.	3/4-1 pt.	3/4-1 tblsp.	
Turcam (bendiocarb)	76 WP	All labeled uses.	3-42 oz.	1/2-8 Tblsp.	Coleus and Cardoon
Vendex (hexakis)	75 WP	spruce mite oligonychus, two-spotted mite	1/2-1 lb	1 1/2-3 tblsp.	Do not add oil to spray. Do not apply more than once in 28 days. Do not apply to mum blooms or poinsettia bracts.

**Notes**

Abbreviations: W, WP = wettable, wettable powder; S, SP = sprayable powder; L, LS = liquid, liquid spray; E, EC = emulsifiable, emulsifiable concentrate; SC = spray concentrate

Precautions: Do not apply liquid concentrate when the temperature is above 85°F (29-30°C.) or any spray when the temperature is above 90°F (32°C).

Do not apply dormant oil sprays if the temperature is below 40°F (4-5°C) or is likely to approach or go below freezing within 24 hours.

Never use a sprayer or a tank which has previously been used to apply herbicides.

Use only the recommended dosage rates. The label directions are the final authority. Wettable powders and other suspensions (flowable) require continuous agitation in the tank to avoid settling. Do not allow spray suspensions to remain in the tank without agitation or any spray mixture to remain in a non-operating sprayer for more than 1 hour.

Clean all spraying equipment thoroughly after each use.

Use spreader-stickers only for hard-to-wet foliage and special uses. Unnecessary wetting agents and spreaders cause excess run-off.

Equivalents: 1 pt. liquid in 100 gals. = 1 tsp. in 1 gal.  
1 lb powder in 100 gals = 1 tblsp. in 1 gal.

1 gal.	= 4 qts.	= 8 pts.	= 128 fl. oz
1 fl. oz.	= 1/8 cup	= 2 Tblsp	= 29.57 milliliter
1 tblsp.	= 1/2 fl. oz.	= 3 tsp.	= 14.78 milliliter
1 cup	= 1/2 pt.	= 8 fl. oz.	= 16 tblsp.
1 lb.	= 16 oz.	= 454 grams	
1 oz.	= 28.3 grams		

## Diseases of Nursery Crops

*R.C. Lambe, Extension Plant Pathologist*  
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Fungicides and bactericides play an important part in the prevention of container and field grown ornamental and flower diseases. They do not take the place of cultural control methods, but should be used to complement them. In some disease situations there are no effective chemicals available. Only the chemicals that are registered by the Environmental Protection Agency are recommended.

Most fungicides on the market protect woody shrubs ground cover plants and flowers against diseases. This protection is accomplished by preventing plant pathogens from becoming established. Systemic fungicides are therapeutic and may eradicate pathogens that are already established. Because chemicals are subject to weathering and degradation, they must be reapplied to the soil or container or susceptible parts at regular intervals as long as the danger of plant disease exists. In general, protectants must be reapplied more frequently than recommended treatment intervals, or if applied in excess of recommended rates.

In every instance the manufacturer's label should be read carefully and attention should be directed particularly to the safety measures listed on the label regarding mixing, handling, compatibility with other chemicals, and application. It is always essential that the user familiarize himself with the antidote given on the label. In many instances, the addition of a surfactant will improve retention of the chemical.

Plant Disease	Fungicide & Formulation; Rate/100 Gal	Remarks
<b>AJUGA</b>		
<u>Sclerotium</u> rot	Terraclor (75% WP); 2.0 lb/1000 sq ft OR 2.5 lb/300.0 gal water; quintozene	Dust or drench on soil surface before planting and thoroughly work into the top 2 inches of soil.
<b>ANDROMEDA (Japanese) (Pieris spp.)</b>		
<u>Phytophthora</u> dieback	Daconil 2787 (500 g/l); 2.0 pt. chlorothalonil	Apply at first sign of diseases and at 7- to 14-day intervals.
	Daconil 2787 (75% WP); 1.5 lb; chlorothalonil	Spray at new leaf emergence.
<u>Phytophthora</u> root rot	Subdue 2E (25%); 1.0-4.0 oz; metalaxyl	Apply Subdue 100 gal to 400 to 800 sq ft, (1.0 to 2.0 pts/sq ft). Repeat at 2 to 3 month intervals. Provide good drainage. After application irrigate to thoroughly wet soil. Repeat at 2- to 3-month intervals. Do not apply rates greater than 40 oz more often than once every 10 weeks. Drench Aliette monthly (0.5-1.5 pt/sq ft) over the surface of the potting medium.
	Subdue 5G (5% G); 25.0-50.0 oz/1000 sq ft; metalaxyl	
	Aliette (80% WP); 1.0-2.0 lb/1000 sq ft; fosetyl-AI	
<b>ARBORVITAE</b>		
<u>Phomopsis</u> needle and twig blight	Benlate (50% WP); 1.0 lb; benomyl	Begin application at budbreak and repeat at 7-day intervals throughout the growing season.
<u>Cercospora</u> blight	Manzate 200 (80% WP); 1.5 lb; mancozeb	Spray mancozeb at 7- to 10-day intervals.
<b>AUCUBA</b>		
<u>Phytophthora</u> root rot	Subdue 2E (25%); 1.0-4.0 oz; metalaxyl	See Andromeda.
	Subdue 5G (5% G); 25.0-50.0 oz/1000 sq ft; metalaxyl	
<u>Cylindrocladium</u> root rot	Benlate (50% WP); 1.0 lb (apply 1.0 pt/6 inch container); benomyl	Drench on the surface of growing medium to prevent disease development. Repeat at 2- to 4-week intervals during disease pressure period.
<u>Exobasidium</u> leaf and flower gall	Zineb (75% WP); 10.5 oz; zineb	Hand pick infected leaves and remove from plant. Apply zineb just before leaves unroll in spring and 10 days later.
Rust	Bayleton (25% WP);	Spray to run-off when rust first appears.

Plant Disease	Fungicide & Formulation; Rate/100 Gal	Remarks
<u>Botrytis</u> blight (Gray mold)	Chipco 26019 (50% WP) 1.0-2.0 lb; iprodione  Benlate (50% WP); 0.5 lb; benomyl	Apply to petals to protect from disease. Continue at 10- to 14-day intervals as long as disease conditions are favorable.
<u>Ovulinia</u> petal blight	Bayleton (25% WP); 8.0-16.0 oz; triadimefon  Benlate (50% WP); 1.0 lb; benomyl  Daconil 2787 (500 g/l); 2.0 pt; chlorothalonil  Daconil 2787 (75% WP); 1.5 lb; chlorothalonil  Zyban (75% WP); 1.5 lb; thiophanate methyl + mancozeb	Apply benomyl when flowers start to show color and at 5-day intervals. Apply Bayleton to all flower buds to point of run off. Application should be made during the expanded bud stage (color showing). A second application may be needed. Spray Daconil 2787 every 7 days during wet weather. Spray Zyban at 7- to 10-day intervals when flowers start to show color.
<u>Phomopsis</u> die-back	Zyban (75% WP); 1.5 lb; thiophanate methyl + mancozeb  Benlate (50% WP); 1.0 lb; benomyl	Spray at 7- to 10-day intervals. Prune out all diseased branches. Avoid stress.  Spray at 7- to 10-day intervals. Prune out all diseased branches. Avoid stress.
<u>Phytophthora</u> root and crown rot		See Andromeda.
<u>Phytophthora</u> shoot blight	Subdue 2E (25%); 1.25-2.5 oz; metalaxyl	Spray to run-off. Repeat at 2- to 3-month intervals.
Powdery mildew	Benlate (50% WP); 0.5 lb; benomyl  Bayleton (25% WP); 2.0-4.0 oz; triadimefon	Spray at 10- to 14-day intervals beginning when disease first appears.  Spray to run-off when mildew first appears.
<u>Rhizoctonia</u> web blight	Benlate (50% WP); 1.0 lb; benomyl	Spray to the foliage making sure the lower leaves are protected. Make 3 applications at 7-day intervals. Avoid crowding the plants.
<u>Septoria</u> leaf spot	Benlate (50% WP); 1.0 lb; benomyl	Repeat at 10-to 14-day intervals throughout the growing season.
<b>BOXWOOD</b> (English, American, Korean or Japanese)		
<u>Phytophthora</u> root rot	Subdue 2E (25%); 1.0-4.0 oz; metalaxyl  Subdue 5G (5% G); 25.0-50.0 oz/1000 sq ft; metalaxyl  Aliette (80% WP); 1.0-2.0 lb/1000 sq ft; fosetyl-A1	See Andromeda.  See Andromeda  See Andromeda.
<b>CAMELLIA</b>		
Leaf gall	See Azalea.	Hand pick infected leaves.
<u>Sclerotinia</u> flower blight	Terraclor (75% WP); 1 cup in enough water to give thorough coverage of 100 sq ft; quintozone	Drench soil surface in late December or early January.
<u>Phytophthora</u> root rot	See Azalea.	
Canker die-back	Benlate (50% WP); 1.0 lb; benomyl	Prune out cankers. Spray during leaf drop.
<b>CEDAR</b>		
<u>Phomopsis</u> needle and twig blight	Benlate (50% WP); 1.0 lb; benomyl	Begin application at budbreak and repeat at 7-day intervals throughout the growing season.

Plant Disease	Fungicide & Formulation; Rate/100 Gal	Remarks
<u>Cercospora</u> blight	Manzate 200 (80% WP); 1.5 lb; mancozeb	Spray at 7- to 10-day intervals.
<b>CHRYSANTHEMUM</b>		
<u>Rhizoctonia</u> root rot	Chipco 26019 (50% WP); 0.4 lb; iprodione	Apply after transplant (1.0-2.0 pt/sq ft). Repeat each 14 days.
<u>Ascochyta</u> ray blight	Chipco 26019 (50% WP) 1.0-2.0 lb; iprodione	Apply at 7- to 10-day intervals.
	Benlate (50% WP); 1.0 lb; benomyl	Apply Benlate at 10- to 14-day intervals. Apply first spray of Daconil just before flower color shows and at 7-day intervals.
	Daconil 2787 (75% WP); 2.0 pt; chlorothalonil	Apply Zyban at 7- to 10-day intervals. Apply at transplant of cuttings.
	Daconil 2787 Flowable Fungicide (500 g/l); 1.5 pt; chlorothalonil	
Zyban (75% WP); 1.5 lb; thiophanate methyl + mancozeb		
<u>Botrytis</u> gray mold	Chipco 26019 (50% WP) 1.0-2.0 lb; iprodione	Apply at first sign of disease and repeat at 10- to 14-day intervals.
<u>Botrytis</u> gray mold and <u>Septoria</u> leafspot	Daconil 2787 (500 g/l); 2.0 pts; chlorothalonil	Apply at prebloom and repeat at 7- to 14-day intervals.
	Daconil 2787 (75% WP); 1.5 lb; chlorothalonil	
Leaf rust	Bayleton (25% WP); 2.0-4.0 oz; triadimefon	Apply at first sign of disease and repeat at 7- to 14-day intervals.
	Manzate 200 (80% WP); 1.5-2.0 lb; mancozeb	Spray at 7- to 10-day intervals.
<u>Pythium</u> root rot	Banrot (40% WP); 6.0-8.0 oz; etridiazole + thiophanate methyl	Retreat container plants at 4-week intervals.
	Terrazole (35% WP); 4.0-6.0 oz; etridiazole	Retreat bedding plants at 4- to 8-week intervals. Retreat container plants at 4- to 12-week intervals.
	Truban; Bedgrown-- 3.0-10.0 oz of 30% WP or 4.0-8.0 oz of 25% EC; etridiazole	Same as above
	Truban (5G); 10.0 oz/cu yd; etridiazole	Incorporate into soil when seeding or transplanting.
Powdery mildew	Benlate (50% WP); 0.5 lb; benomyl	Spray Benlate at 10- to 14-day intervals.
	Bayleton (25% WP); 2.0-4.0 oz; triadimefon	See manufacturer's directions. Spray to run- off when mildew first appears.
Southern blight ( <u>Sclerotium</u> )	Terraclor (25% WP); 8.0 oz; quintozene	See manufacturer's directions.
<b>CRABAPPLE</b>		
Cedar-apple rust	Daconil 2787 (500 g/l); 2.0 pt; chlorothalonil	Start as flower buds open and spray 3 times at 10-day intervals.
	Daconil 2787 (75% WP) 1.5 lb; chlorothalonil	
	Fore (80% WP); 1.5 lb; mancozeb	Same as for Daconil
	Zyban (75% WP); 1.5 lb; thiophanate methyl + mancozeb	Apply beginning at delayed dormant stage. Repeat at 2 week intervals during cover periods.

Plant Disease	Fungicide & Formulation; Rate/100 Gal	Remarks
Fire blight	Agri-Strep; 0.5 lb; streptomycin sulfate  Streptomycin ag. compd.; 100 ppm; streptomycin sulfate	Apply at early midseason and late flowering.
Powdery mildew	Bayleton (25% WP); 2.0-4.0 oz; triadimefon	Spray to run-off when mildew first appears.
Scab	Benlate (50% WP); 1.0 lb; benomyl  Cyprex (65% WP); 0.5 lb; dodine  Daconil 2787 (500 g/l); 2.0 pt; chlorothalonil  Daconil 2787 (75% WP); 1.5 lb; chlorothalonil  Fore (80% WP); 1.5 lb; mancozeb	Spray weekly from budbreak until 2 weeks after petal fall. Spray benomyl on 10 to 14 day schedule  Apply at bud break and at 7-day intervals during wet weather.  Spray at 7-day intervals during wet weather.  Same as Daconil
<b>CRAPE MYRTLE</b>		
Powdery mildew	Benlate (50% WP); 0.5 lb; benomyl  Triforine EC (18.2%); 12.0-18.0 oz; funginex  Bayleton (25% WP); 2.0-4.0 oz; triadimefon	Spray Benlate as flower buds break and repeat at 10- to 14-day intervals during growing season.  Spray Triforine every 7 to 10 days.  Spray Bayleton to run-off when mildew first appears.
<b>DAFFODIL</b>		
<u>Botrytis</u> blight	Chipco 26019 (50% WP) 1.0-2.0 lb; iprodione	Apply every 10 to 14 days.
Basal rot (pre- planting)	Benlate (50% WP); 1.0 lb; benomyl	Submerge clean bulbs for 10 to 15 minutes in warm dip (80-85 °F).
<u>Fusarium</u> <u>Penicillium</u>	Mertect 340-F; 30.0 oz; thiabendazole (TBZ)	Soak for 15 to 30 minutes at 55-75 °F. Stir solution constantly.
<b>DAHLIA</b>		
Powdery mildew	Benlate (50% WP); 0.5 lb; benomyl  Zyban (75% WP); 1.5 lb; thiophanate methyl  Bayleton (25% WP); 2.0-4.0 oz; triadimefon	Spray at 10- to 14-day intervals beginning when disease first appears.  Spray at 7- to 10-day intervals during wet weather.  Spray to run-off when mildew first appears.
<u>Botrytis</u> blight (Gray mold)	Chipco 26019 (50% WP); 1.0-2.0 lb; iprodione	Apply to protect against disease. Repeat at 10 to 14 day intervals.
<b>DOGWOOD</b>		
<u>Rhizoctonia</u> root rot	Chipco 26019 (50% WP); 0.4 lb; iprodione	See Chrysanthemum.
<u>Botrytis</u> petal blight	Benlate (50% WP); 0.5 lb; benomyl	Apply at 10- to 14-day intervals.
<u>Phytophthora</u> root rot	Subdue 2E (25%); 1.0-4.0 oz; metalaxyl  Subdue 5G (5% G); 25.0-50.0 oz/1000 sq ft; metalaxyl	See Andromeda.

Plant Disease	Fungicide & Formulation; Rate/100 Gal	Remarks
<u>Septoria</u> leaf spot	Benlate (50% WP); 1.0 lb; benomyl	Spray at 10- to 14-day intervals beginning at budbreak.
	Daconil 2787 (500 g/l); 2.0 pt; chlorothalonil	Apply at early bloom. Apply at 7- to 14-day intervals.
	Daconil 2787 (75% WP); 1.5 lb; chlorothalonil	Apply at 7- to 14-day intervals.
Spot anthracnose leaf and flower blight	Zyban (75% WP) 1.5 lb; thiophanate methyl + mancozeb	Apply when buds begin to open. Repeat when bracts have fallen; 4 weeks later and in late summer after flower buds are formed.
Powdery mildew	Bayleton (25% WP); 2.0-4.0 oz; triadimefon	Spray to run-off when mildew first appears.
<b>EUONYMUS</b>		
Powdery mildew	Bayleton (25% WP); 2.0-4.0 oz; triadimefon	Spray to run-off when mildew first appears.
	Benlate (50% WP); 0.5 lb; benomyl	Spray at 10- to 14-day intervals beginning when disease first appears.
	Triforine EC (18.2%) 12.0-18.0 funginex	Spray Triforine every 7 to 10 days.
Crown gall	Galltrol-A	See manufacturers directions. Purchase healthy plants. Do not replant in beds where infected plants have been removed.
Anthracnose (Colletotrichum)	Daconil 2787 (75% WP); 1.5 lb; chlorothalonil	Spray at bud break at 14-day intervals.
	Daconil 2787 (500 g/l); 2.0 pts; chlorothalonil	
<u>Botrytis</u> blight (Gray mold)	Chipco 26019 (50% WP); 1.0-2.0 lb; iprodione	Repeat at 10- to 14-day intervals.
<b>FORSYTHIA</b>		
<u>Rhizoctonia</u>	Chipco 26019 (50% WP) 0.4 lb; iprodione	See Chrysanthemum.
<b>GLADIOLUS</b>		
<u>Botrytis</u> leaf blight	Benlate (50% WP); 0.5 lb; benomyl	Spray at 7-day intervals during wet weather. Spray Daconil every 7-10 days during normal weather, every 2 to 3 days during wet periods. Apply Chipco 26019 at 10- to 14-day intervals.
	Chipco 26019 (50% WP); 1.0-2.0 lb; iprodione	
	Daconil 2787 (500 g/l); 2.0 pt; chlorothalonil	
	Daconil 2787 (75% WP); 1.5 lb; chlorothalonil	
<u>Penicillium</u> and <u>Fusarium</u> corm rots	Benlate (50% WP); 1.0 lb; benomyl (pre-planting) Mertect 340-F; 30.0 oz; thiabendazole (TBZ)	Submerge clean corms for 15 to 30 minutes in warm water (80-85° F). Stir solution constantly to be sure chemical remains in suspension.
	Ornalin (50% WP); 1.5-2.0 lb; vinclozolin	
<b>HAWTHORNE</b>		
Rust	Daconil 2787 (75% WP); 1.5 lb; chlorothalonil	Spray at prebloom.

Plant Disease	Fungicide & Formulation; Rate/100 Gal	Remarks
<b>HOLLY (Japanese)</b>		
Black root rot ( <u>Thielaviopsis basicola</u> )	Benlate (50% WP); 1.0 lb; benomyl	Sanitation in propagation. Drench on the surface of the growing medium to prevent disease development. Repeat benomyl at 2- to 4-week intervals.
Root rot: <u>Pythium</u> sp. <u>R. solani</u>	Banrot (40% WP); 12.0 oz; etridiazole + thiophanate methyl	Apply Banrot at 4-week intervals. Apply 0.5 pt/6 inch container.
Rhizoctonia web blight ( <u>Rhizoctonia solani</u> )	Benlate (50% WP); 1.0 lb; benomyl	Thoroughly wet the center of the plants to be protected. Avoid crowding containers to prevent excessive moisture in the lower parts of the plants. Apply Daconil at warm, moist conditions.
	Daconil 2787 (75% WP); 1.5 lb; chlorothalonil	
<u>Phytophthora</u> root rot	Subdue 2E (25%); 1.0-4.0 oz; metalaxyl	See Andromeda.
	Subdue 5G (5% G); 25.0-50.0 oz/1000 sq ft; metalaxyl	See Andromeda.
<b>HYDRANGAE</b>		
<u>Botrytis</u> leaf blight	Ornalin (50% WP); 1.5 lb; vinclozolin	Spray every 10 to 14 days.
	Benlate (50% WP); 1/2 lb; benomyl	Spray every 7 to 10 days during normal weather.
	Chipco 26019 (50% WP); 1.0-2.0 lb; iprodione	Spray every 10 to 14 days.
<b>JUNIPER</b>		
<u>Phomopsis</u> needle and twig blight	Benlate (50% WP); 1.0 lb; benomyl	Begin application at budbreak and repeat at 7-day intervals through the growing season.
Rhizoctonia Web blight ( <u>Rhizoctonia solani</u> )	Benlate (50% WP); 1.0 lb; benomyl	Thoroughly saturate the growing medium. Retreat at 4-week intervals. Spray to thoroughly cover foliage. Avoid crowding containers.
<u>Phytophthora</u> root rot	Subdue 2E (25%); 1.0-4.0 oz; metalaxyl	See Andromeda.
	Subdue 5G (5% G); 25.0-50.0 oz/1000 sq ft; metalaxyl	See Andromeda.
Root rot: <u>Pythium</u> sp. <u>R. solani</u>	Banrot (40% WP); 12.0 oz; etridiazole + thiophanate methyl	Retreat at 4-week intervals.
<b>LILAC</b>		
Powdery mildew	Zyban (75% WP); 1.5 lb; thiophanate methyl + mancozeb	Spray at weekly intervals.
	Benlate (50% WP); 0.5 lb; benomyl	Spray at 10- to 14-day intervals after leaves are 3/4 grown.
	Bayleton (25% WP); 2.0-4.0 oz; triadimefon	Spray to run-off when mildew first appears.
<b>MOUNTAIN LAUREL (<u>Kalmia latifolia</u>)</b>		
<u>Cercospora</u> leaf spot	Benlate (50% WP); 1.0 lb; benomyl	Spray at 7-day intervals during wet weather. Spray with Benlate when buds break in the spring and twice more at 2-week intervals.

Plant Disease	Fungicide & Formulation; Rate/100 Gal	Remarks
(continued)	Daconil 2787 (500 g/l); 2.0 pt; chlorothalonil	Apply at budbreak, 10 and 20 days later. Begin applications of Daconil at spring budbreak.
	Daconil 2787 (75% WP); 1.5 lb; chlorothalonil	
<b>PACHYSANDRA</b>		
<u>Volutella</u> leaf and stem blight	Fore (80% WP); 1.5 lb; mancozeb	Apply first spray in the spring. Make 5 applications at 10- to 14-day intervals.
	Zyban (75% WP); 1.5 lb; thiophanate methyl + mancozeb	Apply at 7-day intervals.
	Kocide 101 (77% WP); 1.0 lb; cu-hydroxide	Apply Kocide at 7 to 10-day intervals.
<b>PEONY</b>		
<u>Botrytis</u> blight (Gray mold)	Benlate (50% WP); 1.0 lb; benomyl	Spray when shoots are 3 to 6 inches high and again when they are 10 to 18 inches high.
	Fore (80% WP); 1.5 lb; mancozeb	Same as above.
<b>PERIWINKLE (<i>Vinca minor</i>)</b>		
<u>Phomopsis</u> stem rot	Kocide 101 (77%); 1.0 lb; cu-hydroxide	Begin application in the spring. Apply at least twice. Plant only healthy plants. Reduce humidity by thinning.
<b>PHOTINIA</b>		
Powdery mildew	Triforine EC (18.2%); 12.0-18.0 oz; funginex	Spray at 10- to 14-day intervals starting when new leaf growth starts.
	Benlate (50% WP); 0.5 lb; benomyl	Same as above.
	Bayleton (25% WP); 2.0-4.0 oz; triadimefon	Spray to run-off when mildew first appears.
<u>Entomosporium</u> leaf spot ( <u>Entomosporium</u> <u>maculatum</u> )	Bayleton (25% WP); 16.0 oz; triadimefon	Apply in early spring as growth starts and reapply on a 14-day schedule until new growth is fully expanded.
	Benlate (50% WP); 1.0 lb; benomyl	Spray at 2- to 4-week intervals. Avoid overhead irrigation. Avoid crowding containers.
	Daconil 2787 (75% WP); 1.5 lb; chlorothalonil	Apply at spring budbreak.
	Daconil 2787 (500 g/l); 2.0 pt; chlorothalonil	Same as above.
<b>PINE (White, Japanese, Black)</b>		
<u>Phytophthora</u> root rot	Subdue 2E (25%); 1.0-4.0 oz; metalaxyl	See Andromeda.
	Subdue 5G (5% G); 15.0-50.0 oz/1000 sq ft; metalaxyl	See Andromeda.
<b>PYRACANTHA (Firethorn)</b>		
Fire blight	Streptomycin eg. compd.; 100 ppm; streptomycin sulfate	Spray when 20% of the blossoms are open and repeat 5 to 7 days during boom period. COMMERCIAL ORNAMENTAL USE ONLY.
	Kocide 101 (77% WP); 1.0 lb; cu-hydroxide	Apply the first spray at budbreak, 10 to 14 days later and at petal fall.
Scab	Benlate (50% WP); 1.0 lb; benomyl	

Plant Disease	Fungicide & Formulation; Rate/100 Gal	Remarks
Scab (continued)	Daconil 2787 (500 g/l); 2.0 pt; chlorothalonil	
	Daconil 2787 (75% WP); 1.5 lb; chlorothalonil	
	Manzate 200 (800% WP); 1.5 lb; mancozeb	
	Kocide 101 (77% WP); 1.0 lb; cu-hydroxide	
<b>RHODODENDRON</b>		
<u>Ovulinia</u> petal blight	Same as for Azalea.	Same as for Azalea.
<u>Phytophthora</u> root rot and wilt	Subdue 2E (25%); 1.0-4.0 oz; metalaxyl	See Andromeda.
	Subdue 5G (5% G); 25.0-50.0 oz/1000 sq ft; metalaxyl	See Andromeda.
	Aliette (80% WP); 1.0-2.0 lb/1000 sq ft; fosetyl-A1	Drench Aliette monthly (0.5-1.5 pt/sq ft) over the surface of the potting medium.
	Aliette (80% WP); 2.5-5.0 lb; fosetyl-A1	Spray to run-off at monthly intervals.
<u>Rust</u>	Same as for Azalea.	Same as for Azalea.
<u>Botrytis</u> gray mold	Chipco 26019 (50% WP); 1.0-2.0 lb; iprodione	See Azalea.
<b>ROSE</b>		
Crown gall	Galltrol-A	See manufacturer's directions. Purchase healthy rose bushes. Do not injure the roots or crowns of roses.
Black spot	Benlate (50% WP); 1.0 lb; benomyl	Start applications in the spring as leaves expand. During dry weather, treat at 7- to 10-day intervals for Fore, or Daconil.
	Daconil 2787 (75% WP); 1.0 lb; chlorothalonil	Use a 10- to 14-day interval with Benlate and Triforine. Shorten intervals with all
	Daconil 2787 Flowable Fungicide (500 g/l); 1.5 pt; chlorothalonil	materials during rainy or humid weather. Spray Zyban at 7- to 10-day intervals.
	Triforine EC (18.2%); 12.0-18.0 oz; funginex	
	Zyban (75% WP); 1.5 lb; thiophanate methyl + mancozeb	
<u>Botrytis</u> blight (Gray mold)	Chipco 26019 (50% WP); 1.0-2.0 lb; iprodione	Apply to buds to protect against disease. Repeat at 10-14 day intervals.
Powdery mildew	Bayleton (25% WP); 2.0-4.0 oz; triadimefon	Start applications in the spring as leaves expand. Treat at 10- to 14-day intervals to protect. Spray at 7-day intervals if mildew is present. Spray Bayleton to run-off when mildew first appears.
	Benlate (50% WP); 0.5 lb; benomyl	
	Milban (39% EC); 1.0 qt; dodemorph	
	Zyban (75% WP); 1.5 lb; thiophanate methyl + mancozeb	
	Triforine EC (18.2%); 12.0-18.0 oz; funginex	

Plant Disease	Fungicide & Formulation; Rate/100 Gal	Remarks
<b>WILLOW</b>		
Crown gall	Galltrol-A	See manufacturer's directions.
<b>YEW (Taxus)</b>		
Phytophthora root and crown rot	Banrot (40% WP); 12.0 oz; etridiazole + thiophanate methyl	Thoroughly saturate the medium. Retreat at 4-week intervals.

#### Field or Seedbed Fumigation

Soil-borne Diseases	Fumigant; Application Rates/Acre	Remarks
Most Soil-borne Disease Organisms (Soil Disinfestant)	Vapam; 40.0-100.0 gal in heavy soils, 25.0-50.0 gal in light soils	<p><b>GENERAL DIRECTIONS FOR FUMIGANTS</b></p> <p><b>Soil Preparation:</b> Before treating, cultivate the area thoroughly. Keep the soil moist, soil deeply and thoroughly. Keep the soil moist, watering if necessary until time to treat. Soil temperature should be between 60 to 90 degrees Fahrenheit at 3-inch depth.</p> <p><b>Preplanting instruction:</b> Cultivate 5 to 7 days after application to promote escape of vapors. Allow an additional 7 to 9 days before planting on well-drained light- to medium-textured soil; 14 days for heavy clay or organic soil; and up to 30 days if soil temperatures are below 60 degrees Fahrenheit.</p> <p><b>Use Precautions:</b> Do not apply to confined spaces without adequate ventilation not in greenhouses where growing plants are present. Do not apply within 3 ft of plant drip line or to areas underlaid by roots or valuable plants. Keep children and pets out of treated area.</p> <p><b>Sprinkling Can Application:</b> Place 0.398 lb (1.0 pt) in sprinkling can, fill with water, and apply to 50 sq ft of well-prepared soil.</p> <p><b>Hose Proportioner Application:</b> Add 0.795 lb (1.0 pt) to 3 qt of water per 100 sq ft. Continue watering to depth of control desired.</p> <p><b>Rotary Tiller Application:</b> Sprinkle or spray using 0.795 lb (1.0 qt) in 2.5 gal of water per 100 sq ft in front of tiller.</p> <p>Apply as fall preplant. Shanks 6 to 8 inches apart.</p>
	Vorlex; 25.0-50.0 gal in light soil, 40.0-60.0 gal in heavy soil	
	Mico-Fume (mylone); 20.0 lb to 80-100 sq yd or 750-900 sq ft or 2.0-2.5 lb/100 sq ft, apply 150.0 gal of water as a drench to each 900 sq ft or 15.0 gal per 100 sq ft immediately after application.	

## Weed Control in Ornamentals

*J.F. Derr, Extension Weed Specialist*

There is now a selection of herbicides for use in nursery stock. Selection of a given herbicide must be based on the particular weed and crop situation. None of the preemergent herbicides are effective against all weed species. Tank-mixing of herbicides often broadens the spectrum of weed control. If a chemical application kills all but one species, that species will multiply. This results in a shift in weed population and eventually weed control with that product becomes ineffective. Chemical rotation can reduce the buildup of a tolerant species. Use of directed sprays of a nonselective herbicide (paraquat or glyphosate) or cultivation is usually necessary to give control of all species.

One application of a preemergent herbicide will not give adequate weed control for an entire year. Late fall or winter applications of simazine, dichlobenil, or pronamide will provide weed control well into the growing season. When control begins to fall, the area can be cultivated and application of one of the other preemergent herbicides can be made.

Applications should be made to limited areas until experience is gained with a given herbicide. Any application of a new herbicide should include an untreated area to allow observation of weed control and possible injury. Small and shallow-rooted plants are more easily injured than large established plants. Sandy soil and excessive watering also increase chances of injury. Irrigate after a granular herbicide application to wash the granules off the leaf surface. Certain granular herbicides will cause spotting of foliage.

It is wise to keep a separate sprayer for herbicides since certain ones are difficult to clean from the spray tank.

Time of Application	Weed Problem	Chemical Rate/1000 sq ft	Remarks
Preplant soil fumigation	Most annual and perennial weeds	methyl bromide (10.0 lb/1000 sq ft)	For certified applicators only. Expose soil to chemical for at least 24 hours and then aerate for 24 to 48 hours before transplanting. Use an airtight cover, and soil temperature should be above 55° F. <b>METHYL BROMIDE IS EXTREMELY POISONOUS.</b> Do not breathe vapor or let it get on your skin.
		metham  (SMDC, Vapam, VPM 10.0 qt of 32% formulation/1000 sq ft)	For certified applicators only. Any type of cover (paper, plastic film, etc.) will increase effectiveness. Apply to freshly prepared, moist soil when temperature is above 55° F. Soil should be moist enough to form a crumbly ball. Keep cover on for 48 to 72 hours and do not disturb area for at least 14 days. Work soil to a depth of 2 inches at least 7 days prior to transplanting. Cover may be left on over winter to prevent reinfestation after treatment. Do not get SMDC in your eyes or on your skin, clothing, or shoes. If application requires walking over the area, wear rubber boots.
Preplant	Certain annual weeds and nutsedge	EPTC 5.0 lb  (Eptam 2.3G 217.0 lb, Eptam 7E 5.7 pt or Eptam 5G 100.0 lb or other labeled formulation)	Apply to a clean cultivated soil and incorporate immediately to a 2 to 4 inch depth. For small areas apply 2.1 fl oz Eptam 7E, 5 lb Eptam 2.3G or 2.3 lb Eptam 5G per 1000 sq ft.
	Annual grasses and certain broadleaf weeds	trifluralin 0.5-4.0 lb  (Treflan 4EC 0.5-4.0 qt or Treflan 5G 10.0-80.0 lb)	Use lower rate if a preplant incorporated treatment is made or higher rate if surfaced applied and followed by irrigation. For small areas, apply 0.7-2.9 fl oz Treflan 4EC or 0.5-1.8 lb Treflan 5G per 1000 sq ft.
Postplant but preemergence to weeds	Annual grasses and certain broadleaf weeds	bensulide 7.5-12.5 lb  (Betasan 7G 107.0-208.0 lb or other labeled formulation)	Apply to weed-free areas. Ornamentals must be established prior to treatment. Irrigate immediately after application. For small areas use 2.4-4.1 lb Betasan 7G per 1000 sq ft.

Time of Application	Weed Problem	Chemical Rate/1000 sq ft	Remarks	
Postplant preemergence weeds (continued)		CIPC 4.0-6.0 lb (Furloe 20G 20-30 lb)	Apply as a dormant application to ground covers and herbaceous perennials. Apply to weed free soil. Bedding plants should be treated after the transplants are established. For small areas apply 7.3-11.0 oz Furloe 20G per 1000 sq ft.	
		DCPA 6.0-14.0 lb (Dacthal 75W 8.0-18.7 lb)	May be used any time after transplanting. Apply to weed-free area after hand weeding or clean cultivation. More than one application is required for season-long control. Duration of control is usually about 8 weeks. Will suppress dodder if applied prior to germination. For small areas apply 3.0-6.8 oz Dacthal 75W per 1000 sq ft.	
		diphenamid 6.0-8.0 lb (Enide 90W 6.6-8.8 lb)	Apply immediately after transplanting or after clean cultivation. Will not control perennials nor weeds that have started to grow. Deep cultivation will reduce effectiveness. For small areas apply 2.5-3.2 oz Enide 90W per 1000 sq ft.	
		napropamide 4.0-6.0 lb (Devrinol 50WP 8.0-12.0 lb, 5G 80.0-120.0 lb, or 2G 200.0-300.0 lb)	Use on container or field grown nursery stock. Apply to clean cultivated soil. Safe on a wide variety of plant material. May be used on newly transplanted stock after soil has settled from first watering. Needs incorporation (mechanical or irrigation). For small areas apply 2.9-4.4 oz Devrinol 50WP, 1.8-2.7 lb Devrinol 5G or 4.6-6.8 lb Devrinol 2G per 1000 sq ft.	
		oryzalin 2.0-4.0 lb (Surflan 75W 2.6-5.3 lb, Surflan 4AS 2.0-4.0 qt)	Can be applied over top or as a directed spray on field and container grown ornamentals. Will not control established weeds. Irrigation will improve weed control. For small areas apply 1.5-2.9 fl oz Surflan 4AS per 1000 sq ft.	
		trifluralin 0.5-4.0 lb (Treflan 4EC 0.5-4.0 qt or Treflan 5G 10.0-80.0 lb)	Will not control established weeds. Use lower rate if incorporated or higher rate and irrigate after application. Apply as a directed spray. Consult label for use on specific soil types. For small areas apply 0.7-2.9 fl oz Treflan 4EC or 0.3-1.8 lb Treflan 5G per 1000 sq ft.	
	Annual grasses and broadleaf weeds		oxadiazon 2.0-4.0 lb (Chipco Ronstar 2G 100.0-200.0 lb)	Use on container or field grown nursery stock. Safe on a wide variety of plant material. Apply to clean soil. Disturbing soil after application may result in reduced weed control. Higher rates may be necessary in bark/peat media. Do not apply when foliage is wet. For continued weed control, an additional application to certain ornamentals can be made 60 to 120 days later. Toxic to fish. Do not contaminate water by washing equipment or disposal of waste. For small areas apply 2.3-4.5 lb Ronstar 2G per 1000 sq ft.
			oxyfluorfen 1.0-2.0 lb (Goal 1.6E 2.5-5.0 qt)	Apply to seedbeds, containers or transplants of many conifer species. Apply before bud-break or after new growth has hardened-off. Goal has preemergence and postemergence activity if applied to weeds less than 3 to 4 inches in height. For small areas apply 1.8-3.7 fl oz Goal 1.6E per 1000 sq ft.

Crop	Weed Problem	Chemical Rate/1000 sq ft	Remarks
Postplant but preemergence to weeds (continued)		oxyfluorfen 2.0 lb + pendimethalin 1.0 lb  (Ornamental Herbicide 2 100.0 lb)	Apply to weed free soil immediately after transplanting or to established ornamentals grown in containers or in the field. Do not apply to ornamentals when foliage is moist or foliar injury can result. Apply overhead irrigation to wash granules off leaf surface. For small areas apply 2.3 lb OH2 per 1000 sq ft.
		oxyfluorfen 2.0 lb + oryzalin 1.0 lb  (Rout Ornamental Herbicide 100.0 lb)	Apply to a weed-free soil surface when foliage is dry and plants are not making a flush of growth. Use on container and field grown stock. Apply overhead irrigation to wash granules off leaf surface. Do not apply to ornamentals when foliage is moist or foliar injury can result. For small areas apply 2.3 lb Rout per 1000 sq ft.
		simazine 2.0-3.0 lb  (Princep 4L 2.0-3.0 qt, Princep 80W 2.5-3.7 lb, Princep 4G 50.0-75.0 lb or other labeled formulation)	Apply immediately after hand weeding and clean cultivation in the fall or spring before new weed growth appears. Do not apply on azaleas, Japanese holly, or rhododendron. Apply no more than once per year. Apply at least one year after transplanting. For small areas apply 1.5 to 2.2 fl oz Princep 4L, 0.9-1.3 oz Princep 80W or 1.1-1.7 lb Princep 4G per 1000 sq ft.
Annual grasses and certain annual and perennial broadleaf weeds	dichlobenil 4.0-6.0 lb  (Dyclomec, Casoron, Norosac 4G 100.0-150.0 lb)	Apply only to a well prepared, weed-free soil in the late fall, winter, or early spring before seeds of annual weeds germinate, or after cultivation has removed all growing weeds. If dichlobenil remains on the soil surface during warm weather, activity will be lost. Do not apply until 4 weeks after transplanting. <b>NOTE:</b> Use higher rate for control of certain perennials in ornamentals established at least one year. Do not remove old weed growth before making a surface application in the fall for control of perennial weeds. For small areas apply 2.3-3.4 lb Casoron, Norosac or Dyclomec per 1000 sq ft.	
Primarily annual grasses and nutsedge		alachlor 4.0 lb  (Lasso II 15G 27.0 lb)	Apply anytime after transplanting and before weeds emerge. Do not use in enclosed structures, on wet foliage or apply more than three (3) times per year. Some injury may occur when applied to actively growing plants. For small areas apply 9.9 oz Lasso II per 1000 sq ft.
		EPTC 5.0 lb  (Eptam 7E 5.7 pt, Eptam 5G 100.0 lb, Eptam 10G 50.0 lb or other labeled formulation)	Apply to established plants after hand weeding or to weed-free areas. Direct the spray onto the soil. Cultivate immediately to incorporate. For small areas, apply 2.1 fl oz Eptam 7E, 2.3 lb Eptam 5G or 1.1 lb Eptam 10G per 1000 sq ft.
		metolachlor 2.0-4.0 lb  (Dual 8E 2.0-3.0 pt Pennant 5G 40-80 lb)	Apply to weed-free soil. Direct toward base of ornamentals established for at least 2 weeks. For additional broadleaf weed control, tank-mix with Princep. For small areas apply 0.7-1.0 fl oz Dual 8E or 0.9-1.8 lb Pennant 5G per 1000 sq ft.

Crop	Weed Problem	Chemical Rate/1000 sq ft	Remarks
Postplant but preemergence to weeds (continued)	Annual weeds and certain perennial grasses	pronamide 1.0-2.0 lb (Kerb 50W 2.0-4.0 lb)	Fall application when temperatures are below 60° F. High rate has given quackgrass control as well as control of other cool season grasses. Do not use on fine-textured soils of high organic content. Kerb should not be applied to transplants less than 1 year old. For small areas apply 0.7-1.4 oz Kerb 50W per 1000 sq ft.
Postemergence to weeds	Many annual weeds plus poison ivy, wild chrysanthemum, and Canada thistle	amitrole 1.05 lb + simazine 3.15 lb (Amizine 7.0 lb)	Treat plants established for 1 year or more. Direct spray onto weeds and keep off leaves and stems of nursery stock. Weeds should be small. Do not apply on azaleas, Japanese holly, or rhododendron. Simazine will provide preemergence control of many annual weeds. For small areas apply 2.5 oz Amitrole per 1000 sq ft.
	All weeds contact kill	paraquat 0.5 to 1.0 lb  (Gramoxone Super 3.0-5.0 pt + X-77 spreader sticker 8.0-32.0 fl oz per 100.0 gal)	Paraquat must be applied as a directed spray to immature and succulent weeds. Applications to perennial weeds usually requires retreatment. Do not contact desirable foliage or green bark. Will not injure woody bark. May be combined with other herbicides such as simazine or oryzalin to give residual activity. For small area application, mix 2.0 fl oz of formulation plus 0.5 fl oz spreader sticker/gal water and lightly wet weed foliage.
	All weeds controlled	glyphosate 2.0-5.0 lb  (Roundup 2.0-5.0 qt, for wiper application use 1 part Roundup to 2 parts water)	Apply as a directed spray in established plantings. Adjust rate of application to weed species according to label instructions. Do not contact bark or foliage of desired plants or serious systemic injury may occur. For small area application with a hand sprayer use 2 fl oz/gal of water and lightly wet the foliage. Also cleared for site preparation prior to planting nursery stock.
	Annual and perennial grasses including bermudagrass, quackgrass and johnsongrass	fluazifop-butyl 0.50 lb  (Fusilade 4E 1.0 pt + nonionic surfactant at 0.5 pt per 25 gal)	May be applied overtop of selected ornamentals but should be applied as a directed spray after budbreak thru hardening of new growth. Treat perennial grasses with high rate at the following stages of growth: bermudagrass, 4-8 inch runners; johnsongrass, 12-18 inches tall; quackgrass, 3-5 leaves but not more than 10 inches tall. Apply only to actively growing grasses not under moisture stress. Repeat applications may be necessary on some perennial grasses. For spot treatment use 0.5 fl oz Fusilade 4E or 1.5 fl oz Fusilade 200 plus 0.5 fl oz nonionic surfactant per gallon.
		fluazifop-P-butyl 0.25 lb  (Fusilade 2000 2.0 pt + nonionic surfactant at 0.5 pt per 25 gal)	
		sethoxydim 0.28-0.48 lb  (Poast 1.5-2.5 pts + crop oil concentrate 1.0 qt)	Apply overtop of ornamentals to actively growing grasses. Use lower rate on annual grasses less than 6 inches tall and higher rate on grasses up to 12 inches in height. Treat perennial grasses with higher rate as follows: bermudagrass, 6 inch runners; johnsongrass, 15-20 inches tall; quack grass, 6 inches tall; wirestem muhly, 6 inches tall. Repeat applications may be necessary on perennial grasses. Less than optimum results are likely if treatments are applied during moisture stress. For spot treatment use 1.25 fl oz Poast plus 1.25 fl oz crop oil concentrate per gallon.

Table 1. Guide for Herbicide Selection - Annual and Perennial Flowers, Vines and Groundcovers<sup>1</sup>

	Betasan	Dacthal	Devrinol	Furloe	Enide	Fusilade	Poast	Ronstar	Surflan	Treflan
<u>Annual and Perennial Flowers</u>										
Alyssum	F	F	-	F	F	-	-	-	-	F
Aster	F	F	C	-	F	-	-	-	-	F
Begonia	-	-	-	F	F	-	F	-	-	-
Chrysanthemum	-	F	C	F	F	-	F	-	C,F	F
Coleus	-	F	-	F	-	F	F	-	-	-
Daffodil	F	-	C	F	-	-	-	-	-	-
Dahlia	F	F	C	F	F	-	-	-	-	F
Daylily	-	-	-	-	-	F	-	-	-	-
Delphinium	-	F	-	F	F	-	-	-	-	-
Ferns	-	-	-	-	-	-	-	-	-	-
Forget-me-not	-	F	-	F	-	-	-	-	-	F
Four-o'clock	-	F	-	-	-	-	-	-	-	F
Geranium	-	F	C	F	F	F	F	-	C,F	-
Gladiolus	F	F	C	F	F	-	F	-	C,F	F
Hosta	-	-	C	-	-	F	-	-	-	-
Impatiens	-	-	-	F	-	-	F	-	-	-
Iris	-	F	-	F	-	-	F	-	-	-
Lily	-	F	-	F	-	-	-	-	-	-
Marigold	F	F	-	F	F	F	F	-	C,F	F
Nasturtium	-	F	-	-	-	-	-	-	-	F
Pansy	F	-	-	F	-	-	-	-	C,F	-
Peony	-	F	-	F	F	-	-	-	-	-
Periwinkle	F	-	-	-	-	-	-	-	-	F
Petunia	-	F	C	F	-	F	F	-	C,F	F
Phlox	-	-	-	-	F	-	-	-	-	F
Salvia	-	-	-	F	F	F	-	-	-	F
Shasta daisy	F	-	C	-	F	-	-	-	-	F
Snapdragon	-	F	-	F	F	-	F	-	-	F
Sunflower	-	F	-	-	-	-	-	-	-	F
Sweetpea	F	F	-	-	-	-	-	-	-	F
Sweet William	-	-	-	-	F	F	-	-	-	F
Tulip	F	-	-	F	-	-	-	-	-	F
Zinnia	F	F	C	F	F	F	F	-	C,F	F
<u>Vines and Groundcovers</u>										
Ajuga	F	-	F	-	-	-	-	F	-	-
Bamboo	-	-	-	-	-	-	-	-	-	-
Clematis	-	-	-	-	-	-	-	-	-	-
English ivy	F	F	F	F	F	F	F	F	C,F	F
Euonymus	-	-	-	F	-	-	-	-	C,F	-
Honeysuckle	-	F	-	-	-	F	-	F	-	-
Jasmine	-	-	-	-	-	-	-	-	-	-
Liriope	-	-	F	-	-	F	-	-	F	F
Pachysandra	F	F	F	F	-	-	F	F	-	-
Pampasgrass	-	-	-	-	-	-	-	-	-	-
Santolina	-	-	-	-	-	F	-	-	-	-
Sedum	F	-	F	-	-	F	-	F	-	F
Vinca (Periwinkle)	F	-	F	-	F	F	F	F	C,F	-
Yucca	-	-	-	-	-	F	-	-	C,F	-

<sup>1</sup>This table should be used only as a guide. A 'C' indicates the herbicide is registered for use on that species when container-grown. An 'F' indicates the herbicide is registered for use on that species when field-grown. Check the herbicide label for special considerations such as variety, plant growth stage, rate adjustment or application precautions prior to application.

Table 2. Guide for Herbicide Selection - Narrowleaf and Broadleaf Evergreens

Tolerant Species	Trade Name								
	Casoron, Norosac	Dacthal	Devrinol	Dual, Pennant	Enide	Eptam	Fusilade	Goal	Kerb
<b><u>NARROWLEAF EVERGREENS</u></b>									
Arborvitae	F	F	C	F	C,F	-	F	C,F	F
Cedar (Cedrus)	-	-	C,F	-	-	-	F	-	-
Chamaecyparis	-	-	-	-	-	F	-	-	-
Cryptomeria	-	-	-	-	-	-	-	-	-
Fir	-	F	C,F	F	-	F	-	C,F	F
Hemlock	-	-	F	-	C,F	F	F	C,F	F
Juniper	F	F	C,F	C,F	C,F	F	F	C,F	F
Leyland cypress	-	F	C,F	-	-	-	-	-	-
Pine	F	F	C,F	F	-	F	F	C,F	F
Spruce	-	F	F	F	-	F	F	C,F	F
Yew	F	F	F	F	C,F	F	F	C,F	F
<b><u>BROADLEAF EVERGREENS</u></b>									
Aucuba	-	-	F	C,F	-	-	F	-	-
Azalea	F	F	C,F	F	C,F	F	F	-	F
Barberry	-	-	-	-	C,F	-	-	-	F
Bayberry	-	-	-	-	-	-	-	-	-
Boxwood	F	F	C,F	F	-	F	F	-	F
Camellia	F	F	C,F	F	C,F	F	F	-	-
Euonymus	F	F	C,F	F	C,F	F	F	-	F
Holly	-	F	C,F	C,F	C,F	F	F	-	F
Leucothoe	F	-	C,F	F	-	F	-	-	-
Magnolia (Southern)	F	F	-	-	-	F	-	-	F
Mahonia	-	-	-	-	C,F	-	F	-	-
Mountain laurel	-	F	-	F	-	-	-	-	F
Osmanthus	F	-	F	-	-	-	F	-	-
Pittosporum	F	F	C,F	-	C,F	-	F	-	-
Pyracantha	F	-	C,F	F	C,F	-	F	-	F
Rhododendron	F	F	C,F	F	C,F	F	F	-	F

Table 2. Guide for Herbicide Selection - Narrowleaf and Broadleaf Evergreens (Continued)

Tolerant Species	Trade Name							
	Lasso II	OH 2	Poast	Princep	Ronstar	Rout	Surflan	Treflan
<b><u>NARROWLEAF EVERGREENS</u></b>								
Arborvitae	-	-	-	F	-	C,F	C,F	F
Cedar (Cedrus)	-	-	-	-	C,F	-	-	-
Cryptomeria	-	-	-	-	-	-	C,F	-
Chamaecyparis	-	C,F	F	-	C,F	C,F	-	-
Fir	-	-	-	-	-	-	C,F	F
Hemlock	-	-	F	F	F	-	-	F
Juniper	C,F	C,F	F	F	C,F	C,F	C,F	F
Leyland cypress	-	-	-	-	-	-	-	-
Pine	-	C,F	F	F	C,F	C,F	C,F	F
Spruce	-	C,F	F	F	F	C,F	C,F	F
Yew	F	C,F	F	F	F	-	C,F	F
<b><u>BROADLEAF EVERGREENS</u></b>								
Aucuba	-	-	-	-	-	-	-	-
Azalea	-	C,F	F	-	C,F	C,F	C,F	F
Barberry	-	C,F	F	F	C,F	C,F	F	F
Bayberry	-	-	-	-	-	-	-	-
Boxwood	-	C,F	F	-	C	C,F	F	F
Camellia	-	C,F	F	-	C,F	-	-	F
Euonymus	F	C,F	F	-	C,F	C,F	C,F	F
Holly	C,F	C,F	F	F	C,F	C,F	C,F	F
Leucothoe	-	-	-	F	C	-	-	-
Magnolia (Southern)	-	-	F	-	C	-	F	-
Mahonia	-	C,F	-	F	C,F	C,F	C,F	-
Mountain laurel	-	-	-	-	-	-	C,F	F
Osmanthus	-	-	-	F	C	C,F	C,F	-
Pittosporum	-	C,F	-	-	C,F	C,F	-	F
Pyracantha	-	C,F	-	-	C,F	C,F	-	F
Rhododendron	-	C,F	F	-	C,F	C,F	F	F

Table 3. Guide for Herbicide Selection - Deciduous Trees and Shrubs<sup>1</sup>

Tolerant Species	Trade Name								
	Casoron, Norosac	Dacthal	Devrinol	Dual, Pennant	Enide	Eptam	Fusilade	Goal	Kerb
<b>DECIDUOUS TREES</b>									
Amelanchier (serviceberry)	-	-	-	-	-	-	-	-	-
Ash	F	F	F	-	C,F	-	F	-	F
Beech	-	-	-	-	C,F	-	-	-	F
Birch	F	F	F	-	C,F	-	-	-	F
Cherry	-	-	F	F	C,F	-	F	-	F
Crabapple	F	F	F	F	C,F	-	F	-	F
Dawn redwood	-	-	-	-	-	-	-	-	-
Dogwood	F	F	C,F	F	C,F	F	F	-	F
Elm	F	F	-	-	-	-	-	-	F
Ginkgo	-	-	-	-	-	-	-	-	F
Goldenchain tree	-	-	F	-	-	-	-	-	-
Goldenrain tree	F	-	-	-	-	-	-	-	-
Hawthorn	-	F	F	-	-	-	-	-	F
Honeylocust	F	F	F	-	-	-	F	-	F
Linden	F	-	-	-	-	F	-	-	F
Magnolia	F	F	-	-	-	F	F	-	F
Maple	F	F	F	F	C,F	-	F	-	F
Oak	F	F	F	F	C,F	F	F	-	F
Pear	F	-	F	-	-	-	F	-	-
Poplar	F	F	-	-	-	-	-	-	F
Redbud	-	F	-	-	C,F	-	F	-	-
Russian Olive	F	F	-	-	C,F	-	F	-	-
Sourgum (Nyssa)	-	-	-	-	-	-	-	-	-
Sourwood (Oxydendron)	-	-	-	-	-	-	-	-	-
Sweetgum	-	-	-	-	C,F	-	F	-	F
Sycamore	-	F	-	-	C,F	-	-	-	F
Tulip tree	-	F	-	-	-	-	-	-	-
Walnut	-	F	F	-	C,F	-	-	-	F
Willow	F	F	-	-	C,F	-	F	-	F
Zelkova	-	-	-	-	-	-	-	-	-
<b>DECIDUOUS SHRUBS</b>									
Abelia	-	F	C,F	-	-	-	F	-	-
Cotoneaster	F	F	C,F	F	C,F	-	F	-	F
Crape myrtle	-	-	C,F	-	-	-	-	-	-
Deutzia	F	F	-	-	-	-	F	-	-
Euonymus	F	F	C,F	F	C,F	F	-	-	F
Flowering quince	F	-	-	-	-	-	F	-	F
Forsythia	F	F	C,F	F	C,F	-	F	-	F
Hibiscus	-	-	C,F	-	-	-	-	-	-
Honeysuckle	F	F	F	F	C,F	-	F	-	-
Hydrangea	-	F	-	-	C,F	-	F	-	-
Hypericum	-	-	F	F	C,F	-	-	-	-
Lilac	F	F	-	F	C,F	F	F	-	F
Nandina	F	-	C,F	F	-	-	-	-	-
Photinia	F	-	C,F	F	-	-	F	-	-
Privet	F	F	C,F	F	C,F	-	F	-	F
Rose	F	F	C,F	F	C,F	F	F	-	-
Spirea	F	F	-	F	C,F	-	F	-	F
Viburnum	-	F	F	F	C,F	F	F	-	F
Vitex	-	-	-	-	-	-	-	-	-
Weigela	F	F	-	F	C,F	-	F	-	-
Witchhazel (Hamamelis)	-	-	-	-	-	-	-	-	-

<sup>1</sup>This table should be used only as a guide. A 'C' indicates the herbicide is registered for use on that species when container-grown. An 'F' indicates the herbicide is registered for use on that species when field-grown. Check the herbicide label for special considerations such as variety, plant growth stage, rate adjustment or application precautions prior to application.

Table 3. Guide for Herbicide Selection - Deciduous Trees and Shrubs (Continued)

	Lasso II	OH 2	Poast	Trade Name		Rout	Surflan	Treflan
				Princep	Ronstar			
<u>DECIDUOUS TREES</u>								
Amelanchier (serviceberry)	-	-	-	-	-	-	-	-
Ash	-	-	F	-	F	-	-	F
Beech	-	-	-	-	-	-	-	-
Birch	-	C,F	F	-	F	-	-	F
Cherry	-	-	F	-	-	-	C,F	F
Crabapple	F	-	F	F	F	-	-	F
Dawn redwood	-	-	-	-	-	-	-	-
Dogwood	F	C,F	F	F	C,F	C,F	-	F
Elm	-	-	-	F	-	-	-	-
Ginkgo	-	-	-	-	C	-	F	-
Goldenchain tree	-	-	-	-	-	-	-	-
Goldenrain tree	-	-	-	-	-	-	C,F	-
Hawthorn	-	C,F	-	-	-	-	-	-
Honeylocust	-	-	F	F	-	-	-	F
Linden	-	-	-	-	-	-	-	-
Magnolia	-	C,F	F	-	C,F	C,F	C,F	-
Maple	-	C,F	F	-	F	C,F	F	F
Oak	-	C,F	F	F	C,F	C,F	F	F
Pear	-	-	-	-	-	-	F	-
Poplar	-	-	F	-	-	-	-	F
Redbud	-	C,F	-	-	-	-	-	F
Russian olive	-	-	F	F	F	C,F	-	-
Sourgum (Nyssa)	-	-	-	-	-	-	-	F
Sourwood (Oxydendron)	-	-	-	-	-	-	-	-
Sweetgum	-	-	F	-	-	-	F	-
Sycamore	-	-	F	-	-	-	-	F
Tulip tree	-	-	-	-	-	-	-	-
Walnut	-	-	-	-	-	-	-	F
Willow	-	-	-	-	-	-	-	F
Zelkova	-	-	-	-	-	-	-	-
<u>DECIDUOUS SHRUBS</u>								
Abelia	-	C,F	-	-	-	C,F	C,F	-
Cotoneaster	F	C,F	F	F	C,F	C,F	C,F	F
Crape myrtle	-	-	-	-	-	-	F	-
Deutzia	-	-	-	-	-	-	-	F
Euonymus	F	C,F	F	-	C,F	C,F	F	F
Flowering quince	-	-	-	-	-	-	-	-
Forsythia	-	C,F	F	-	C,F	C,F	C,F	F
Hibiscus	-	-	-	-	-	C,F	C,F	-
Honeysuckle	-	C,F	F	-	C,F	C,F	C,F	F
Hydrangea	-	C,F	-	-	-	-	-	-
Hypericum	-	C,F	-	-	-	C,F	-	-
Lilac	-	-	-	-	F	-	F	F
Nandina	-	-	F	-	-	C,F	F	-
Photinia	-	C,F	-	-	C	C,F	F	-
Privet	-	C,F	-	-	C,F	C,F	F	F
Rose	-	-	-	-	C,F	-	C,F	F
Spirea	-	C,F	F	-	-	C,F	-	F
Viburnum	-	-	F	-	C	C,F	C,F	F
Vitex	-	-	-	-	-	-	-	-
Weigela	-	-	-	F	-	C,F	C,F	F
Witchhazel (Hamamelis)	-	-	-	-	-	-	-	-

<sup>1</sup>This table should be used only as a guide. A 'C' indicates the herbicide is registered for use on that species when container-grown. An 'F' indicates the herbicide is registered for use on that species when field-grown. Check the herbicide label for special considerations such as variety, plant growth stage, rate adjustment or application precautions prior to application.

Table 4. Guide to Those Weeds Which May Be Controlled by Herbicides Approved for Use in Ornamentals

Weed	Herbicide									
	Betasan	Norosac	Casoron, Dacthal	Devrinol	Dual	Enide	Eptam	Furloe	Goal	Kerb
<u>GRASSES AND SEDGES</u>										
Annual bluegrasses	G	G	F	G	-	G	-	-	F	G
Baryardgrass	G	G	F	G	G	G	G	F	F	F
Cheat	-	-	-	-	-	-	-	-	-	-
Crabgrass	G	G	G	G	G	G	G	F	F	F
Fall panicum	G	G	F	G	G	G	G	F	F	F
Foxtails	G	G	G	G	G	G	G	F	F	F
Goosegrass	G	G	F	G	G	G	G	F	F	-
Johnsongrass (Seedling)	G	G	F	G	G	-	F	N	-	F
Orchardgrass, fescue	N	G	N	N	-	-	F	-	-	G
Quackgrass	N	G	N	N	-	-	F	-	-	G
Small grains (Volunteer)	G	-	-	G	-	G	-	-	-	G
Stinkgrass	-	-	-	-	-	-	-	-	-	-
Yellow Nutsedge	N	G	N	P	F	N	G	N	-	N
<u>BROADLEAF WEEDS</u>										
Artemisia (Wild chrysanthemum)	N	G	N	N	-	-	F	-	-	-
Bittercress	-	-	-	-	-	-	-	-	G	-
Canada thistle	N	-	N	N	-	-	-	-	-	-
Carpetweed	N	G	P	G	-	-	G	-	-	-
Chickweed	-	G	G	G	-	G	G	G	F	G
Dandelion	N	G	N	-	-	-	-	-	-	-
Dock	N	G	N	-	-	-	-	G	-	-
Dodder	N	G	F	-	-	-	-	G	-	-
Dogfennel	N	G	P	-	-	-	-	G	-	-
Filaree	-	-	-	F	-	-	-	-	-	-
Galinsoga (Quickweed)	-	-	N	F	G	G	N	N	G	-
Groundsel, common	-	G	P	F	P	P	-	N	G	-
Henbit (Deadnettle)	-	G	P	-	-	-	-	-	G	-
Horseweed (Marestail)	-	G	-	N	-	-	-	-	G	-
Knotweed	-	-	F	G	-	G	-	G	G	-
Lambsquarters	F	G	G	F	P	F	F	G	G	F
Morningglory	N	G	N	N	N	P	P	N	G	-
Mustard	-	-	P	N	-	-	-	-	G	-
Nightshade	N	-	F	N	G	N	F	-	G	-
Pigweed	F	G	F	F	G	G	G	F	G	F
Prickly lettuce	-	-	-	G	-	-	-	-	G	-
Prickly sida	-	G	-	-	-	-	-	-	G	-
Purslane	F	G	G	G	F	P	G	G	G	-
Pusley, Florida	-	-	-	-	-	-	-	-	-	-
Ragweed	N	G	N	P	N	N	P	N	-	P
Red sorrel	N	G	N	-	-	-	-	-	-	-
Shepherdspurse	F	-	P	-	-	F	-	P	G	-
Smartweed	N	G	N	P	P	F	P	G	G	F
Sowthistle	-	-	-	G	-	-	-	-	G	-
Spurge, spotted	-	-	F	-	-	-	-	-	G	-
Velvetleaf	N	-	N	N	P	N	F	N	G	-
Veronica (Speedwell)	-	-	P	-	-	-	-	-	-	-
Wild aster	N	-	N	-	-	-	-	-	-	-
Wild carrot	N	-	N	-	-	-	-	-	-	-
Yellow woodsorrel	-	G	G	N	-	-	-	-	G	-

G = good control, F = fair, P = poor, N = no control, and - = no information.

Table 4. Guide to Those Weeds Which May Be Controlled by Herbicides Approved for Use in Ornamentals (Cont'd)

Weed	Herbicide								
	Lasso II	O.H. 2	Fusilade	Poast	Princep	Ronstar	Rout	Surflan	Treflan
<u>GRASSES AND SEDGES</u>									
Annual bluegrasses	-	G	P	P	G	F	G	-	-
Baryardgrass	G	G	G	G	G	G	G	G	G
Cheat	-	-	-	-	-	-	-	-	-
Crabgrass	F	G	G	G	F	G	G	G	G
Fall panicum	G	G	G	G	F	-	G	G	G
Foxtails	G	G	G	G	F	G	G	G	G
Goosegrass	G	G	G	G	-	G	G	G	G
Johnsongrass (Seedling)	G	G	G	G	P	-	G	G	G
Orchardgrass, fescue	-	N	F	F	F	N	N	N	N
Quackgrass	N	N	G	G	F	-	N	N	N
Small grains (Volunteer)	-	G	G	G	-	-	G	-	-
Stinkgrass	-	-	-	-	-	-	-	-	-
Yellow Nutsedge	F	N	N	N	N	N	N	N	N
<u>BROADLEAF WEEDS</u>									
Artemisia (Wild chrysanthemum)	-	-	N	N	-	-	-	-	-
Bittercress	-	G	N	N	-	G	G	-	-
Canada thistle	N	N	N	N	N	N	N	N	N
Carpetweed	G	-	N	N	N	N	N	N	N
Chickweed	-	F	N	N	G	N	F	F	G
Dandelion	-	G	N	N	-	-	G	-	-
Dock	-	-	N	N	-	-	-	-	-
Dodder	-	-	N	N	-	-	-	-	-
Dogfennel	-	-	N	N	F	-	-	-	-
Filaree	-	-	N	N	-	-	-	-	-
Galinsoga (Quickweed)	G	G	N	N	-	G	G	N	N
Groundsel, common	-	G	N	N	G	F	G	P	N
Henbit (Deadnettle)	-	G	N	N	G	-	G	-	-
Horseweed (Marestail)	-	G	N	N	-	-	G	-	-
Knotweed	-	G	N	N	-	-	G	-	-
Lambsquarters	F	G	N	N	G	G	G	F	F
Morningglory	N	G	N	N	F	-	G	N	N
Mustard	-	G	N	N	G	-	G	N	N
Nightshade	G	G	N	N	G	-	G	P	P
Pigweed	G	G	N	N	G	G	G	F	F
Prickly lettuce	-	G	N	N	G	-	G	-	-
Prickly sida	-	-	N	N	-	-	-	-	-
Purslane	G	G	N	N	G	G	G	F	F
Pusley, Florida	-	-	N	N	-	-	-	-	-
Ragweed	N	-	N	N	G	-	-	N	N
Red sorrel	-	-	N	N	-	-	-	-	-
Shepherdspurse	G	G	N	N	G	G	G	N	N
Smartweed	P	G	N	N	-	-	G	P	P
Sowthistle	-	G	N	N	F	-	G	-	-
Spurge, spotted	-	G	N	N	-	-	G	-	-
Velvetleaf	P	-	N	N	G	-	-	P	P
Veronica (Speedwell)	-	G	N	N	-	-	G	-	-
Wild aster	-	-	N	N	-	-	-	-	-
Wild carrot	-	-	N	N	-	-	-	-	-
Yellow woodsorrel	-	G	N	N	-	G	G	-	-

G = good control, F = fair, P = poor, N = no control, and - = no information.



