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# PB1589-Commercial Insect and Mite Control for Trees, Shrubs and Flowers

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# Commercial Insect and Mite Control for Trees, Shrubs and Flowers



# Commercial Insect and Mite Control for Trees, Shrubs and Flowers

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**Credit:** This publication was adapted from “Insect and Mite Control on Woody Ornamentals and Herbaceous Perennials,” Bulletin 504, an Ohio State University Extension publication authored by D.J. Shetlar, Department of Entomology, The Ohio State University, Columbus, Ohio; “Insect Control for Shade Trees,” EC 851, and “Insect Control for Shrubs,” EC 780, authored by H.E. Williams, Professor Emeritus, Entomology and Plant Pathology, Agricultural Extension Service, The University of Tennessee.

# Seasonal Appearance of Ornamental Pests and Normal Time Frame to Apply Control Measures

The following information serves as a guide to help you know the approximate time when control measures can be implemented. Consult the text for more detailed instructions and information:

## Dormant - Before Growth Starts

| Host                  | Pest   |
|-----------------------|--|
| Arborvitae            | tip dwarf mite, Fletcher scale, spruce spider mites  |
| Ash                   | ash flower gall mite, scurfy scale, oystershell scale  |
| Bittersweet           | euonymus scale   |
| Cotoneaster           | San Jose scale   |
| Douglas fir           | Cooley spruce gall adelgid   |
| Elm                   | European elm scale, Putnam scale, scurfy scale, San Jose scale   |
| Euonymus              | euonymus scale, winged euonymus scale  |
| Fir                   | pine needle scale  |
| Flowering fruit trees | mites, maple bladder gall mite, maple pouch gall mite, San Jose scale, scurfy scale, terrapin scale, aphids, white peach scale, pear psylla, European fruit lecanium scale |
| Hackberry             | Putnam scale   |
| Hawthorn              | terrapin scale, European red mite  |
| Hemlock               | Hemlock scale, pine needle scale, Fiorinia scale   |
| Hickory               | Hickory leaf stem gall   |
| Juniper               | Juniper scale, tip dwarf mite, spider mites  |
| Lilac                 | oystershell scale  |
| Linden                | cottony maple scale  |
| Maple                 | terrapin scale, cottony maple scale, Putnam scale, oystershell scale, scurfy scale, lecanium scale, maple mealybug   |
| Oak                   | golden oak scale, kermes scales, obscure oak scale, lecanium scale   |
| Pine                  | pine bark adelgid, pine needle scale, eriophyid (rust) mites, white pine aphid   |
| Poplar                | oystershell scale  |
| Spruce                | spruce spider mite, spruce gall adelgid  |
| Sweetgum              | sweetgum pit-making scale  |
| Tulip tree            | tuliptree scale  |
| Willow                | oystershell scale  |
| Yew (Taxus)           | Fletcher scale, mealybugs  |

## After Growth Starts

### Late March-April (early)

| Host   | Pest   |
|--|--|
| Ash  | ash flower gall mite   |
| Boxwood                                      | boxwood psyllid  |
| *Douglas fir                                 | Cooley spruce gall adelgid   |
| Pine   | Pales weevil, Northern pine weevil, Zimmerman pine moth  |
| Spruce (Norway, red, black, white, Colorado) | eastern spruce gall adelgid, spruce spider mite, Cooley spruce gall adelgid, spruce needle miner |

\*Cooley spruce gall adelgid of Douglas fir can be controlled from spring through fall when temperature is above 60 F.

### April (early)

| Host                  | Pest                        |
|-----------------------|-----------------------------|
| Azalea                | azalea lace bug             |
| Boxwood               | boxwood psyllid             |
| Flowering fruit trees | eastern tent caterpillar    |
| Honey locust          | honey locust pod gall midge |

|         |   |
|---------|---|
| Juniper | juniper webworm   |
| Pine    | white pine weevil, white pine aphid<br>European pine shoot moth<br>Nantucket pine tip moth                    |
| Spruce  | northern pine weevil, Pales weevil, white pine weevil, spruce spider mite, spruce needle miner, gall adelgids |

### April (mid)

| Host                  | Pest                               |
|-----------------------|------------------------------------|
| Boxwood               | boxwood psyllid                    |
| Fir                   | balsam twig aphid                  |
| Douglas fir           | Cooley spruce gall adelgid         |
| Flowering fruit trees | eastern tent caterpillar           |
| Inkberry              | inkberry leafminer                 |
| Magnolia              | yellow poplar weevil               |
| Maple                 | maple bladder gall mite            |
| Pine                  | northern pine weevil, Pales weevil |
| Spruce (Colorado)     | eriophyid mite, spruce spider mite |
| Tuliptree             | yellow poplar weevil               |

**April (late)**

| <b>Host</b>           | <b>Pest</b>   |
|-----------------------|---|
| Arborvitae            | arborvitae leafminer  |
| Ash                   | forest tent caterpillar   |
| Birch                 | forest tent caterpillar   |
| Boxwood               | boxwood leafminer, boxwood psyllid  |
| Elm                   | woolly apple aphid, elm leaf beetle   |
| Euonymus              | euonymus scale  |
| Fir                   | balsam twig aphid   |
| Flowering fruit trees | eastern tent caterpillar, lesser peachtree borer  |
| Hackberry             | hackberry nipple gall psyllid   |
| Hawthorn              | woolly apple aphid, hawthorn lace bug, hawthorn leafminer   |
| Hemlock               | spruce spider mite, hemlock scale, pine needle scale, fiorinia scale  |
| Juniper               | juniper webworm   |
| Maple                 | eriophyid mite, maple shoot moths, forest tent caterpillar  |
| Mountain ash          | woolly aphid  |
| Oak                   | forest tent caterpillar, gypsy moth   |
| Pine                  | sawflies, spotted pine aphid, Nantucket pine tip moth, Zimmerman pine moth, pine tube moth, pine needle scale |
| Poplar                | forest tent caterpillar   |
| Spruce                | balsam twig aphid, spruce spider mite, woolly larch aphid, pine needle scale                                  |
| Sweetgum              | forest tent caterpillar   |
| Wild cherry           | eastern tent caterpillar  |

**May (early)**

| <b>Host</b>           | <b>Pest</b>  |
|-----------------------|--|
| Arborvitae            | spruce spider mite, arborvitae leafminer                               |
| Ash                   | lilac (=ash) borer, forest tent caterpillar                            |
| Azalea                | azalea mite, rhododendron borer, azalea lace bug                       |
| Birch                 | birch leafminer, forest tent caterpillar                               |
| Boxwood               | boxwood leafminer  |
| Dogwood               | dogwood borer  |
| Douglas fir           | Cooley spruce gall adelgid   |
| Elm                   | cankerworm   |
| Flowering fruit trees | eastern tent caterpillar   |
| Hackberry             | lace bugs  |
| Hawthorn              | hawthorn leafminer, cankerworm   |
| Holly                 | holly leafminer  |
| Juniper               | juniper midge, juniper tip midge, juniper scale                        |
| Laurel                | rhododendron borer   |
| Maple                 | forest tent caterpillar, fall cankerworm                               |
| Mountain ash          | lace bugs  |
| Oak                   | lace bugs, oak kermes scale, golden oak scale, forest tent caterpillar |
| Pieris                | andromeda lace bug   |
| Pine                  | pine bark adelgid, spittlebug, eriophyid mite                          |
| Poplar                | forest tent caterpillar  |
| Rhododendron          | rhododendron borer, lace bugs  |
| Serviceberry          | hawthorn lace bug  |
| Shade trees           | cankerworms  |
| Spruce                | spruce spider mite   |

|             |                         |
|-------------|-------------------------|
| Sweetgum    | forest tent caterpillar |
| Sycamore    | sycamore lace bug       |
| Yew (Taxus) | mealybugs               |

**May (mid)**

| <b>Host</b>           | <b>Pest</b>  |
|-----------------------|--|
| Arborvitae            | arborvitae leafminer, spruce spider mite   |
| Ash                   | Putnam scale, oystershell scale  |
| Birch                 | bronze birch borer, oystershell scale  |
| Bittersweet           | euonymus scale   |
| Elm                   | flatheaded appletree borer, white-marked tussock moth  |
| Euonymus              | euonymus scale   |
| Flowering fruit trees | flatheaded appletree borer, Putnam scale   |
| Hackberry             | Putnam scale   |
| Hawthorn              | hawthorn leafminer, scurfy scale, oystershell scale  |
| Hemlock               | Fiorinia scale   |
| Hickory               | hickory petiole gall adelgid   |
| Juniper               | juniper scale  |
| Lilac                 | oystershell scale, lilac (=ash) borer  |
| Linden                | scurfy scale   |
| Maple                 | oystershell scale, flatheaded apple-tree borer, green-striped maple worm                                 |
| Mountain ash          | lace bugs  |
| Oak                   | flatheaded appletree borer, golden oak scale, oak kermes scale, May/June beetles, orange-striped oakworm |
| Pachysandra           | euonymus scale, twospotted spider mite   |
| Pieris                | andromeda lace bug   |
| Pine                  | spruce spider mite, eriophyid mite   |
| Rhododendron          | azalea leafminer, rhododendron borer   |
| Serviceberry          | hawthorn lace bug  |
| Shade trees           | white-marked tussock moth, scurfy scale  |
| Sycamore              | sycamore lace bug  |
| Tulip tree            | yellow poplar weevil   |
| Willow                | scale  |
| Yew (Taxus)           | mealybugs  |

**May (late)**

| <b>Host</b>           | <b>Pest</b>   |
|-----------------------|---|
| Arborvitae            | spruce spider mite,   |
| Ash                   | oystershell scale, lilac (=ash) borer, fall webworm, elm spanworm |
| Azalea                | lace bugs, rhododendron borer, azalea whitefly,                   |
| Birch                 | bronze birch borer, oystershell scale                             |
| Bittersweet           | euonymus scale  |
| Boxwood               | boxwood leafminer, lecanium scale                                 |
| Dogwood               | dogwood borer   |
| Douglas-fir           | bagworms  |
| Euonymus              | euonymus scale, winged euonymus scale                             |
| Flowering fruit trees | terrapin scale, (peach, plum, apricot)                            |
| Hawthorn              | oystershell scale   |
| Hemlock               | spruce spider mite,   |
| Hickory               | elm spanworm  |
| Honeysuckle           | honeysuckle leafminer   |
| Juniper               | juniper tip dwarf mite, juniper scale, spruce spider mite         |

|                 |  |
|-----------------|--|
| Lilac           | oystershell scale, lilac (=ash) borer  |
| Magnolia        | yellow poplar weevil   |
| Maple           | oystershell scale, green-striped maple worm  |
| Mountain ash    | European red mite, lace bugs   |
| Mountain laurel | azalea leafminer, lace bug   |
| Oak             | golden oak scale, oak kermes scale, orange-striped oakworm, elm spanworm, an oak clearwing borer |
| Pachysandra     | oystershell scale, euonymus scale  |
| Pieris          | andromeda lace bug   |
| Pin oak         | May beetles  |
| Poplar          | oystershell scale, euonymus scale  |
| Rhododendron    | azalea whitefly, azalea leafminer, rhododendron borer  |
| Shade trees     | terrapien scale, leafhoppers   |
| Spruce          | spruce spider mite   |
| Tulip tree      | yellow poplar weevil   |
| Yew (Taxus)     | mealybugs  |
| Willow          | oystershell scale  |

**June (early)**

| Host                  | Pest  |
|-----------------------|---|
| Arborvitae            | arborvitae leafminer, bagworms, black vine weevil, Fletcher scale                             |
| Ash                   | elm spanworm  |
| Azalea                | azalea bark scale, black vine weevil  |
| Birch                 | bronze birch borer  |
| Flowering fruit trees | flatheaded appletree borer, woolly apple aphid  |
| Hemlock               | strawberry root weevil  |
| Hickory               | elm spanworm  |
| Juniper               | juniper tip midge, juniper scale  |
| Linden                | webworms  |
| Maple                 | flatheaded appletree borer, lecanium scale  |
| Oak                   | oak skeletonizers, May/June beetles, flatheaded appletree borer, lecanium scale, elm spanworm |
| Pine                  | European pine shoot moth, Nantucket pine tip moth   |
| Rhododendron          | azalea bark scale, black vine weevil  |
| Spruce                | spruce needle miner, spruce spider mite   |
| Sweet gum             | sweet gum pit-making scale  |
| Sycamore              | sycamore lace bug   |
| Walnut                | fall webworm  |
| Yew (Taxus)           | black vine weevil   |

**June (mid)**

| Host                  | Pest  |
|-----------------------|---|
| Arborvitae            | arborvitae leafminer, bagworms, black vine weevil, Fletcher scale |
| Azalea                | oystershell scale   |
| Bald-cypress          | bagworms  |
| Birch                 | birch leafminer, bronze birch borer                               |
| Buckthorn             | bagworms  |
| Cedars                | bagworms  |
| Cotoneaster           | San Joes scale, black vine weevil                                 |
| Fir                   | bagworms, black vine weevil                                       |
| Flowering fruit trees | San Jose scale, bagworms, peachtree borer                         |

|              |  |
|--------------|--|
| Hemlock      | spruce spider mite, bagworms, black vine weevil                              |
| Hornbeam     | bagworms   |
| Ivy          | Japanese beetle  |
| Juniper      | bagworms, juniper scale  |
| Larch        | bagworms   |
| Linden       | linden leaf beetles, Japanese beetle, bagworms Maplebagworms, lecanium scale |
| Oak          | bagworms   |
| Pine         | pine tortoise scale, bagworms  |
| Rhododendron | black vine weevil  |
| Shade trees  | bagworms, leafhoppers  |
| Shrubs       | Japanese beetle  |
| Spruce       | spruce spider mite, spruce needle miner                                      |
| Walnut       | walnut caterpillar   |
| Willow       | bagworm  |
| Yew (Taxus)  | Fletcher scale, black vine weevil  |

**June (late)**

| Host                  | Pest  |
|-----------------------|---|
| Arborvitae            | bagworms  |
| Euonymus              | bagworms  |
| Fir                   | bagworms  |
| Flowering fruit trees | flatheaded appletree borer, San Jose scale, lesser peachtree borer (peach, plum, apricot), bagworms |
| Hemlock               | bagworms  |
| Honey locust          | mimosa webworm  |
| Juniper               | bagworms  |
| Linden                | bagworms  |
| Locust                | locust leafminer  |
| Maple                 | flatheaded appletree borer, cottony maple scale, bagworms   |
| Mimosa                | mimosa webworm  |
| Oak                   | flatheaded appletree borer, bagworms, Pine bagworms, pine tortoise scale                            |
| Silver maple          | cottony maple scale, bagworms   |
| Spruce                | spruce bud scale  |
| Yew (Taxus)           | black vine weevil   |

**July (early)**

| Host                  | Pest                                       |
|-----------------------|--|
| Arborvitae            | Fletcher scale, bagworms                   |
| Elm                   | elm leaf beetle                            |
| Euonymus              | euonymus scale, bagworms                   |
| Flowering fruit trees | San Jose scale, bagworms                   |
| Hemlock               | hemlock scale, pine needle scale, bagworms |
| Honey locust          | mimosa webworm                             |
| Linden                | cottony maple scale, bagworms              |
| Oak                   | flatheaded appletree borer, bagworms       |
| Pine                  | pine tube moth, pine webworm, bagworms     |
| Silver maple          | cottony maple scale, bagworms              |
| Spruce                | pine needle scale                          |
| Walnut                | walnut caterpillar                         |
| Yew (Taxus)           | black vine weevil, Fletcher scale          |

### July (mid)

| Host                  | Pest   |
|-----------------------|--|
| Barberry              | barberry webworms  |
| Bittersweet           | euonymus scale   |
| Euonymus              | euonymus scale, winged euonymus scale                                  |
| Flowering fruit trees | San Jose scale   |
| Honey locust          | mimosa webworm   |
| Maple                 | cottony maple scale  |
| Oak                   | kermes scale, obscure scale, yellownecked caterpillar,                 |
| Pine                  | pine tortoise scale, Pales, northern pine and white pine weevil adults |
| Yew (Taxus)           | black vine weevil, mealybugs, Fletcher scale                           |

### July (late)

| Host         | Pest  |
|--------------|---|
| Hemlock      | hemlock looper                              |
| Honey locust | mimosa webworm                              |
| Juniper      | juniper tip midge                           |
| Oak          | oak skeletonizers, yellownecked caterpillar |
| Yew (Taxus)  | black vine weevil                           |

### August (early)

| Host         | Pest                |
|--------------|---------------------|
| Honey locust | mimosa webworm      |
| Mimosa       | mimosa webworm      |
| Pine         | aphid, pine webworm |

### August (mid)

| Host | Pest                 |
|------|----------------------|
| Ash  | banded ash clearwing |

### September (early)

| Host       | Pest                       |
|------------|----------------------------|
| Arborvitae | Fletcher scale             |
| Locust     | locust borer               |
| Magnolia   | magnolia scale             |
| Maple      | cottony maple scale        |
| Pine       | pine root collar weevil    |
| Sweet gum  | sweet gum pit-making scale |
| Tuliptree  | tuliptree scale            |

### September (mid)

| Host    | Pest                 |
|---------|----------------------|
| Juniper | juniper tip midge    |
| Spruce  | spruce gall adelgids |

### September (late) (through October)

| Host    | Pest                  |
|---------|-----------------------|
| Juniper | juniper webworm       |
| Pine    | Pales weevil (adults) |

## Micro-Injection of Systemic Insecticides into Trees

Systemic insecticides, used as foliar sprays, soil drenches and granular applications to trees for control of a number of important pests, are not new.

Several companies have been developing various methods of injecting these same systemic insecticides directly into the trunks of trees to allow the vascular transport system to distribute the pesticide throughout the plant. Some of these injection systems use 3/8-inch to 1/2-inch holes for injecting or implanting capsules. Recent evidence indicates that these larger diameter holes may not heal rapidly on some species of trees. Therefore, these techniques should probably be avoided.

Other injection systems use much smaller injection holes, "micro-injection," which seem to heal more rapidly. The following two systems are nationally available.

### Mauget System

The J. J. Mauget Company, 5435 Peck Rd., Arcadia, CA 91006, provides a micro-injection system which uses prepacked plastic containers, which can be compressed to provide internal pressure. An 11/64-inch drill bit is used to make holes in the tree trunk and a microinjector tube is inserted. The compressed container is then attached and the pesticide is injected into the tree vascular system.

Mauget provides the following products: IMICIDE (imidacloprid), IMISOL (imidacloprid plus DEBC), ABACIDE (abamectin) and ABASOL (abamectin plus DEBC) are labeled for use on ornamental trees and shrubs. INJECT-A-CIDE B (dicotophos) is for use on trees listed on the label. IMICIDE and IMISOL have adelgids, aphids, beetles, borers, lace bugs, leafhoppers, mealybugs, pine tip moth, scale, thrips and whiteflies listed on the label. ABACIDE and ABASOL have bagworms, beetles, caterpillars, leafminers, mites and spittlebug listed on the label. INJECT-A-CIDE B has aphids, beetles, borers, caterpillars, galls, lace bugs, leafhoppers, leafminers, mites, pine beetles, pine tip moth, psyllids, scales and spittlebugs listed on the label.

### Tree Tech Microinjection Systems, Inc.

Tree Tech Microinjection Systems, Inc., 950 215th Ave., Morriston, FL 32668, has developed a micro-injection system using prepacked plastic containers that can be compressed to provide internal pressure. A 11/64-inch drill bit is used to make holes in the tree trunk and a tip with container is inserted. A tap with a mallet seats the tip and compresses the container.

Vivid II (abamectin) is labeled for use on ornamental trees (including forest, non-cropbearing as well as woody shrubs) for control of adelgids, aphids, brown-

tail moth, elm leaf beetle, lace bug, lygus bug, mites, oakworm, scale, white pine weevil, engraver beetle, eucalyptus borer and flatheaded borer.

Dendrex (acephate) is labelled for use on flowering crabapple for control of aphids, tent caterpillars and leafrollers. It is labeled for other trees and shrubs for control of aphids, bagworms, birch leafminer, tent caterpillars, lace bugs, tussock moth larvae, Gypsy moth larvae, scale crawlers, grasshoppers, cankerworms (spring and fall), Nantucket pine tip moth, Zimmerman pine moths, root weevil adults, boxelder bugs, thrips, whiteflies, bronze birch borer, Japanese beetles, elm leaf beetle (larvae), and other listed pests.

Harpoon (oxydemeton-methyl) is labeled for the following trees and pests: cedars (bark beetle), cottonwoods (aphids), Douglas-fir (cone moths, engraver beetles), elms (elm leaf beetles), junipers (bark beetles), pines [except pinyon] (6-spined engraver beetles, flatheaded borer, black turpentine beetle, Nantucket pine tip moth, pine needle scale and a few other listed pests), redwood (bark beetles, mites and needle scale), spruce (adelgids), and walnuts and pecans [non-bearing] (aphids, mites).

## **Insect and Mite Control Recommendations for Trees and Shrubs**

### **Use Pesticides Properly to Prevent Pollution**

The proper use of pesticides will reduce the pollution of our environment to the necessary minimum. Pesticides are carried into water on soil particles that erode. Take measures necessary to prevent erosion. Do not pour excess spray mixtures or pesticides into sewage systems. Every little bit disposed of in this way adds to the stream pollution problem. Wash the residues from your empty container and mix it into your garden spray. Apply the last drop of the pesticide to your plants. Triple or pressure rinse container, puncture or crush and put in a sanitary landfill. Observe wind conditions and avoid spraying during periods of windy weather to prevent drifts.

### **Anticipate Pest Problems**

Every ornamental plant is host to a variety of insect pests during the growing season. Anticipate insect problems and inspect the leaves, stems, buds and flowers of ornamentals regularly. Frequently, the problem can be identified by observing the injury that results from the feeding activities of the insect. Damage from a heavy infestation can be prevented by early detection and control.

### **Emergence of Insects**

Insects will begin to feed and deposit eggs when the temperatures rise to 50 to 65 F or above and remain in this range for one to two weeks. In some years, pests may appear one to two weeks earlier or later than in other years because of an early or late spring.

### **Effective Spraying**

Insecticides are most effective when they are applied to the parts of the plant on which the young larvae or nymphs are feeding. A fine-mist spray will thoroughly wet the plant surfaces. Stop spraying when the plant surfaces are wet to the point of run-off or dripping. Repeat the spray applications at regular intervals to control the late-hatching, emerging or migrating insects.

Apply an insecticide when weather conditions are favorable. The temperatures should be in the 60 to 80 F range with a wind velocity of less than five miles per hour, with no rain forecast for 24 hours. If one-half inch or more of rainfall occurs within 12 hours after spraying, repeat the application.

### **Insect Galls**

Abnormal plant growths are induced by insect feeding and ovipositing. The immature stages of flies, wasps, mites, and aphids inhabit the galls. The immature insect may be sheltered in various galls for up to three winters before emerging as an adult. Most insects inhabit the galls for a period of three to four weeks to two months during the spring and early summer. Chemical control must be taken prior to gall initiation if it is to be effective.

**Abbreviations used in Table 1 for the developmental stages of insects or mites observed in infestations are listed below:**

|     |            |
|-----|------------|
| E   | Egg        |
| C   | Crawler    |
| N   | Nymph      |
| L   | Larva      |
| P   | Pupa       |
| A   | Adult      |
| All | All stages |



**Table 1. Ornamental Pests**

| Host & Pest           | Stage  | Where to Treat   | What to Use  | When to Treat   |
|-----------------------|--------|--|--|---|
| <b>ARBORVITAE</b>     |        |  |  |   |
| Aphids                | E      | Crevices of bark on twigs of most deciduous plants   | dormant oil  | February-March  |
|                       | N & A  | Undersides of leaves of elm, linden, maple, oak and many other plants; also twigs; also needles of some conifers | Malathion, Diazinon, Dursban, Dimethoate, Merit (not for commercial nursery), Talstar, Orthene, Discus, insecticidal soap, Marathon (nursery beds, flats, containers), Endeavor, Flagship, TriStar, Safari       | April-September   |
| Bagworm               | L      | Foliage of many trees, shrubs, hedges, especially arborvitae, white cedar  | Sevin, Carbaryl, Bt (Dipel, Javelin & others), Malathion, Diazinon, Orthene, Dursban, Dylox, Talstar, Mavrik Aquaflow, Tempo, Decathlon, Tempo SC Ultra, Conserve SC, SpinTor, Scimitar, Mimic                   | late May-July   |
| Arborvitae Leaf Miner | A      | All foliage of arborvitae  | Dursban, Orthene, Discus, Dimethoate, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers)   | May-June  |
| Fletcher Scale        | N      | Foliage and twigs of Taxus and arborvitae  | horticultural oil  | April   |
|                       | C      |  | Merit (not for commercial nursery), Diazinon, Malathion, horticultural oil, Dimethoate, Orthene, Discus, Dursban, Tempo, Decathlon, Tempo SC Ultra, Marathon (nursery beds, flats, containers), Flagship, Safari | May-June  |
| Spruce Mite           | E      | Foliage, especially inner foliage  | dormant oil  | February-March  |
|                       | N<br>A |  | Hexygon, Avid, horticultural oil, insecticidal soap, Ornamite (plantation & nursery use only), Kelthane, Metasystox-R2, Talstar, Scimitar, Mavrik Aquaflow, Floramite, TetraSan, Judo, Forbid                    | April-June, September-October<br>Two sprays made one week apart. Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide. |

**Table 1. Ornamental Pests**

| Host & Pest                                    | Stage       | Where to Treat   | What to Use  | When to Treat  |
|--|-------------|--|--|--|
| <b>ASH</b>                                     |             |  |  |  |
| Lilac Borer/Ash Borer and Banded Ash Clearwing | L<br>A      | Bore into branches and trunk, scar wounds. Sawdust (boring dust) protruding from boring holes. | Dursban, Onyx, permethrin (Astro and others)   | Mid-April and mid-July for ash. Prune and burn dead and dying branches. Remove larvae with sharp knife. Insert wire into boring hole. Parasitic nematodes can be applied to the trunk from May to September to control borers in an infested tree or shrub. Dursban or permethrin can be used 2 weeks after using parasitic nematodes. |
| Ash flowergall mite (Eriophyid mite)           | E<br>N<br>A | Twigs<br><br>Foliage and blossoms  | dormant oil<br><br>horticultural oil, Kelthane, Sevin, Carbaryl  | February-March<br><br>Treat when first blossoms begin to form.   |
| Plant/leaf bugs                                | N<br>A      | Foliage  | Sevin, Carbaryl, Dursban, Malathion, Mavrik Aquaflow, Scimitar, Talstar, Tempo, Decathlon, Flagship  | Treat when young nymphs appear in early spring and repeat as needed.   |
| <b>AZALEA</b>                                  |             |  |  |  |
| Aphids   | N & A       | Undersides of leaves and stems   | Merit (not for commercial nursery), Malathion, Diazinon, Orthene, Discus, Talstar, insecticidal soap, Pyrellin, Marathon (nursery beds, flats, containers), Flagship, TriStar, Safari  | April-October  |
| Azalea Caterpillar                             | L           | Foliage  | Decathlon, Sevin, Carbaryl, Conserve SC  | June-September   |
| Azalea Bark Scale                              | N           | Bark of twigs and branches of azalea, rhododendron, andromeda                                  | Diazinon, Sevin, Carbaryl, Malathion, Orthene, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Safari  | May-June   |
| Lace Bug                                       | N<br>A      | Undersides of leaves   | Drench with Merit 75WP or Marathon 60WP as an alternative to foliar sprays<br><br>Dimethoate, Orthene, Discus, Diazinon, Tempo, Decathlon, Tempo SC Ultra, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Dursban 50W, Flagship | February-March<br><br>April-October  |
| Azalea Leaf Miner                              | L           | Foliage, larvae within rolled leaves of azalea   | Merit (not for commercial nursery), Dimethoate, Diazinon, Malathion, Sevin, Carbaryl, Azatin, Orthene, Address, Talstar, Pyrellin, Dursban 50W, Marathon (nursery beds, flats, containers)   | May-August   |
| Azalea Leaf Tier                               | L           | Foliage of azalea (see also fruittree leaf roller)   | Sevin, Carbaryl, Talstar, Azatin, Orthene, Pyrellin  | May-June   |

**Table 1. Ornamental Pests**

| Host & Pest                | Stage    | Where to Treat  | What to Use  | When to Treat   |
|----------------------------|----------|---|--|---|
| AZALEA, Cont'd.            |          |   |  |   |
| Azalea Stem Borer          | A        | Tips of twigs, trunk  | prune and burn dead and dying twigs  | May, June   |
|                            | L        | Circles stems, bores in stems and trunk   | Dursban, Orthene   |   |
| Azalea Whitefly            | N & A    | Undersides of leaves of azalea, rhododendron, andromeda   | Dimethoate, Malathion, Diazinon, Dursban 50W, Orthene, Discus, Thiodan, Resmethrin, Talstar, Azatin, Pyrellin, Marathon (nursery beds, flats, containers), Merit (Not for commercial nursery), Flagship, TriStar, Safari | May-August  |
| Black Vine Weevil          | A        | Foliage, bark or trunk and branches, and the surfaces of ground beneath where beetles walk after emerging | Thiodan, Tempo, Decathlon, Tempo SC Ultra, Pinpoint (container grown), Diazinon, Orthene, Dursban, Talstar, Mavrik Aquaflow,   | May-September<br>Treat three weeks until no adults are found. If adults can overwinter in container plants in polyhouses begin treatments in March-April.   |
|                            | L        | Roots   | Furadan 4F (container grown), Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), parasitic nematodes  | May-September   |
| Two-banded Japanese Weevil | L & A    | Foliage, roots. Adults notch leaves eventually leaving only the petiole.                                  | Talstar, Orthene   | April-September   |
| Southern Red Mite          | E, N & A | Underside of leaves   | Hexygon, Kelthane, insecticidal soap, Scimitar, Ornamate (field & nursery), Floramite, TetraSan, Judo, Forbid  | May-October<br>Two sprays made one week apart. Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide. |
| BARBERRY                   |          |   |  |   |
| Aphids                     | All      | Undersides of leaves, stems, on new shrubs  | Merit (not for commercial nursery), Diazinon, Malathion, Orthene, Discus, Thiodan, Dursban, Talstar, Endeavor, Marathon (nursery beds, flats, containers), Flagship, TriStar, Safari                                     | April-August  |
| Barberry Looper            | L        | Thorough coverage of foliage  | Orthene, Talstar, Tempo, Mavrik Aquaflow, Decathlon, Tempo SC Ultra, Scimitar  | May-July  |
| Webworm                    | L        | Twigs and leaves webbed together  | Sevin, Malathion, Dylox, Orthene, Tempo, Decathlon, Talstar, Mavrik Aquaflow, Scimitar   | July-September  |

**Table 1. Ornamental Pests**

| Host & Pest                           | Stage                       | Where to Treat   | What to Use   | When to Treat  |
|---------------------------------------|-----------------------------|--|---|--|
| BARBERRY, Cont'd.                     |                             |  |   |  |
| Whitefly                              | E, N & A                    | Undersides of leaves   | Diazinon, Thiodan, Malathion, Dursban, Azatin, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Flagship, TriStar, Safari, Judo, Forbid  | April-September  |
| BIRCH                                 |                             |  |   |  |
| Bronze Birch Borer (flatheaded borer) | A<br>L                      | Treat entire tree especially the upper part of tree and the unshaded areas of trunk with wounds or cracks in the bark. Tunnels under bark and in sapwood. Stressed trees are very susceptible. | Merit, Marathon or Discuss drench around the base of the tree as an alternative to trunk sprays.<br><br>Fertilize to maintain vigor. Protect trunk from physical injury and sun scald. Dursban, Onyx, permethrin (Astro and others)   | February to mid-April<br><br>Late May, early July  |
| Yellownecked caterpillar              | L                           | Foliage of birch and other hardwoods such as oak, maple, hickory, crabapple, quince, elm, butternut, walnut and locust.  | Sevin, Carbaryl, Bt (Dipel, Javelin and others), Dursban, Conserve SC, SpinTor  | July-August  |
| Birch Leafminer                       | L<br>E<br>A                 | Large, blotched, or blistered areas on leaves. New leaf growth attacked generally in early season.   | Metasystox-R2, Sevin, Carbaryl, Talstar, Malathion, Orthene, Dimethoate, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers)   | May-August<br>Apply Merit to the soil (not mulch) in February-March as a soil drench or a soil injection |
| Aphids                                | E                           | branches   | dormant oil   | February-March   |
| Spiny Witch-hazel Leaf Gall Aphid     | hibernating female<br><br>N | foliage  | dormant oil (Systemic drenches of Merit, Marathon, Discuss, Flagship and Safari can be made during February-March instead of an April-May spray)<br><br>Orthene, Dimethoate, Discus, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Flagship, Safari | February-March<br><br>April-May  |
| Dusky Birch Sawfly                    | L                           | foliage  | Tempo, Decathlon, Tempo SC Ultra, Scimitar, Talstar, Dursban, Orthene, Merit, Marathon  | April-May<br>June-August   |
| BOXELDER                              |                             |  |   |  |
| Boxelder Bug                          | N<br>A                      | Leaves, stems, trunk, seeds.<br><br>Male trees do not produce seed on which bugs feed. The false boxelder bug or red shoulder bug is similarly associated with the goldenraintree.             | Tempo, Decathlon, Tempo SC Ultra, Sevin, Carbaryl, Malathion, Diazinon, Thiodan, Dursban, Talstar   | May-September  |

**Table 1. Ornamental Pests**

| Host & Pest                                  | Stage            | Where to Treat   | What to Use   | When to Treat   |
|--|------------------|--|---|---|
| <b>BOXWOOD</b>                               |                  |  |   |   |
| European Hornet                              | A                | Bark of twigs, especially lilac, also ash, rhododendron, birch (locate and spray nest) | Sevin, Dursban  | June-July   |
| Boxwood Leafminer                            | A                | Thorough coverage of foliage of boxwood.   | Sevin, Carbaryl, Dimethoate   | April   |
|  | L                | Soil drench as an alternative to a foliar spray in April-May.                          | Merit (not for commercial nursery), Marathon (apply to soil in nursery beds, flats, containers)   | February-early April  |
|  | L                | Underside of leaves of boxwood   | Dimethoate, Orthene, Discus, Merit (not for commercial nursery), Marathon (apply to soil in nursery beds, flats, containers)  | April-May   |
| Mealybugs                                    | All              | Stems and leaves   | Malathion, Dimethoate, Orthene, Discus, Dursban, Talstar, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Flagship, TriStar, Safari                             | April-September   |
| Boxwood Mite                                 | E                | Underside of leaves of boxwood   | dormant oil   | February-March  |
|  | L<br>N<br>A      |  | Kelthane, Orthene, Mavrik<br>Aquaflow, Avid, Scimitar, TetraSan, Judo, Forbid   | Late April-June<br>Two sprays made one week apart.  |
| Boxwood Psyllid                              | A                | Underside of leaves of boxwood   | Malathion, Dursban, Dimethoate, Talstar, Orthene, Discus, Tempo, Decathlon, Tempo SC Ultra, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers)                      | Late March-May  |
| Webworms                                     | L                | Leaves webbed together, turn brown   | Sevin, Dylox, Orthene, Dursban  | May-September   |
| <b>CATALPA</b>                               |                  |  |   |   |
| Catalpa Sphinx                               | L                | Leaves of tree, defoliate tree.  | Dursban, Sevin, Carbaryl, Orthene, Bt (Dipel, Javelin & others)   | May, July   |
| <b>CHESTNUT</b>                              |                  |  |   |   |
| Large Chestnut Weevil, Small Chestnut Weevil | E<br>L<br>A<br>P | Nuts, leaves and burrs, soil.  | Sevin   | Apply four sprays on a 7-10 day interval beginning August 7. Gather nuts daily so that emerging weevil larvae can not enter the soil. |
| Giant Bark Aphid (Hickory Aphid)             | E<br>N<br>A      | Bark of trunk and limbs. Several generations. Large population causes severe damage.   | insecticidal soap, Merit (not for commercial nursery), Malathion, Diazinon, Orthene, Discus, horticultural oil, Marathon (nursery beds, flats, containers), Endeavor, Flagship, TriStar, Safari | April, May, June, July, August  |
| Fall Webworm                                 | E<br>L           | Web encloses leaves and twigs on terminal end of branches.                             | Bt (Dipel, Javelin, and others), Orthene, Dursban, Diazinon, Malathion, Sevin, Carbaryl, Conserve SC, Mimic, SpinTor  | May-June, August-September  |

**Table 1. Ornamental Pests**

| Host & Pest                    | Stage  | Where to Treat  | What to Use   | When to Treat   |
|--------------------------------|--------|---|---|---|
| CHESTNUT, Cont'd.              |        |   |   |   |
| Twig Pruner                    | L<br>E | Bore under bark and in center of twigs. Cut twig off by making concentric circular cuts from center of twig outward.  | Chemical control is not practical   | Collect and burn fallen twigs.  |
| Asian Ambrosia Beetle          | A      | Trunk and branches. Treat at first sign of attack, usually when tree is just about to come out of winter dormancy. Look for tiny shotholes in tree with toothpick diameter protrusions composed of sawdust-like frass.  | permethrin (Astro and others), Dursban (use ambrosia beetle rate)             | Late March-May or when attack seen.   |
| DOGWOOD                        |        |   |   |   |
| Dogwood Borer                  | L      | Trunk and lower limbs from soil line to lower limb scaffold.  | Dursban, Onyx, permethrin (Astro and others)                                  | Late-April and mid-July. Parasitic nematodes can be applied to the trunk from May to September to control borers in an infested tree or shrub. Dursban or permethrin can be used 2 weeks after using parasitic nematodes.   |
| Dogwood Club Gall (Midge)      | A<br>L | Leaves and small branches.  | Sevin, Carbaryl   | Treat when leaves are expanding in early spring.  |
| Dogwood Twig Borer             | L      | Tunnels in limbs, holes and boring dust along underside of infested wilting limb.<br><br>Prune and burn infested limbs in May or June before borer matures.   | Thiodan, Dursban, permethrin (Astro and others)                               | Mid-June  |
| Rose Leafhopper                | N<br>A | Foliage commonly stippled white.  | Sevin, Carbaryl, Malathion, Flagship, Discus, Marathon, Merit, TriStar        | April-August  |
| Whitefringed Beetle            | A      | Larvae girdle trunk and roots below soil line, especially on seedlings.   | Sevin, Carbaryl, Imidan<br>Mow and rake before spraying.                      | June-September<br>Spray the plants and all of the ground on a 10 day schedule to control the adults and prevent egg laying. Keep infested fields free of weeds. Do not use leguminous cover crops such as red clover. Instead, use oats, sudex or small grains. Do not plant dogwood near kobus magnolia or yellowwood. |
| Japanese Beetle<br>White Grubs | L      | Larvae feed on fibrous roots. This is primarily a regulatory problem when shipping nursery stock to states west of the Mississippi River. Check with the Tennessee Department of Agriculture for current shipping certification of ball and burlap nursery stock. | Merit (not for commercial nursery), Marathon (field nurseries and containers) | June-July   |

**Table 1. Ornamental Pests**

| Host & Pest                              | Stage            | Where to Treat   | What to Use  | When to Treat                                   |
|--|------------------|--|--|---|
| DOGWOOD, Cont'd.                         |                  |  |  |   |
| Dogwood Sawfly                           | L                | Foliage  | Malathion, Diazion, Dursban, Orthene, Sevin, Carbaryl, Scimitar, Talstar, Tempo, Decathlon, Tempo SC Ultra, SpinTor, Conserve SC, Merit, Marathon, Discus  | July-August                                     |
| Flatheaded Appletree Borer               | all              | Larvae bore into trunk and feed in phloem and on the sapwood. Newly transplanted trees are very susceptible  | Marathon, Discus, or Merit, drench around the base of the tree as an alternative to trunk sprays.<br><br>Dursban, Onyx, permethrin (Astro and others)  | February to mid-April<br><br>Mid May, late June |
| Asian Ambrosia Beetle                    | A                | Trunk and branches. Treat at first sign of attack, usually when tree is just about to come out of winter dormancy. Look for tiny shotholes in tree with toothpick diameter protrusions composed of sawdust-like frass. | permethrin (Astro and others), Dursban (use ambrosia beetle rate)  | Late March-May or when attack seen.             |
| ELM                                      |                  |  |  |   |
| Elm Coxcomb Gall                         | E<br>N<br>A      | Leaves, series of elevations with red tips filled with green or brown aphids. Resembles a rooster's comb.  | Malathion, Diazion   | March, April, May                               |
| Elm Leaf Aphid                           | E<br>N<br>A      | Leaves, small yellow to green aphids.  | Marathon (nursery beds, flats, containers), insecticidal soap, Diazion, horticultural oil, Malathion, Dursban, Merit (not for commercial nursery), Endeavor, Flagship, TriStar, Safari                       | April, May-June                                 |
| Elm Sack Gall                            | E<br>N<br>A      | Leaves, bladder-like galls attended by ants.   | Diazion, Malathion   | March, April-May                                |
| Elm Bark Beetle (Native Elm Bark Beetle) | E<br>L<br>A      | Bark of small branches and trunk carry Dutch Elm disease.  | Dursban, permethrin (Astro and others)   | May   |
| European Elm Bark Beetle                 | E<br>L<br>A      | Principal vector of Dutch Elm disease. Crotches of small twigs in outer perimeter of crown.  | Dursban, permethrin (Astro and others)   | February, May                                   |
| European Elm Scale (Brown Elm Scale)     | E<br>C<br>N<br>A | The overwintering nymphs adhere to the twigs and base of buds.<br><br>Crawlers hatch in late May to mid-June and move to the leaves where they develop for the rest of the summer.                                     | dormant oil<br><br>horticultural oil, Diazion, Malathion, Tempo, Decathlon, Tempo SC Ultra, Sevin, Carbaryl, Dursban, Discus, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers) | February-March<br><br>June-August               |

**Table 1. Ornamental Pests**

| Host & Pest             | Stage            | Where to Treat  | What to Use  | When to Treat   |
|-------------------------|------------------|---|--|---|
| ELM, Cont'd.            |                  |   |  |   |
| White-Banded Leafhopper | E<br>N<br>A      | Vector of phloem necrosis. Bark, leaves.  | Sevin, Carbaryl, Diazinon, Dursban, Merit, Discus, Marathon, Metasystox-R2 (soil injection), Flagship, TriStar   | May, June   |
| Elm Leaf Beetle         | E<br>L<br>P<br>A | Leaves skeletonized, turn brown.  | Sevin, Carbaryl, Dursban, Conserve SC  | April, May, July  |
| Larger Elm Leaf Beetle  | E<br>L<br>P<br>A | Large yellow to brown beetle with greenish patches at end of wing covers (elytra). Larvae are reddish-brown, metallic lustered. | Sevin, Malathion, Conserve SC  | May, June   |
| Elm Leafminer           | L                | Foliage of elm.   | Dursban, Discus, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Talstar   | May-June  |
| Whitefringed Beetle     | A                | Larvae girdle trunk and roots below soil line, especially on seedlings.   | Sevin, Carbaryl, Imidan<br>Mow and rake before spraying.   | June-September<br>Spray plants and surface of soil on a 10 day schedule to control the adults and prevent egg laying. Keep infested fields free of weeds. Do not use leguminous cover crops such as red clover. Instead, use oats, sudex or small grains. Do not plant elm near kobus magnolia or yellowwood. |
| EUONYMUS                |                  |   |  |   |
| Bean Aphid              | All              | Undersides of leaves and stems  | Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Malathion, Diazinon, Orthene, Discus, Thiodan, insecticidal soap, horticultural oil, Endeavor, Flagship, TriStar, Safari | April-September   |
| Euonymus Scale          | E, A<br>C, N     | Foliage, twigs and stems of euonymus bittersweet, pachysandra   | dormant oil<br><br>horticultural oil, Malathion, Sevin, Carbaryl, Orthene, Dursban, insecticidal soap, Dimethoate, Safari  | February-March<br><br>April-August. Two sprays 10 days apart whenever crawlers are emerging. Two more sprays at 10 day intervals will be needed for each flush of crawlers (Dimethoate, Safari only one application needed).  |



**Table 1. Ornamental Pests**

| Host & Pest   | Stage            | Where to Treat  | What to Use  | When to Treat   |
|---|------------------|---|--|---|
| <b>WINGED EUONYMUS (BURNING BUSH)</b>   |                  |   |  |   |
| Twospotted Spider Mite  | E<br>L<br>N<br>A | Foliage   | Kelthane, horticultural oil, Hexygon, insecticidal soap, Avid, Talstar, Scimitar, Ornamite (field and nursery), Floramite, Isotox IV, Ovation SC, TetraSan, Judo, Forbid   | April-August<br>Two to three sprays made 5 days apart. Do not use horticultural oil more than once per week. Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide. |
| <b>FRUIT TREE FLOWERING ORNAMENTAL ( Ornamental Crabapple, Cherry, Plum, Pear; fruit not for consumption)</b> |                  |   |  |   |
| Aphids (crabapple, pear, plum, cherry)  | E<br>N<br>A      | Leaves, twigs, buds, discoloration, distortion, honeydew.   | insecticidal soap, horticultural oil, Malathion, Diazinon, Orthene, Discus, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Endeavor, Flagship, TriStar, Safari  | April, May, June, July August<br>Note: Do not use Orthene or Isotox IV on flowering crab apple as foliar injury may occur.  |
| Green Peach Aphid (Plum, cherry)  | E<br>N<br>A      | Slender, light green or yellow. Treat foliage.  | insecticidal soap, Malathion, Discus, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers) Diazinon, Orthene, Endeavor, horticultural oil, Flagship, TriStar, Safari   | April, May, June  |
| Apple Aphid (crabapple)   | E<br>N<br>A      | Treat foliage. This aphid is green.   | insecticidal soap, Malathion, Diazinon, Discus, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), horticultural oil, Endeavor, Flagship, TriStar, Safari   | March, April, May   |
| The Rosy Apple Aphid (crabapple)  | E<br>N<br>A      | Dark purple, rosy pink, or slate. Treat foliage.  | Talstar, Discus, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), insecticidal soap, horticultural oil, Diazinon, Malathion, Endeavor, Flagship, TriStar, Safari  | March, April, May   |
| Woolly Apple Aphid (crabapple, elm, mountain ash)   | E<br>N<br>A      | Leaves, twigs, buds, roots, blue-black with white, wooly covering over rear end of body. Treat balled and burlapped and container grown plants. | horticultural oil, Diazinon, Di-Syston, Malathion, Mavrik Aquaflow Metasystox-R2 (soil injection), Discus, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Dursban, Talstar, Endeavor, Flagship, TriStar, Safari | April, May, June, July, August  |

**Table 1. Ornamental Pests**

| Host & Pest   | Stage       | Where to Treat  | What to Use   | When to Treat  |
|---|-------------|---|---|--|
| FRUIT TREE FLOWERING ORNAMENTAL ( Ornamental Crabapple, Cherry, Plum, Pear; fruit not for consumption) Cont'd.      |             |   |   |  |
| Peachtree Borer<br>(cherry, plum, peach)  | E<br>L<br>A | Roots, trunk and lower limb scaffold.                       | Dursban, Onyx, permethrin (Astro and others)  | Late May, July 15<br>Parasitic nematodes can be applied to the trunk from late June to September to control borers in an infested tree or shrub. Dursban or Lindane can be used 2 weeks after using parasitic nematodes.   |
| Shothole borer  | A           | Trunk and limbs   | Dursban, permethrin (Astro and others)  | Later May, July 15<br>Same timing of sprays as with peachtree borer.   |
| Lesser Peachtree Borer<br>(cherry, plum, peach)   | E<br>L<br>A | Injured areas of trunk limbs.                               | Dursban, Onyx, permethrin (Astro and others)  | Late April, Mid-June<br>Parasitic nematodes can be applied to the trunk from late May to September to control borers in an infested tree or shrub. Dursban or Lindane can be used 2 weeks after using parasitic nematodes. |
| Round-Headed Appletree Borer<br>(crabapple, mountain ash, hawthorn, serviceberry, chokecherry, quince, cotoneaster) | E<br>L<br>A | Trunk near ground. Young seedling trees frequently damaged. | Dursban, permethrin (Astro and others)  | April, June  |
| Fall Webworm<br>(crabapple, cherry, pear, plum)   | L           | Tents over terminal end of branches.                        | Dursban, Orthene, permethrin (Astro and others), Sevin, Carbaryl, Malathion, Bt (Dipel, Javelin and others), Tempo, Decathlon, Tempo SC Ultra, Talstar, Scimitar, Diazinon, Conserve SC, SpinTor, Mimic | June, August<br>Note: Do not use Orthene or Isotox IV on flowering crab apple as foliar injury may occur.  |
| White Apple Leafhopper<br>(crabapple)   | N<br>A      | Leaves are stripped and blotched by feeding of leafhoppers  | Discus, Merit, Marathon, Sevin, Carbaryl, Thiodan, permethrin (Astro and others), Flagship, TriStar   | April, May, June, July, August, September  |
| Rose Leafhopper<br>(crabapple)  | N<br>A      | Leaves are stippled and blotched by feeding of leafhoppers. | Sevin, Carbaryl, Thiodan, Discus, Merit, Marathon, permethrin (Astro and others), Flagship, TriStar   | April, May, August, September  |

**Table 1. Ornamental Pests**

| Host & Pest  | Stage            | Where to Treat   | What to Use  | When to Treat   |
|--|------------------|--|--|---|
| FRUIT TREE FLOWERING ORNAMENTAL ( Ornamental Crabapple, Cherry, Plum, Pear; fruit not for consumption) Cont'd. |                  |  |  |   |
| Mites —<br>European red mite,<br>Twospotted spider<br>mite, (crabapple,<br>pear, cherry, plum)                 | E<br>L<br>N<br>A | Limbs, crevices of bark on<br>limbs and trunk.<br><br>Foliage  | dormant oil (not for twospotted<br>spider mites)<br><br>Kelthane, Hexygon, horticultural<br>oil, Avid, insecticidal soap,<br>Talstar, Scimitar, Ornamate (field<br>& nursery), Floramite, Isotox IV,<br>Ovation SC, TetraSan , Judo,<br>Forbid | February-March<br><br>April-September<br>Two to three sprays made 5 days<br>apart. Do not use horticultural oil<br>more than once per week.<br>Hexygon should only be used<br>once per crop cycle or once per<br>year and since it is predominantly<br>ovicidal/larvicidal, it should<br>be applied prior to adult mite<br>buildup. If adult mites are present<br>in medium to high populations<br>or if all life stages are present,<br>apply Hexygon or TetraSan in<br>combination with a registered<br>contact adult miticide. |
| Pear Slug<br>(pear)  | E<br>L<br>A      | Leaves are skeletonized by<br>feeding larvae.  | Diazinon, Carbaryl,<br>Sevin, Conserve SC, SpinTor   | April-May, July   |
| Pear Psylla<br>(pear)  | E<br>N<br>A      | Crevices of bark on trunk,<br>debris or ground cover. They<br>feed on buds and leaves,<br>causing leaf drop and<br>deformed buds.  | dormant oil<br><br>Diazinon, Azatin XL, Ornazin  | February-March<br><br>Spray foliage two weeks after<br>petal fall and again two weeks<br>later.   |
| San Jose Scale<br>(crabapple, pear,<br>cherry, plum)   | E<br>C<br>N<br>A | Circular, size of a pinhead,<br>dark brown to black, raised<br>dull yellow center, males<br>oval. Lemon yellow crawlers<br>on stems, buds, leaves and<br>fruit.  | dormant oil<br><br>horticultural oil, Diazinon, Sevin,<br>Carbaryl, Malathion, Orthene,<br>Dursban, Safari   | February-March<br><br>May, June-July, August<br><br>Note: Do not use Orthene or<br>Isotox IV on flowering crab apple<br>as foliar injury may occur.   |
| Oystershell Scale<br>(crabapple, pear,<br>cherry, plum)  | E<br>C<br>N<br>A | Brown to gray, oyster shell<br>shape, 1/8 inch long, narrow<br>at one end, widened and<br>rounded at other end. Males<br>are smaller and oval.   | dormant oil<br><br>horticultural oil, Diazinon,<br>Sevin, Carbaryl, Malathion,<br>Orthene, Tempo, Decathlon,<br>Tempo SC Ultra, Safari   | February-March<br><br>May-June, July-August<br><br>Note: Do not use Orthene or<br>Isotox IV on flowering crabapple<br>as foliar injury may occur.   |
| Asian Ambrosia<br>Beetle   | A                | Trunk and branches. Treat<br>at first sign of attack,<br>usually when tree is just<br>about to come out of<br>winter dormancy. Look<br>for tiny shotholes in tree<br>with toothpick diameter<br>protrusions composed of<br>sawdust-like frass. | permethrin (Astro and others),<br>Dursban (use ambrosia beetle<br>rate)  | Late March-May or when attack<br>seen.  |

**Table 1. Ornamental Pests**

| Host & Pest  | Stage            | Where to Treat   | What to Use  | When to Treat  |
|--|------------------|--|--|--|
| FRUIT TREE FLOWERING ORNAMENTAL ( Ornamental Crabapple, Cherry, Plum, Pear; fruit not for consumption) Cont'd. |                  |  |  |  |
| Terrapin Scale<br>(crabapple, pear,<br>plum, cherry)   | E<br>C<br>N<br>A | One of largest native scales, dark brown, hemispherical, convex, crimped or fluted around edges. Crawlers flattened, lighter in color, leaves, twigs.              | dormant oil<br><br>horticultural oil, Malathion, Diazinon, Sevin, Carbaryl, Orthene, Discus, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Flagship, Safari  | February-March<br><br>May-June<br><br>Note: Do not use Orthene or Isotox IV on flowering crabapple as foliar injury may occur.   |
| European Fruit Lecanium Scale<br>(crabapple, pear,<br>plum, cherry)  | E<br>C<br>N<br>A | Larger but similar in appearance to Terrapin scale. May be partly covered with white powdery substance.  | dormant oil<br><br>horticultural oil, Diazinon, Malathion, Sevin, Carbaryl, Merit (not for commercial nurseries), Orthene, Discus, Marathon (nursery beds, flats, containers), Flagship, Safari  | February-March<br><br>June-August<br><br>Note: Do not use Orthene or Isotox IV on flowering crabapple as foliar injury may occur.  |
| Japanese Beetle  | A                | The beetles are 3/8 inch long, metallic green with coppery wing covers   | Merit, Marathon, Discus, Sevin, Tempo, Decathlon, Tempo SC Ultra, Talstar, Scimitar  | April (soil application)<br><br>June, July & early August (spray weekly)   |
| White Peach Scale<br>(plum, cherry, peach)   | E<br>C<br>N<br>A | Circular, white tinged with brown.   | dormant oil<br><br>horticultural oil, Malathion, Diazinon, Orthene, Dursban, Safari  | February-March<br><br>May, July, September<br>Three generations - treat when crawlers are present.<br><br>Note: Do not use Orthene or Isotox IV on flowering crabapple as foliar injury may occur. |
| Fall Cankerworm<br>(crabapple)   | E<br>L<br>A      | Adults emerge to lay eggs in November and December. Larvae appear as foliage develops in the spring. Slender, green, striped, looping caterpillars.                | dormant oil<br><br>Sevin, Carbaryl, Bt (Dipel, Javelin, and others), Conserve SC, SpinTor, Scimitar, Talstar, Mimic<br><br>Trap the emerging adult females crawling up the trunk to lay eggs with a sticky adhesive band of tangle foot. | February-March<br><br>April  |
| Eastern Tent Caterpillar<br>(crabapple, cherry,<br>peach)  | L                | Dirty white webs in limb crotches beginning in March when wild cherry leaves are developing. Larvae remain in web during cloudy or rainy weather, defoliate trees. | horticultural oil, Tempo, Decathlon, Tempo SC Ultra, Talstar, Sevin, Carbaryl, Bt (Dipel, Javelin, and others), Scimitar, Dursban, Orthene, Malathion, Diazinon, Conserve SC, insecticidal soap, SpinTor, Mimic                          | March-April<br><br>Note: Do not use Orthene or Isotox IV on flowering crabapple as foliar injury may occur.  |
| Periodical Cicada species<br>(crabapple)   | A                | Eggs are deposited in splintered twigs.  | Sevin, Carbaryl  | May-June   |
| Oriental Fruit Moth<br>(crabapple, cherry,<br>pear and plum)   | L<br>P<br>A      | Pinkish white 1/2- inch larva tunnel in succulent shoot tip.   | Dursban, permethrin (Astro and others)   | April, July, August  |

**Table 1. Ornamental Pests**

| Host & Pest                      | Stage       | Where to Treat  | What to Use  | When to Treat  |
|----------------------------------|-------------|---|--|--|
| <b>HACKBERRY</b>                 |             |   |  |  |
| Psyllids (hackberry Nipple Gall) | E<br>N<br>A | Nipple-shape gall on underside of leaf. Cup-shaped impression on upper side of leaf.                    | Metasystox-R2 (soil injection), Discus, Malathion, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Sevin, Carbaryl, Dursban  | Treat when leaf buds are showing some green and again when leaves are one-half expanded.   |
| Psyllids (Blister Gall)          | E<br>N<br>A | Blister gall on leaf, circular, flat and blister-like. Convex on underside with a nipple in the center. | Malathion, Dursban, Sevin, Carbaryl, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Discus, Metasystox-R2 (soil injection)  | Treat when leaf buds are showing some green and again when leaves are one-half expanded.   |
| Asian Woolly Hackberry Aphid     | E           | Twigs of hackberry and sugarberry   | dormant oil  | February-March   |
|                                  | N           | root zone   | Drench with Merit, Discuss, Marathon, Flagship   | March-June   |
|                                  | A           | foliage   | Marathon II, Flagship, Tristar, Safari   | July-September   |
| <b>HEMLOCK</b>                   |             |   |  |  |
| Twospotted Spider Mite           | E<br>N<br>A | Needles with grayish cast. Foliage  | Ornamite (plantation and nursery use only), Hexygon, Avid, Scimitar, insecticidal soap, Kelthane, Talstar, horticultural oil, Floramite, Ovation SC, TetraSan, Judo, Forbid                          | April-September<br>Two to three sprays made 5 days apart. Do not use horticultural oil more than once per week. Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide. |
| Spruce Mite                      | E<br>N<br>A | Needles turn yellow, webbing between leaves.  | dormant oil<br><br>Hexygon, Dimethoate, Avid, Kelthane, Scimitar, Metasystox-R2, insecticidal soap, horticultural oil, Ornamite (plantation and nursery use only), Floramite, TetraSan, Judo, Forbid | February-March<br><br>April, September-October<br>Two sprays made one week apart. Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide.                               |

**Table 1. Ornamental Pests**

| Host & Pest                         | Stage            | Where to Treat   | What to Use   | When to Treat   |
|-------------------------------------|------------------|--|---|---|
| <b>HEMLOCK, Cont'd.</b>             |                  |  |   |   |
| Hemlock Eriophyid Mite (Rust Mites) | E<br>N<br>A      | Needles with grayish cast, feed on upper and lower needle surfaces.  | dormant oil<br><br>horticultural oil, Sevin, Carbaryl, Kelthane, Dimethoate, Judo, Forbid   | February-March<br><br>April-May<br>Two sprays made one week apart.  |
| Hemlock Looper                      | L                | foliage  | Sevin, Carbaryl, SpinTor, Conserve SC, Mimic  | May, June   |
| Hemlock Fiorinia Scale              | A<br>C           | foliage  | Sevin, Carbaryl, Diazinon, Malathion, horticultural oil, Safari   | May-June  |
| Hemlock Scale                       | A<br>C<br>E<br>N | Foliage. Small, oblong, dark gray or nearly black, undersides of needles; needles drop prematurely.                                    | dormant oil<br><br>horticultural oil, Diazinon, Sevin, Carbaryl, Malathion, Dimethoate, Safari  | February-March<br><br>April, May, August  |
| Hemlock Woolly Adelgid              |                  | root zone<br><br>trunk injection<br><br>underside of foliage   | Drench with Merit, Discus, or Marathon<br><br>Imicide<br><br>Merit, Marathon II, Flagship<br><br>insecticidal soap, horticultural oil | mid-March to mid-June or late August-early December<br><br>One week before to 2 weeks after leaf out in the spring or during September, about a month before partial leaf shed.<br><br>mid-May to mid-June, late July-October<br><br>May-September, October-April<br>Note: if using horticultural oil, use a 1% spray solution from May-September and a 2% spray solution from October-April. |
| <b>HICKORY</b>                      |                  |  |   |   |
| Giant Bark Aphid                    | E<br>N<br>A      | See under CHESTNUT.  |   |   |
| Hickory Leafstem Gall Phylloxera    | E<br><br>N<br>A  | Twigs of hickory   | dormant oil<br><br>Sevin, Carbaryl, Diazinon, Malathion, Dursban, Merit (not for commercial nurseries)                                | Treat overwintering eggs with dormant oil spray in March.<br><br>Control stem mothers in April at bud split.  |
| Twig Girdler                        | A                | Twigs girdled by adult break off and fall to ground.   | Chemical control is not practical.  | Rake and destroy fallen twigs in the late fall, winter, spring and early summer.  |
| Twig Pruner                         | L                | See under CHESTNUT.  | Chemical control is not practical.  | Rake and destroy fallen twigs before April 1.   |
| Hickory Horned Devil                | L                | Largest native caterpillar 4 to 5 inches long. The green body is covered with spines and has long, reddish spines in back of the head. | No controls needed. Usually occur in small numbers.   | July, August, September   |



**Table 1. Ornamental Pests**

| Host & Pest                | Stage            | Where to Treat  | What to Use  | When to Treat  |
|----------------------------|------------------|---|--|--|
| HOLLY, Cont'd.             |                  |   |  |  |
| Cottony Camellia Scale     | A                | Primarily on underside of leaves.   | dormant oil  | February-March   |
|                            | E<br>N<br>A      |   | horticultural oil, Sevin, Carbaryl, Tempo, Decathlon, Dursban, Diazinon, Malathion, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, Flagship, Safari | May-June   |
| Japanese Wax Scale         | A<br>C<br>N      |   | dormant oil<br><br>Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, Dursban, Orthene, Dimethoate, Flagship, Safari                                    | February-March<br><br>Apply Merit in early May or wait until mid-May to apply other listed insecticides. A second application of Dursban, Orthene, Cygon or Dimethoate should be made 10-14 days after the first application. Since there are 2-3 generations per year, spray again with the two spray regiment whenever crawlers are seen emerging. Don't use Dimethoate or Cygon on Burford holly.                                       |
| Southern Red Mite          | E<br>L<br>N<br>A | Undersides of leaves of Ilex, especially convexa.<br>Also other broadleaved evergreens.   | dormant oil<br><br>Ornamite (field & nursery), Scimitar, Dursban, Hexygon, horticultural oil, Kelthane, insecticidal soap, Floramite, TetraSan, Judo, Forbid                                   | February-March<br><br>April-May,<br>August-October<br>Two sprays made one week apart. Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide. |
| HONEYLOCUST                |                  |   |  |  |
| Mimosa Webworm             | L                | Leaves webbed together and skeletonized.  | Sevin, Dylox, Dursban, Talstar, Tempo, Scimitar  | June-July<br>August-September  |
| Honeylocust Plant Bug      | N                | Examine expanding leaflets for the small, green nymphs and treat before distortion, stunting and discoloration of foliage occurs. | insecticidal soap, horticultural oil, Sevin, Carbaryl, Dursban, Tempo, Decathlon, Tempo SC Ultra, Scimitar, Talstar, Flagship  | April  |
| Honeylocust Pod Gall Midge | L                | Leaves. Causes leaf galls.  | Sevin, Carbaryl, Conserve SC   | Treat growing tips as soon as growth starts in the spring. Retreat at 10-day intervals until infestation is cleaned up.  |



**Table 1. Ornamental Pests**

| Host & Pest             | Stage            | Where to Treat                           | What to Use  | When to Treat   |
|-------------------------|------------------|--|--|---|
| HONEYLOCUST, Cont'd.    |                  |  |  |   |
| Honeylocust Spider Mite | E<br>L<br>N<br>A | Foliage                                  | Kelthane, Hexygon, horticultural oil, insecticidal soap, Avid, Talstar, Scimitar, Ornamite (field & nursery), TetraSan, Judo, Forbid   | April-September<br>Two to three sprays made 7 days apart.<br>Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide.               |
| JUNIPER                 |                  |  |  |   |
| Bagworm                 | L                | Foliage                                  | Cygon, Dimethoate, Talstar, Mavrik Aquaflow, Tempo, Decathlon, Tempo SC Ultra, Diazinon, Orthene, Sevin, Carbaryl, Malathion, Dursban, Dylox, Bt (Dipel, Javelin, and others), Conserve SC, SpinTor, Mimic | late May-June   |
| Juniper Scale           | All              | Leaves and stems                         | horticultural oil, Sevin, Malathion, Dursban, Orthene, Safari  | late April-May  |
| Juniper Webworm         | L                | Foliage of juniper, grayish when covered | Dursban, Orthene   | March-April, August   |
| Spruce Mite             | E, N, A          | Foliage, especially inner foliage        | dormant oil<br><br>Hexygon, Avid, horticultural oil, insecticidal soap, Dimethoate, Ornamite (plantation or nursery use only), Kelthane, Metasystox-R2, Floramite, TetraSan, Judo, Forbid                  | February-March<br><br>April, October<br>Two sprays made one week apart.<br>Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide. |
| LILAC                   |                  |  |  |   |
| Melon Aphid             | All              | Undersides of leaves                     | Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, Diazinon, Orthene, Dursban, Endeavor, Flagship, TriStar, Safari  | April-September   |

**Table 1. Ornamental Pests**

| Host & Pest                            | Stage       | Where to Treat   | What to Use  | When to Treat   |
|--|-------------|--|--|---|
| <b>LILAC, Cont'd.</b>                  |             |  |  |   |
| Lilac Borer                            | L           | Bark of trunk and larger branches, especially around wounds of lilac                                   | Dursban, Onyx, permethrin (Astro and others)   | Mid-April and mid-June for lilac and privet. Parasitic nematodes can be applied to the trunk from May to September to control borers in an infested tree or shrub. Dursban or permethrin can be used 2 weeks after using parasitic nematodes. |
| Lilac Leaf Miner                       | L           | Leaves mined and rolled, defoliation occurs  | Orthene, Talstar, Mavrik Aquaflow, Dursban, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers)   | April-July  |
| Two-banded Japanese Weevil             | L<br>A      | Roots, new leaves, shoots, inner foliage. Adults notch leaves, eventually leaving only the petiole.    | Orthene, Talstar   | April-September   |
| <b>LOCUST</b>                          |             |  |  |   |
| Locust Borer                           | L<br>A      | Mine in sapwood, heartwood.  | Dursban, permethrin (Astro and others)   | August-September  |
| Locust Leafminer                       | L<br>A      | Leaves.<br>Mine in leaves.   | Malathion, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Sevin, Carbaryl, Diazinon, Conserve SC  | May, June, July   |
| Blister Beetle                         | A           | Foliage  | Sevin, Carbaryl, Thiodan   | June-September  |
| <b>MAGNOLIA</b>                        |             |  |  |   |
| Yellow Poplar Weevil                   | L<br>A      | Leaves. Adults feed on leaves in April and again in May to early June. Larvae mine in leaves in April. | Sevin, Carbaryl, Talstar, Dursban, Scimitar, Orthene, Tempo, Decathlon, Tempo SC Ultra   | April, May to early June  |
| Magnolia Borer                         | E<br>L<br>A | Burrow in trunk near base of tree. Two generations per year.   | Dursban, permethrin (Astro and others)   | Early May, early September  |
| <b>MAPLE</b>                           |             |  |  |   |
| Aphids — numerous species infest maple | E<br>N<br>A | Undersides of leaves, stems and on trunk; honeydew dripping is a nuisance.                             | Diazinon, Discus, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Malathion, Metasystox-R2 (soil injection), Endeavor, Flagship, TriStar, Safari | April-September   |
| Woolly Alder Aphid                     | E<br>N<br>A | Curled leaf encloses cottony mass often in thread-like tufts and blue-black aphids.                    | Diazinon, Malathion, Discus, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Metasystox-R2 (soil injection), Endeavor, Flagship, TriStar, Safari | April-July  |

**Table 1. Ornamental Pests**

| Host & Pest   | Stage            | Where to Treat  | What to Use  | When to Treat  |
|---|------------------|---|--|--|
| MAPLE, Cont'd.  |                  |   |  |  |
| Norway Maple Aphid  | E<br>N<br>A      | Often defoliates Norway and sugar maple. Large, hairy green to brown aphid.   | horticultural oil, Diazinon, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, Malathion, Metasystox-R2, Endeavor, Flagship, TriStar, Safari | April, May, June<br><br>Note: some varieties of maple are oil sensitive  |
| Giant Bark Aphid (Hickory Aphid)                          |                  | See under CHESTNUT.   |  |  |
| Sugar Maple Borer (Roundheaded borer pest of sugar maple) | E<br>L<br>A      | Presence of transverse ridges or elevations on large limbs or trunk with sawdust-like frass and moisture with rough, cracked bark.  | Dursban, permethrin (Astro and others)   | Late May, mid-July   |
| Maple Callus Borer  | E<br>L<br>A      | Rough places or wounds on trunk. Larvae bore into sapwood.  | Remove larvae from beneath bark in spring.<br>Dursban, Onyx, permethrin (Astro and others)   | Early May, late June.<br>Parasitic nematodes can be applied to the trunk from late May to September to control borers in an infested tree or shrub.<br>Dursban or permethrin can be used 2 weeks after using parasitic nematodes.  |
| Maple Spider Mite   | E<br>N<br>A      | Foliage   | Ornamite, Hexygon, Avid, Scimitar, insecticidal soap, Kelthane, Talstar , horticultural oil, Floramite, Ovation SC, TetraSan, Judo, Forbid   | May-September<br>Two sprays made one week apart.<br>Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide.   |
| Shoot Boring Caterpillar                                  | E<br>L<br>P<br>A | Terminal end of branches mined; leaves wilt and turn black.<br>Spray to control larvae that have over-wintered and will be entering terminal twigs. More of a problem on red maple. | Talstar  | Apply a foliar treatment of Talstar in April (when the first two pair of leaves have come out). An additional spray 5-7 days later is more likely to be needed on seedling trees due to the variability in leafing out as compared to the more uniform growth of cultivars.<br><br>July-August (Larvae hatch from eggs and feed before overwintering in hollowed out buds). Spray at first sign of damage. |
| Gall-Making Maple Borer                                   | L<br>E<br>P<br>A | Base of small dead twigs on trunk, sapwood and heartwood of trunk; swellings or galls develop over wounds.  | Thiodan, Dursban, permethrin (Astro and others)  | April, May, July, August   |

**Table 1. Ornamental Pests**

| Host & Pest         | Stage            | Where to Treat   | What to Use  | When to Treat  |
|---------------------|------------------|--|--|--|
| MAPLE, Cont'd.      |                  |  |  |  |
| Leopard Moth        | E<br>L<br>P<br>A | Larvae bore into branches and trunk, feed in heartwood; frass or sawdust extruded through holes.                                 | Thiodan, Dursban, permethrin (Astro and others)  | April-August   |
| Petiole Borer       | E<br>L           | Small sawflies tunnel in leaf petioles; one third of leaves drop.  | Diazinon, Scimitar, Talstar, Tempo, Decathlon, Tempo SC Ultra  | Leaf drop will not damage tree. Control recommendations are usually not warranted. Some of the maple petiole borer damage may be prevented by applying insecticide sprays to the trees in mid-April. |
| Fall Cankerworm     | E                | Leaves skeletonized at tips of branches, leaves completely eaten except for veins by older larvae.                               | dormant oil  | February-March   |
|                     | L                | Larvae appear as foliage develops in the spring. Slender, green, striped, looping caterpillars.                                  | Sevin, Carbaryl, Talstar, Bt (Dipel, Javelin and others), Scimitar, Conserve SC, SpinTor, Mimic  | April  |
|                     | A                | Adults emerge to lay eggs in November and December.  | Trap the emerging adult females crawling up the trunk to lay eggs with a sticky adhesive band of Tangle Foot.  |  |
| Spring Cankerworm   | E                | Twigs of maple, elm, oak, beech, linden, others.   | dormant oil  | Mid-to-late March  |
|                     | L                | Inchworm like caterpillars are gray to brown with faint yellow stripes. They appear as foliage develops and can defoliate trees. | Sevin, Carbaryl, Talstar, Bt (Dipel, Javelin, and others), Scimitar, Tempo, Decathlon, Tempo SC Ultra, permethrin (Astro and others), Conserve SC, SpinTor   | April  |
|                     | A                | Adults emerge to lay eggs in late February and March. Can defoliate trees.   | Trap the emerging adult females crawling up the trunk to lay eggs with a sticky adhesive band of Tangle Foot.  |  |
| Cottony Maple Scale | A                | Twigs of silver and other maples.  | dormant oil  | February-March   |
|                     | E                |  | horticultural oil,   | May, June  |
|                     | N                |  | Sevin, Carbaryl, Tempo, Decathlon, Malathion, Diazinon, horticultural oil, Dursban, Tempo SC Ultra, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, Flagship, Safari | June, July<br>Note: Some varieties of maple are oil sensitive.   |

**Table 1. Ornamental Pests**

| Host & Pest                            | Stage       | Where to Treat   | What to Use   | When to Treat  |
|--|-------------|--|---|--|
| MAPLE, Cont'd.                         |             |  |   |  |
| Maple Mealybug                         | E<br>N<br>A | Bark and twigs of maple.   | dormant oil<br><br>Sevin, Carbaryl, Tempo, Malathion, Diazinon, horticultural oil, Dursban, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, Flagship, TriStar, Safari | February-March<br><br>April, May, June, August<br><br>Note: Some varieties of maple are oil sensitive.   |
| Lecanium Scales                        | E<br>N<br>A | Dark to reddish-brown circular to oval, strongly convex.   | dormant oil<br><br>Sevin, Carbaryl, horticultural oil, Malathion, Dursban, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, Flagship, Safari                           | February-March<br><br>June-August<br>Note: Some varieties of maple are oil sensitive. Use Merit or Marathon in May if applying to the root zone.   |
| Oystershell Scale                      | E<br>N<br>A | Scales resemble miniature oysters on limbs, twigs, trunk.  | dormant oil<br><br>Malathion, horticultural oil, Sevin, Carbaryl, Dursban, Safari   | February-March<br><br>June<br>Note: Some varieties of maple are oil sensitive.   |
| Cottony Cushion Scale                  | E<br>N<br>A | Brown scales, large white cottony fluted mass with 600 red eggs.   | dormant oil<br><br>Sevin, Carbaryl, horticultural oil, Malathion, Dursban, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, Flagship, Safari                           | February-March<br><br>April, May, June, August<br>Note: Some varieties of maple are oil sensitive.   |
| Potato Leafhopper                      | N<br>A      | Treat foliage for these tiny, light green nymphs and adults. Only the adults can fly.                                  | Sevin, Carbaryl, Diazinon, Dursban, Talstar, Tempo, Decathlon, Scimitar, Tempo SC Ultra, Flagship, Discus, Marathon, Merit, Tristar   | Throughout late spring and summer to prevent hopperburn to leaves.   |
| Fall Webworm                           | E<br>L      | Dirty web encloses end of branches.  | Malathion, Sevin, Carbaryl, Diazinon, Bt (Dipel, Javelin & others), Dursban, Conserve SC, Mimic, SpinTor  | May, June, August, September   |
| Greenstriped Mapleworm                 | E<br>L      | Foliage of maple yellowish-green larvae marked above with 8 light- and 7 dark-green stripes. Two generations per year. | Sevin, Carbaryl, Mavrik Aquaflow, Azatin, Tempo, Decathlon, Tempo SC Ultra, Bt (Dipel, Javelin, and others), Talstar  | May-June, July-August  |
| Maple Pouch Galls (Maple bladder gall) | E<br>N<br>A | Green, red, black galls on upper leaf surface. No appreciable damage to tree vigor.                                    | dormant oil,<br><br>Sevin, Carbaryl, insecticidal soap, horticultural oil, Kelthane   | Note: Some varieties of maple are oil sensitive. Spray bark in early spring before leaf buds break with dormant oil. Apply any of the other listed insecticides when first leaves are 1/4 expanded and again in 10 days. |
| (Maple spindle or finger gall)         |             | Green to red spindle shape or fingerlike leaf galls.   |   |  |
| Maple Trumpet Skeletonizer             | E<br>L<br>P | Undersides of leaves, larvae spin a long trumpet-like tube of silk and frass, leaves fold around tube.                 | Sevin, Carbaryl, Diazinon   | May-June-July  |

**Table 1. Ornamental Pests**

| Host & Pest                         | Stage            | Where to Treat  | What to Use   | When to Treat  |
|-------------------------------------|------------------|---|---|--|
| MAPLE, Cont'd.                      |                  |   |   |  |
| Forest Tent Caterpillar             | L<br>P           | Larvae live in colony on silken net on trunks or large limbs; bluish caterpillar with black dots; diamond and white dots alternate on back. | Sevin, Carbaryl, Bt (Dipel, Javelin, and others), Dursban, Dimilin, Mimic, SpinTor, Conserve SC, Mimic  | April, May, June   |
| Flatheaded Appletree Borer          | All              | Larvae bore into trunk and feed in phloem and outer sapwood. Newly transplanted trees are very susceptible.                                 | Marathon, Discus, or Merit drench around the base of the tree as an alternative to trunk sprays<br><br>Dursban, Onyx, permethrin (Astro and others)   | February to mid-April<br><br>Mid-May, late June  |
| MIMOSA                              |                  |   |   |  |
| Mimosa Webworm                      | L                | Leaves webbed together and skeletonized.  | Sevin, Carbaryl, Dylox, Dursban, Talstar, Tempo, Decathlon, Tempo SC Ultra, Scimitar  | June, July, August   |
| OAK                                 |                  |   |   |  |
| Aphids                              | All              | Undersides of leaves discolored, distorted, cupped, covered with honeydew.  | Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, insecticidal soap, horticultural oil, Orthene, Malathion, Diazinon, Endeavor, Flagship, TriStar, Safari | April, May, June-September   |
| Giant Bark Aphid                    | All              | See under CHESTNUT.   |   |  |
| Red Oak Borer (roundheaded borer)   | E<br>L<br>P<br>A | Larvae bore into inner bark and sapwood, tunnels extend into near the center of the trunk.  | Fertilize trees to maintain vigor. Remove "brood" trees in young timber stands.<br>Dursban, permethrin (Astro and others)   | Early June, mid-July   |
| White Oak Borer (roundheaded borer) | E<br>L<br>P<br>A | Larvae bore into sapwood and heartwood; frass or sawdust is extruded from the borer hole; adults emerge through round holes in the bark.    | Dursban, permethrin (Astro and others)  | Early May, June  |
| Columbian Timber Beetle             |                  | See under POPLAR.   |   |  |
| Carpenterworm                       | E<br>L<br>P<br>A | Eggs laid in bark crevices or wound; larvae bore into sapwood and heartwood; large winding tunnels weaken tree.                             | Dursban, permethrin (Astro and others)  | Mid to late April<br>Spraying oak should coincide with leafing out and flowering of pecan. |
| Twig Girdler<br>Twig Pruner         | E<br>L           | See under CHESTNUT.<br>Twig girdler - female lays eggs in twig before chewing a notch around the twig that then falls to the ground.        | Chemical control is not practical.  | Pick up and burn the fallen twigs.   |

**Table 1. Ornamental Pests**

| Host & Pest                                | Stage            | Where to Treat  | What to Use  | When to Treat   |
|--|------------------|---|--|---|
| OAK, Cont'd.                               |                  |   |  |   |
| Flatheaded Appletree Borer                 | All              | Larvae bore into trunk and feed in phloem and outer sapwood. Newly transplanted trees are very susceptible.   | Marathon, Discus, or Merit Drench around the base of the tree as an alternative to trunk sprays.<br><br>Dursban, Onyx, permethrin (Astro and others) | February to mid-April<br><br>Mid-May, late June                                     |
| Twolined Chestnut borer (flatheaded borer) | All              | Larvae bore into trunk and feed in phloem and outer sapwood. Newly transplanted trees are very susceptible. Oaks growing vigorously in the nursery may not need protection. | Marathon, Discus, or Merit drench around the base of the tree as an alternative to trunk sprays.<br><br>Dursban, Onyx, permethrin (Astro and others) | February to mid-April<br><br>Mid-May, late June                                     |
| Oak Bark Scarver (roundheaded borer)       | All              | Larvae feed in bark and pupate in outer sapwood; scars result from feeding.   | Dursban, permethrin (Astro and others)   | May, early July<br>Apply first spray when chestnut and chinkapin are in full bloom. |
| Asiatic Oak Weevil                         | A                | foliage   | Talstar, Sevin, Carbaryl, Dursban, Permethrin (Astro and others)   | late June to late August  |
| Oak Sapling Borer (roundheaded borer)      | E<br>L<br>P<br>A | Base and roots of oak saplings; base of tree may be hollowed out, causing death of tree or bulb-like swellings at base.   | Dursban, permethrin (Astro and others)   | Early May, mid-June   |
| Oak Branch Borer (roundheaded borer)       | E<br>L<br>P<br>A | Larvae feeding in small branches cause gall-like swellings.   | Dursban, permethrin (Astro and others)   | Mid-May   |
| Ivory Marked Beetle (roundheaded borer)    | E<br>L<br>P<br>A | Larvae enter through scars on bark; feed in heartwood.  | Dursban, permethrin (Astro and others)   | May, mid-June   |
| Chestnut Bark Borer (roundheaded borer)    | E<br>L<br>P<br>A | Larvae feed in thick moist bark in crotches and at base of tree.  | Dursban, permethrin (Astro and others)   | May, mid-June   |
| An Oak Borer (clearwing moth)              | L                | Bark of trunk   | Dursban, Onyx, permethrin (Astro and others)   | Early June, July 1  |
| Oak Treehopper                             | N<br>A           | Egg laying slits in bark can kill small branches. Two generations per year.   | Sevin, Carbaryl, Orthene   | May-June, August  |
| Oak Sawflies                               | L                | Foliage. They skeletonize the leaves.   | Sevin, Carbaryl, Dursban, Orthene, Malathion, Diazinon, Merit, Marathon, Discus, Conserve SC, SpinTor  | May-September   |
| Orangestriped Oakworm                      | L                | Black caterpillars with eight longitudinal orange-yellow stripes on back and sides; larvae feed in groups.  | Sevin, Carbaryl, Bt (Dipel, Javelin, and others), Dursban, Conserve SC, SpinTor, Decathlon, Tempo, Tempo SC Ultra, Talstar, Scimitar                 | June, August  |
| Redhumped Oakworm                          | L                | Larvae skeletonize leaves feeding in groups. Later entire leaf is eaten.  | Sevin, Carbaryl, Bt (Dipel, Javelin, and others), Dursban, Conserve SC, SpinTor, Decathlon, Tempo, Tempo SC Ultra, Talstar, Scimitar                 | May, August   |

**Table 1. Ornamental Pests**

| Host & Pest                  | Stage            | Where to Treat  | What to Use   | When to Treat  |
|------------------------------|------------------|---|---|--|
| OAK, Cont'd.                 |                  |   |   |  |
| Saddled Prominent            | L                | Young larvae skeletonize upper leaf surface; older larvae eat entire leaf; trees defoliated.  | Sevin, Carbaryl, Bt (Dipel, Javelin, and others), Dursban, Conserve SC, SpinTor, Decathlon, Tempo, Tempo SC Ultra, Talstar, Scimitar  | June-July  |
| Variable Oakleaf Caterpillar | A<br>L           | Larvae skeletonize lower leaf surface and later eat entire leaf.  | Sevin, Carbaryl, Dursban, Bt (Dipel, Javelin, and others), Conserve SC, SpinTor, Decathlon, Tempo, Tempo SC Ultra, Talstar, Scimitar  | May-June, August-September   |
| Yellownecked Caterpillar     | L                | Foliage of oak and other hardwoods such as maple, hickory, birch, crabapple, quince, elm, butternut, walnut and locust.                 | Sevin, Carbaryl, Bt (Dipel, Javelin and others), Dursban, Conserve SC, SpinTor, Decathlon, Tempo, Tempo SC Ultra, Talstar, Scimitar   | July-August  |
| Gypsy Moth                   | L                | Foliage of oak and other hardwoods; young larvae feed on leaf base or leaf surface; older larvae feed from edge of leaf at night.       | Sevin, Carbaryl, Bt (Dipel, Javelin, and others), Dimilin, Dursban, Talstar, Tempo, Decathlon, Tempo SC Ultra, Orthene, Conserve SC, SpinTor, Mimic   | April-early June   |
| Obscure Scale                | N                | The scale are a mottled gray that looks like the bark. Scrape the bark to reveal the lighter color on the underside of the scale cover. | dormant oil   | February-March   |
|                              | C                |   | horticultural oil, Safari   | Mid-July and again on August 1. Treat when crawlers emerge. This may be earlier than mid-July.   |
| Oak Lecanium Scale           | N                | Crawlers emerge in June and migrate to leaves. They migrate back to the branches in August to overwinter as second-instar nymphs.       | dormant oil   | February-March   |
|                              | C                |   | horticultural oil, Sevin, Carbaryl, Tempo, Decathlon, Tempo SC Ultra, Malathion, diazinon, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, Flagship, Safari | June-July<br>A couple sprays about 14 days apart may be needed.  |
| Oak Spider Mite              | E                | Found on the upper leaf surface of oak, birch, chestnut, beech, elm and hickory.  | dormant oil   | Early spring before leaf buds break.   |
|                              | E<br>L<br>N<br>A |   | Kelthane, Avid, Hexygon, horticultural oil, insecticidal soap, Scimitar, Floramite, TetraSan, Judo, Forbid  | May-September<br>Two to three sprays made 5 days apart. Do not use horticultural oil more than once per week. Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide. |



**Table 1. Ornamental Pests**

| Host & Pest        | Stage       | Where to Treat   | What to Use   | When to Treat  |
|--------------------|-------------|--|---|--|
| OAK, Cont'd.       |             |  |   |  |
| Oak Galls          |             | Numerous galls or growths occur on leaves, stems, buds, twigs and leaf petioles of many plants. Wasps, flies, aphids and mites are the principal gall makers.<br>Most galls do not damage plants except for disfiguring the plant parts. Once formed and developed, there is little stress on the plants. By sheer numbers and deformed growth, some galls interfere with normal plant functions. Leaf galls and twig galls do cause damage in some infestations. Twig galls can cause severe damage or the death of trees. Identity of a gall has to be determined and the life cycle understood before effective control measures can be applied.<br>Send gall specimens to your local county Extension office for identification in the event of a heavy infestation. |   | No controls are needed in many cases.<br><br>To be effective, insecticides such as Diazinon, Malathion, Dimethoate, or Sevin must be applied just prior to the time of egg laying and the initial stages of gall development. Some galls can be controlled during the early development stage. |
| Oak Phylloxera     | E<br>N<br>A | Bark of trunk and branches.<br><br>Foliage   | dormant oil<br><br>Bioneem, Sevin, Carbaryl, Dursban, Tempo, Decathlon, horticultural oil, insecticidal soap, Azatin, Ornazin, Discus, Marathon, Merit                        | February-March<br><br>Treat when nymphs first appear in April-May.   |
| Gouty Oak Gall     | E<br>L<br>A | Twigs, irregular, globose, 1 1/2 inches in diameter, frequently confluent, length to 5 inches, surface with round exit holes.  | No satisfactory chemical controls.  | April - leaf galls<br><br>summer - gouty oak gall on twigs and branches  |
| Horned Oak Gall    | EA          | Twigs. Tubes project like horns. Globose, irregular, woody, variable in size with many horn-like projections.  | No satisfactory chemical controls.  | April - leaf galls<br><br>summer - horned oak gall on twigs and branches   |
| Succulent Oak Gall | E<br>L<br>A | Globular gall, succulent, hollow leaf, bud and catkin gall containing a white, free globular kernel, green, sometimes red tinged, diameter 1/4 to 1/2 inch. Spring.  | Diazinon, Malathion, Dimethoate, Sevin, Carbaryl  | March, April   |
| Wool Sower Gall    | E<br>L<br>A | Globular, white, pinkish-marked, woolly growth with seed-like grains on twigs in June, diameter 1 1/2 to 2 inches.   | No control needed.  | April  |
| PINE               |             |  |   |  |
| Bagworm            | L           | Foliage of many trees. Feed on bark and needles from mid-May through August.   | Bt (Dipel, Javelin, and others), Malathion, Diazinon, Orthene, Dursban, Sevin, Tempo, Decathlon, Tempo SC Ultra, Mavrik, Aquaflo, Dylox, Conserve SC, SpinTor, Confirm, Mimic | mid-May through August<br>Best control on young larvae from mid-May to mid-June  |

**Table 1. Ornamental Pests**

| Host & Pest              | Stage  | Where to Treat   | What to Use   | When to Treat                    |
|--------------------------|--------|--|---|----------------------------------|
| PINE, Cont'd.            |        |  |   |                                  |
| European Pine Shoot Moth | L      | Small area between buds on terminals and laterals; foliage and bark of twigs on Scotch, Mugho, Japanese black pine.  | Prune or shear off infested terminals before June.<br>Di-Syston, Dylox, Diazinon, Dimethoate, Orthene, Dimilin, Scimitar, permethrin (Astro and others), Asana XL, Confirm, Mimic | Early April, June                |
| Nantucket Pine Tip Moth  | L<br>P | Tunnel in buds and twigs of young trees up to 10 feet tall.<br>(three generations; use pheromone traps to better time sprays)  | Di-Syston, Dylox, Dimethoate, Orthene, Dimilin, Scimitar, Confirm, Mimic, permethrin (Astro and others)   | April-August                     |
| Pine Bark Adelgid        | N      | Bark of trunk, branches, and twigs on white pine; also Scotch and Austrian pine.   | dormant oil<br><br>horticultural oil, Dursban, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, insecticidal soap, Flagship, Tristar     | February-March<br><br>April-July |
| Loblolly Pine Sawfly     | L      | Feed in groups on needles. Red-brown head, dull green body with gray stripes. One inch long. Eats last year's needles only. Trees not killed.  | Malathion, Tempo, Decathlon, Tempo SC Ultra, Orthene, Sevin, Carbaryl, Scimitar, Talstar, Conserve SC, SpinTor, Merit, Marathon   | March-May                        |
| Pine Sawflies            | L      | Larvae feed in groups on needles. Olive green or tan with glossy black head. Some have two longitudinal black stripes on back or a row of black spots on each side or a large black spot on last segment. Sawflies usually have 8 pair of fleshy prolegs that lack tiny hooks called crochets. Needles of most conifers especially red, Scotch, white pine and spruce. | Malathion, Dursban, Orthene, Sevin, Carbaryl, Scimitar, Talstar, Tempo, Decathlon, Tempo SC Ultra, Conserve SC, SpinTor, Merit, Marathon  | March-October                    |
| Red-Headed Pine Sawfly   | L      | Thorough wetting of needles. Broods may occur throughout the season.   | Scimitar, Malathion, Talstar, Dursban, Tempo, Decathlon, Tempo SC Ultra, Orthene, Sevin, Carbaryl, Conserve SC, SpinTor, Merit, Marathon  | May-September                    |
| Virginia Pine Sawfly     | L      | Feed in groups on needles; green body with black spots or stripes, black head; one generation.   | Scimitar, Malathion, Talstar, Dursban, Tempo Decathlon, Tempo SC Ultra, Orthene, Conserve SC, SpinTor, Merit, Marathon  | March-May                        |

**Table 1. Ornamental Pests**

| Host & Pest                  | Stage  | Where to Treat   | What to Use   | When to Treat                                    |
|------------------------------|--------|--|---|--|
| PINE, Cont'd.                |        |  |   |  |
| Pine Needle Scale            | E      | Needles of white, red, Scotch, Austrian, Mughho pine, spruce.  | dormant oil   | February-March                                   |
|                              | C<br>N |  | Sevin, Carbaryl, Malathion, Orthene, horticultural oil, Dursban, insecticidal soap, Metasystox-R, Safari  | April, July-August when crawlers are emerging.   |
| Pine Needle Miner            | A      | Foliage of pitch and jack pine.  | Dimethoate  | May-June   |
| Pine Spittlebug              | N<br>A | Foliage (needles), need long residual, especially white pine, also Scotch, red, Japanese.  | Malathion, Orthene, Tempo, Decathlon, Tempo SC Ultra  | May, July-August                                 |
| Pine Webworm                 | L      | Foliage (needles) on red, pitch, white pine, usually on seedlings and in plantations.  | Sevin, Carbaryl, Orthene In the landscape, manual removal of the frass nests on the ends of branches is an alternative to spraying.   | June-early September                             |
| White Pine Aphid             | E      | Needles of white pine; twigs and small branches of white pine. 1/8" with white marking.  | dormant oil   | February-March                                   |
|                              | N<br>A |  | Orthene, Malathion, Merit, Marathon, Discus, Diazinon, Tempo, Decathlon, Tempo SC Ultra, Dibrom, insecticidal soap, horticultural oil, Dursban, Dimethoate, Endeavor, Flagship, TriStar, Safari | April-September                                  |
| Pine Tortoise Scale          | N      |  | dormant oil   | February-March                                   |
|                              | C      |  | Marathon (nursery beds, flats, containers), Discus, Merit (not for commercial nurseries), Sevin, Carbaryl, Malathion, Orthene, horticultural oil, Dursban, insecticidal soap, Safari            | early June-July when crawlers are emerging       |
| Pine Tube Moth               | L      | Needles webbed into tube.  | No insecticide labeled for this insect. Control rarely warranted. In the landscape, handpick and dispose of pine tubes.   | May, July  |
| Eriophyid Mites (Rust Mites) | E      | Needles discolor and become chlorotic. Rust mites taper from head to tail. They are smaller than spider mites.   | dormant oil   | February-March                                   |
|                              | E      |  | horticultural oil, Kelthane, Dimethoate, Sevin, Carbaryl  | April-October<br>Two sprays made one week apart. |
|                              | N<br>A |  |   | First treat when new growth is 3-5 inches long.  |
| Black Turpentine Beetle      | A      | One-third to one-fourth inch long, bore vertical tunnel in cambium; larvae bore large gallery adjacent to vertical tunnel; pitch tubes on lower trunk and roots. | Dursban, permethrin (Astro and others)  | April-September                                  |
| Ips Engraver Beetles         | A      | One-eighth inch long, crown and upper trunk.   | Dursban, permethrin (Astro and others)  | March-September                                  |

**Table 1. Ornamental Pests**

| Host & Pest                              | Stage  | Where to Treat  | What to Use   | When to Treat   |
|--|--------|---|---|---|
| PINE, Cont'd.                            |        |   |   |   |
| Southern Pine Engraver                   | A      | Trunk--mid and lower, 3/16 inch long.   | Dursban, permethrin (Astro and others)  | March-September   |
| Eastern Fivespined Ips                   | A      | Trunk--mid and lower, 1/4 inch long; bark with shot holes and pitch tubes; Y- or H-shaped galleries with short lateral to either side in inner bark.                      | Dursban, permethrin (Astro and others)  | March-September   |
| Southern Pine Beetle                     | A      | S-shaped tunnels in inner bark.   | Dursban, permethrin (Astro and others)<br>Remove dying trees.   | April-October   |
| Pales Weevil                             | L      | Stump treatment:<br>Pull and destroy stumps before June or treat stumps in March-early April or after trees are cut and the temperature is above 50 F.                    | Asana XL (Christmas tree plantings, forest tree nurseries, conifer seed orchards only, stump only), Dursban, Lorsban                |   |
|  | A      | Foliar treatment:<br>The tender bark of seedling conifers and the young twigs of larger conifers can be protected by spraying in early to late April and again in August. | Dursban   |   |
| Pine Root Collar Weevil                  | A<br>L | Bark at base of trunk and soil surface 8 inches out from trunk of Scotch, red pine and Austrian pine.   | Dursban, permethrin (Astro and others)  | early April   |
| White Pine Weevil                        | A      | Thorough coverage on terminals of white pine, Norway and white spruce, Scotch pine and Japanese black pine.   | Dursban, Metasystox-R2, Dimethoate, Permethrin (Astro and others), Talstar, Onyx, Tempo, Scimitar, Decathlon<br><br>Merit, Marathon | For Christmas tree growers, spray with Metusystox-R2 or Dimethoate 7-10 days after forsythia full bloom and a second application three weeks later. Another option is an application of Talstar or Decathlon when forsythia is in full bloom and again three weeks later.<br><br>In the landscape, spray with Onyx, Talstar, Tempo, Scimitar, permethrin (Astro and others) when forsythia is in full bloom. Repeat three weeks later.<br><br>Apply as a soil drench in October or November to prevent damage the following spring. |
| Southern Pine Sawyer (roundheaded borer) | A      | Trunk<br>At least two generations per year with overlapping broods.   | Dursban, permethrin (Astro and others)  | Late April-early May, mid-July  |

**Table 1. Ornamental Pests**

| Host & Pest                        | Stage            | Where to Treat   | What to Use  | When to Treat  |
|------------------------------------|------------------|--|--|--|
| <b>POPLAR, YELLOW OR TULIPTREE</b> |                  |  |  |  |
| Tuliptree Aphid                    | E<br>N<br>A      | Pale green aphids on underside of leaves; leaves become pale and fall prematurely.                                   | horticultural oil, insecticidal soap, Metasystox-R2, Diazinon, Malathion, Orthene, Discus, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Endeavor, Flagship, TriStar, Safari | April, May, June   |
| Root Collar Borer                  | E<br>L<br>A      | Burrow in trunk near base of tree.<br>Two generations per year.  | Dursban, permethrin (Astro and others)   | Early May, early September   |
| Tuliptree Scale                    | E<br>N<br>A      | Twigs and stems.   | dormant oil<br><br>Sevin, Carbaryl, insecticidal soap, Orthene, horticultural oil, Diazinon, Dursban, Discus, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Flagship, Safari | February-March<br><br>Treating in May with Orthene or Merit may aid in control but a follow up treatment of the crawlers in September-early October is required for more complete control. |
| Columbian Timber Beetle            | E<br>L<br>P<br>A | Sapwood of trunk under bark; white dust collects at borer hole; later a sap-soaked area may develop around the hole. | Dursban, permethrin (Astro and others)   | May-June-October   |
| Yellow Poplar Weevil               | L<br>A           | Leaves; mine in leaves side by side.   | Sevin, Carbaryl, Scimitar, Dursban, Orthene, Tempo, Decathlon, Talstar, Tempo SC Ultra   | April, late May-early June   |
| <b>PRIVET</b>                      |                  |  |  |  |
| Privet Aphid                       | All              | New leaves curled lengthwise   | Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Orthene, Discus, Dursban, insecticidal soap, horticultural oil, Flagship, TriStar, Safari                                      | April-May<br>September   |
| Lilac Borer                        | L                | Trunk  | See under LILAC  |  |
| Lilac Leaf Miner                   | L                | Leaves   | See under LILAC  |  |
| European Hornet                    | A                | Bark   | See under BOXWOOD  |  |
| Mealybugs                          |                  | Stems and leaves   | Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, Diazinon, Dursban, Orthene, Flagship, TriStar  | April-June   |
| Privet Rust Mite                   | All              | Leaves and stems   | Kelthane, Dursban, horticultural oil, Sevin, Carbaryl, Judo, Forbid  | April-June<br>Two sprays made one week apart.  |

**Table 1. Ornamental Pests**

| Host & Pest                | Stage         | Where to Treat  | What to Use  | When to Treat  |
|----------------------------|---------------|---|--|--|
| PRIVET, Cont'd.            |               |   |  |  |
| Southern Red Mite          | E, N, & A     | Lower leaf surfaces   | Kelthane, Dursban, Hexygon, Avid, Talstar, Ornamite (field & nursery), Scimitar, horticultural oil, Floramite, TetraSan, Judo, Forbid  | May-June<br>September-October<br>Two sprays made one week apart. Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide.  |
| White Peach Scale          | All, E, N & A | Bark of trunk, branches, and twigs or ornamental stone fruits, privet and lilac                 | Sevin, Carbaryl, Malathion, Dursban, Orthene, horticultural oil, Safari  | April-September  |
| Two-banded Japanese Weevil |               | Roots, new leaves, shoots, inner foliage. Adults notch leaves, eventually leaving only petiole. | Talstar, Orthene   | April-September  |
| PYRACANTHA                 |               |   |  |  |
| Apple and Rose Aphids      | All, E, N & A | Terminal stems and leaves, undersides of leaves   | Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, Malathion, Orthene, Dursban, insecticidal soap, horticultural oil, Endeavor, Flagship, TriStar, Safari | April-September  |
| Hawthorn Lace Bug          | All, E, N & A | Undersides of pyracantha, cotoneaster or hawthorn leaves  | Orthene, Discus, Dursban, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), diazinon, Tempo, Tempo SC Ultra, Decathlon, horticultural oil, Flagship              | mid-May to October   |
| Southern Red Mite          | All           | Upper and lower leaf surfaces, leaves turn gray or brown  | Hexygon, Ornamite (field & nursery), horticultural oil, Kelthane, insecticidal soap, Scimitar, Floramite, TetraSan, Judo, Forbid   | April-May<br>September-October<br>Two sprays made one week apart. Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide. |
| San Jose Scale             | All           | Stems and leaves  | Sevin, Carbaryl, Malathion, Orthene, Dursban, Safari   | April-June<br>August   |
| Webworms                   | L             | Leaves webbed together and turn brown   | Bt (Dipel, Javelin & others), Dursban, Sevin, Carbaryl, Malathion, Dylox   | June-September   |

**Table 1. Ornamental Pests**

| Host & Pest                                      | Stage       | Where to Treat   | What to Use   | When to Treat  |
|--|-------------|--|---|--|
| <b>RHODODENDRON</b>                              |             |  |   |  |
| Black Vine Weevil                                | L           | Roots  | DeltaGard G, Furadan 4F (container grown), Merit (not for commercial nurseries) Marathon (nursery beds, flats, containers) parasitic nematodes  | May-September  |
|  | A           | Foliage, roots. Adults notch the edges of leaves.  | Orthene, Talstar, Mavrik Aquaflow, Diazinon, Scimitar, Dursban, Tempo, Decathlon, Tempo SC Ultra  | May-September<br>Treat every three weeks until no adults are found.<br>If adults can overwinter in container plants in polyhouses, begin treatment in March-April. |
| Rhododendron Borer                               |             | Trunk and branches   | Dursban 50W, Onyx, permethrin (Astro and others)  | Mid-May and late June  |
| Rhododendron Gall Midge (Rhododendron Tip Midge) | L<br>P<br>A | Tender, new leaves   | A soil drench with Diazinon or Dursban from late fall to early spring is directed at controlling the overwintering larvae and pupae. One or two additional soil drenches can be made in season between growth flushes in conjunction with the use of Orthene foliar sprays timed to protect each flush of new growth. | April-September  |
| Rhododendron Lace Bug                            | N<br>A      | Underside of leaves  | Orthene, Discus, Diazinon, Tempo, Decathlon, Merit (not for commercial nursery), Marathon (nursery beds, flats, containers), Dursban 50W, Tempo SC Ultra, Flagship  | April-October  |
| Rhododendron Stem Borer                          | L,A         | The primary control is to prune out and destroy wilted branches where eggs have been laid in June to mid-July. Prune below the lower of two girdled areas on the branches. | Rhododendron borer sprays should also help control this pest.   | May and July sprays.<br>Prune in the summer.   |
| Cranberry Rootworm                               | A           | Foliage  | Dursban   | May<br>Spray at first sign of serpentine leaf feeding. Make a second spray 7-10 days later   |
| <b>ROSE</b>                                      |             |  |   |  |
| Rose Chafer                                      | A           | Thoroughly wet foliage with a residual spray   | Sevin, Carbaryl, Dursban, Thiodan   | May-June   |
| Rose Sawfly                                      | L           | Upper and lower surface of foliage, especially on rambler rose   | Diazinon, Malathion, Dursban, Orthene, Conserve SC, SpinTor, Merit, Marathon, Discus  | May-July   |

**Table 1. Ornamental Pests**

| Host & Pest                         | Stage                     | Where to Treat  | What to Use  | When to Treat   |
|-------------------------------------|---------------------------|---|--|---|
| ROSE, Cont'd.                       |                           |   |  |   |
| Thrips                              | N & A                     | Buds and flowers, base of petals  | Diazinon, Dimethoate, Dursban, Dylox, Conserve SC, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers)  | April-September   |
| Japanese beetle                     | A                         | The beetles are 3/8 inches long, metallic green with coppery wing covers                            | Sevin, Carbaryl, Scimitar  | June, July & early August (spray weekly)  |
| Twospotted Spider Mites             | N & A                     | foliage   | Kelthane, Isotox IV, Avid, Hexygon, horticultural oil, insecticidal soap, Talstar, Scimitar, Ornamite (field and nursery), Floramite, Ovation SC, Judo, Forbid                           | April-September   |
| SPRUCE                              |                           |   |  |   |
| Spruce Mite                         | E<br>N<br>A               | Needles turn yellow, webbing between leaves   | dormant oil<br><br>Hexygon, Avid, Kelthane, Scimitar, Metasystox-R2, insecticidal soap, horticultural oil, Ornamite (plantation and nursery use only), Floramite, TetraSan, Judo, Forbid | February-March<br><br>April, September-October<br>Two sprays made one week apart. Hexagon should only be used once per crop cycle or once per year and since it is mostly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide. |
| Hemlock Eriophyid Mite (Rust Mites) | E<br>N<br>A               | Needles with grayish cast, feed on upper and lower needle surfaces.                                 | dormant oil<br><br>horticultural oil, Sevin, Carbaryl, Kelthane, Dimethoate, Judo, Forbid  | February-March<br><br>April-May<br>Two sprays made one week apart.  |
| Hemlock Scale                       | A<br><br>C<br>E<br>N<br>A | Foliage. Small, oblong, dark gray or nearly black, undersides of needles; needles drop prematurely. | dormant oil<br><br>horticultural oil, Diazinon, Sevin, Carbaryl, Malathion, Safari   | February-March<br><br>April, May, August  |
| Pine Needle Scale                   | E<br><br>C<br>N           | Needles   | dormant oil<br><br>Sevin, Carbaryl, Malathion, Orthene, horticultural oil, Dursban, insecticidal soap, Metasystox-R  | February-March<br><br>April, July-August when crawlers are emerging.  |
| Pine Bark Adelgid                   | A<br><br>E<br>N<br>A      | Bark of trunk, branches, and twigs  | dormant oil<br><br>horticultural oil, Diazinon, Dursban, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), insecticidal soap, Discus, Flagship           | February-March<br><br>April-July  |



**Table 1. Ornamental Pests**

| Host & Pest          | Stage      | Where to Treat  | What to Use   | When to Treat   |
|----------------------|------------|---|---|---|
| SPRUCE, Cont'd.      |            |   |   |   |
| Pine Spittlebug      | N<br>A     | Foliage (needles), need long residual   | Diazinon, Malathion, Orthene, Tempo, Decathlon, Tempo SC Ultra  | May, July-August  |
| Bagworm              | L          | Foliage of many trees. Feed on bark and needles from mid-May through August.  | Bt (Dipel, Javelin, and others), Malathion, Diazinon, Orthene, Dursban, Sevin, Tempo, Decathlon, Tempo SC Ultra, Mavrik, Aquaflo, Dylox, Conserve SC, SpinTor, Confirm, Mimic | Mid-May-August<br>Best control on young larvae from mid-May to mid-June   |
| Sawflies             | L          | Larvae feed in groups on needles. Sawflies usually have 8 pair of fleshy prolegs that lack tiny hooks called crochets. Needles of most conifers.  | Malathion, Diazinon, Dursban, Orthene, Sevin, Carbaryl, Scimitar, Talstar, Tempo, Decathlon, Tempo SC Ultra, SpinTor, Merit, Marathon, Discus                                 | March-October   |
| Ips Engraver Beetles | A          | One-eighth inch long, crown and upper trunk.  | Dursban, permethrin (Astro and others)  | March-September   |
| White Pine Weevil    | A          | Thorough coverage on terminals of Norway and white spruce.  | Dursban, Metasystox-R2, Dimethoate, Permethrin (Astro and others), Talstar, Onyx, Tempo, Decathlon, Scimitar<br><br>Merit, Marathon   | For Christmas tree growers, spray with Metusystox-R2 or Dimethoate 7-10 days after forsythia full bloom and a second application three weeks later. Another option is an application of Talstar or Decathlon when forsythia is in full bloom and again three weeks later.<br><br>In the landscape, spray with Onyx, Talstar, Tempo, Scimitar, permethrin (Astro and others) when forsythia is in full bloom. Repeat three weeks later.<br><br>Apply as a soil drench in October or November to prevent damage the following spring. |
| Pales Weevil         | L<br><br>A | Stump treatment:<br>Pull and destroy stumps before June or treat stumps in March-early April or after trees are cut and the temperature is above 50 F.<br><br>Foliar treatment:<br>The tender bark of seedling conifers and the young twigs of larger conifers can be protected by spraying in early to late April and again in August. | Asana XL (Christmas tree plantings, forest tree nurseries, conifer seed orchards only, stump only), Dursban, Lorsban<br><br>Dursban   |   |
| SWEET GUM            |            |   |   |   |
| Fall Webworm         |            | See under CHESTNUT.   |   |   |
| Leaf Tier            | L          | Leaves webbed or tied together.   | Dylox, Sevin, Carbaryl  | June, July  |

**Table 1. Ornamental Pests**

| Host & Pest                 | Stage       | Where to Treat   | What to Use  | When to Treat                |
|-----------------------------|-------------|--|--|------------------------------|
| SWEET GUM, Cont'd.          |             |  |  |                              |
| Terrapin Scale              | A           | Twigs and stems.   | dormant oil  | February-March               |
|                             | All         |  | Diazinon, Malathion, Sevin, Carbaryl, Dursban, Orthene, Merit (not for commercial nurseries), Discus, Marathon (nursery beds, flats, containers), Flagship | June, July                   |
| Sweetgum Scale              | A           | Pit on underside of leaf; small discolored galls occur on upper surface.                                   | dormant oil  | February-March               |
|                             | All         |  | Malathion, Sevin, Carbaryl, Dursban, Orthene   | May-June, August             |
| SYCAMORE                    |             |  |  |                              |
| Fall Webworm                |             | See under CHESTNUT.  |  |                              |
| Sycamore Lace Bug           | N<br>A      | Underside of leaves; foliage stippled, turns white, drops prematurely.                                     | Malathion, Sevin, Carbaryl, Discus, Marathon, Merit, Flagship  | May, September               |
| VIBURNUM                    |             |  |  |                              |
| Snowball Aphid              | N & A       | Foliage of Viburnum  | Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Orthene, Dursban, Endeavor, Flagship, TriStar, Safari                    | April-May                    |
| WALNUT                      |             |  |  |                              |
| Giant Bark Aphid            |             | See under CHESTNUT.  |  |                              |
| Fall Webworm                |             | See under CHESTNUT.  |  |                              |
| Walnut Caterpillar          | E<br>L      | Larvae feed in colonies.   | Sevin, Carbaryl, Malathion,  | May, June, August, September |
| Walnut Petiole Gall Mite    | E<br>N<br>A | Twigs and bark before new growth begins. Large, deformed, hairy growths on leaf petiole.                   | Kelthane, Sevin, Carbaryl  | April-May                    |
| Butternut Gall Mite         | All         | Twigs and bark before new growth begins.   | Kelthane, Sevin, Carbaryl  | April, May                   |
| WILLOW and POPLAR           |             |  |  |                              |
| Giant Bark Aphid            |             | See under CHESTNUT.  |  |                              |
| Cottonwood Leaf Beetle      | L<br>P<br>A | Larvae feed in groups; leaves skeletonized by young larvae. Older larvae consume entire leaf except veins. | Orthene, Sevin, Carbaryl, Talstar, Dursban, Conserve SC  | April, May, September        |
| Imported Willow Leaf Beetle |             |  |  |                              |

**Table 1. Ornamental Pests**

| Host & Pest                          | Stage       | Where to Treat  | What to Use   | When to Treat  |
|--------------------------------------|-------------|---|---|--|
| WILLOW and POPLAR, Cont'd.           |             |   |   |  |
| Twospotted Spider Mite               | E<br>N<br>A | Heavy infestation causes browning and cupping of undersides of leaves.                        | Kelthane, Hexygon, horticultural oil, Isotox IV, insecticidal soap, Ornamite (field & nursery), Avid, Talstar, Scimitar, Floramite, Ovation SC, TetraSan, Judo, Forbid      | May-September<br>Two to three sprays made 5 days apart. Do not use horticultural oil more than once per week. Hexygon should only be used once per crop cycle or once per year and since it is predominantly ovicidal/larvicidal, it should be applied prior to adult mite buildup. If adult mites are present in medium to high populations or if all life stages are present, apply Hexygon or TetraSan in combination with a registered contact adult miticide. |
| Willow Sawfly                        | E<br>L<br>A | Young larvae feed in colonies; entire leaf eaten.   | Diazinon, Malathion, Talstar, Tempo, Tempo SC Ultra, Decathlon, Conserve SC, Orthene, SpinTor, Merit, Marathon, Discus  | May-September  |
| Elm Sawfly                           | L<br>A      | Feed on bark of small twigs and leaves.   | Malathion, Diazinon, Talstar, Tempo, Tempo SC Ultra, Decathlon, Conserve SC, Orthene, SpinTor, Merit, Marathon, Discus  | May, August  |
| Willow Shoot Sawfly                  | E<br>L      | Larvae bore in pith killing shoots.   | Diazinon, Talstar, Tempo, Tempo SC Ultra, Decathlon, Conserve SC, Orthene, SpinTor, Merit, Marathon, Discus   | May, June  |
| Poplar Tentmaker                     | L           | Feed on the foliage of poplar and willow. They make a protective nest out of leaves and silk. | Dursban, Othene, Sevin, Carbaryl, Bt (Dipel, Javelin and others), Malathion, Diazinon, Tempo, Decathlon, Talstar, Scimitar, permethrin ( Astro and others), Tempo SC Ultra  | May-October  |
| Cottonwood Borer (roundheaded borer) | A<br>L      | Base of trunk under bark; base of tree riddled by tunnels.                                    | Thiodan, Dursban, permethrin (Astro and others)   | early June, mid-July   |
| YEW                                  |             |   |   |  |
| Asiatic Garden Beetle                | L & A       | Foliage stripped off at night by adult, roots cut by white grub                               | Sevin, Orthene, Dursban   | May-July   |
| Taxus Mealybug                       | N           | Bark of trunk and large branches  | dormant oil   | February-March   |
|                                      | N           | Bark of small branches and twigs  | Orthene, Malathion, Sevin, Carbaryl, Diazinon, Thiodan, Merit (not for commercial nurseries), Discus, Marathon (nursery beds, flats, containers), Flagship, TriStar, Safari | May, July  |

**Table 1. Ornamental Pests**

| Host & Pest                                     | Stage    | Where to Treat   | What to Use   | When to Treat  |
|---|----------|--|---|--|
| YEW, Cont'd.                                    |          |  |   |  |
| Cottony Taxus Scale<br>(cottony camellia scale) | N        | Bark of twigs and branches of taxus  | dormant oil   | February-March   |
|   | N        | Same as above  | Sevin, Carbaryl, Dursban, Tempo, Decathlon, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), horticultural oil, Tempo SC Ultra, Flagship, Safari | May-June   |
| Taxus Weevil<br>(Black Vine Weevil)             | A        | Foliage, bark of trunk and branches, and the surfaces of ground beneath where beetles walk after emerging. Adults notch the edges of leaves. | Thiodan, Tempo, Decathlon Diazinon, Orthene, Dursban, Talstar, Tempo SC Ultra, Mavrik Aquaflow  | May-September<br>Treat every three weeks until no adults are found.<br><br>If adults can overwinter in container plants in polyhouses begin treatments in March-April. |
|   | L        | Roots  | DeltaGard G, Merit (not for commercial nurseries), Marathon (nursery beds, flats, containers), Discus, Furadan 4F, (container grown), parasitic nematodes                         | May-September  |
| Fletcher Scale                                  | N        | See under ARBORAVITAE  | see under ARBORAVITAE   |  |
|   | C        | See under ARBORAVITAE  | see under ARBORAVITAE   |  |
| YUCCA   |          |  |   |  |
| Termites  | N & A    | Roots, lower trunk   | Dursban (1% soil drench)  | April  |
| Yucca Plant Bug                                 | E, N & A | Leaves and stems   | Orthene, Sevin, Carbaryl  | May-October  |
| Stalk Borer                                     | L        | Tunnels in the stems, wilted plants have a hole in stem from which frass has been extruded   | Diazinon, Dursban, Talstar, Tempo, Decathlon, Tempo SC Ultra  | May-June   |
| Scale   | C        | Stems and leaves   | Sevin, Carbaryl, Malathion, Dursban, Orthene, horticultural oil, Safari   | April-June<br>August   |

## Table 2. Insect and Mite Control Recommendations for Flowers

Listed Insecticides can be easily measured and/or mixed in amounts sufficient to treat small to medium size areas

| Pest  | Insecticide Formulations                                | Amount to Use per Gallon           | Precautions and Remarks  |
|---|---|------------------------------------|--|
| ANTS  | Malathion 57% EC  | 2 tsp                              | Locate nests or trails. Apply as a localized treatment to nesting area. A general area treatment may be necessary. Slow acting insecticide baits are recommended for certain ants including imported fire ants. See Commercial Turfgrass Insect Control, PB1342.   |
| APHIDS  | Malathion 57% EC  | 2 tsp                              | Repeat applications are usually needed. Malathion is ineffective during cool, wet weather. Use Orthene with caution on Gloxinia, Philodendron and Salvia when repeated applications are needed. Dimethoate should not be applied to chrysanthemums or any other plant not on the label. Dimethoate is for commercial ornamental (nursery) use. |
|   | Orthene 9.4% EC   | 2 Tbs                              |  |
|   | Dimethoate 400 4 lb/gal EC                              | See label                          |  |
|   | horticultural oil (SunSpray Ultra-Fine Spray Oil)       | 2.5-5 Tbs                          |  |
|   | Marathon 60% WP   | see label                          |  |
|   | Marathon II   | see label                          |  |
|   | Merit 75% WP  | 0.25 tsp/2.5 gal                   |  |
|   | Merit 2 lb/gal F  | 0.46-0.6 fl oz per 1000 sq ft      |  |
|   | Discus  | see label                          |  |
|   | Safer Insecticidal Soap                                 | 5 Tbs                              |  |
| ARMYWORMS   | Sevin 80% WP  | 2 1/2 Tbs/3 gal for each 100 sq ft | Sevin injures Boston ivy, Virginia creeper and maidenhair ferns.   |
|   | Orthene 9.4% EC   | 3 Tbs                              | Spray when insects are present or when feeding injury is first noticed.  |
|   | Conserve 1 lb/gal SC                                    | 0.06 fl oz (2 ml)                  |  |
| BLISTER BEETLE<br>JUNE BEETLE<br>JAPANESE BEETLE<br>FLEA BEETLE | Sevin 50% WP  | 2 Tbs                              | See precautions under Armyworms.   |
| CABBAGE LOOPER  | Sevin 50% WP  | 2 Tbs                              | Spray when worms are 1/8 to 1/4 inch long. Mature worms 1/2 to 1 inch long are difficult to control. Hand pick and destroy to protect flowers.   |
|   | Bacillus thuringiensis, Bt (Javelin WG, Steward, Dipel) | Follow label                       |  |
|   | Conserve 1 lb/gal SC                                    | 0.06 fl oz (2 ml)                  |  |
| CANNA LEAF ROLLER   | Orthene 9.4% EC   | 3 Tbs                              |  |
| CORN EARWORM  | Conserve 1 lb/gal SC                                    | 0.06 fl oz (2 ml)                  |  |
|   | Sevin 50% WP  | 2 Tbs                              | Spray thoroughly and repeat as needed.   |
| EUROPEAN CORN BORER   | Conserve 1 lb/gal SC                                    | 0.06 fl oz (2 ml)                  |  |
|   | Sevin 50% WP  | 2 Tbs                              | Spray thoroughly   |

**Table 2. Insect and Mite Control Recommendations for Flowers**

| <b>Pest</b>                    | <b>Insecticide Formulation</b>                    | <b>Amount to Use per Gallon</b> | <b>Precautions and Remarks</b>   |
|--------------------------------|---|---------------------------------|--|
| COMMON STALK BORER             | Orthene 9.4% EC                                   | 3 Tbs                           |  |
| IRIS BORER                     | Dimethoate 400 4 lb/gal EC                        | see label                       | Apply to foliage in early spring when leaf fans are about 6 inches tall. Repeat in 10 to 14 days. Rogue infested, decaying tubers from bed and destroy. Remove leaf litter and plant debris from bed in late fall. |
| LEAFHOPPER                     | Orthene 9.4% EC                                   | 3 Tbs                           | Apply to foliage as needed. See precautions under aphids.  |
|                                | Dimethoate 400 4 lb/gal EC                        | see label                       |  |
| LEAFMINERS                     | Orthene 9.4% EC                                   | 3 Tbs                           | Apply to foliage thoroughly - kills larvae in leaves. Only use Dimethoate on plants listed on the label.<br>Dimethoate is for commercial ornamental (nursery) use.   |
|                                | Dimethoate 400 4 lb/gal EC                        | see label                       |  |
|                                | Marathon 60% WP                                   | see label                       |  |
|                                | Merit 75% WP                                      | 0.25 tsp/2.5 gal                |  |
|                                | Merit 2 lb/gal F                                  | 0.46-0.6 fl oz per 1000 sq ft   |  |
|                                | Marathon II                                       | see label                       |  |
|                                | Discus  | see label                       |  |
| PLANT BUGS                     | Sevin 50% WP                                      | 2 Tbs                           | Apply to foliage as needed.  |
|                                | Malathion 57% EC                                  | 2 tsp                           |  |
|                                | Orthene 9.4% EC                                   | 3 Tbs                           |  |
|                                | Pyrethrins  | see label                       |  |
| SLUGS AND SNAILS               | Metaldehyde + Sevin B                             | Follow label directions         | Apply baits around plant bed borders in early evening. Moisten bait with a mist spray. Remove boards, plant debris and leaf litter from area to permit soil to dry and to reduce shelter for pests.                |
|                                | Mesurool 75% WP                                   | 2 lb/acre in 50 gal water       |  |
| SOWBUG, PILLBUGS AND MILLIPEDE | Sevin 50% WP                                      | 2 Tbs                           | Spray or dust flower beds, leaf litter, lawn areas around house and flower beds.   |
| SPIDER MITES                   | horticultural oil (SunSpray Ultra-Fine Spray Oil) | 2.5-5 Tbs                       | Spray foliage thoroughly when infestation appears. Two to three sprays made 5 days apart. Do not use horticultural oil more than once per week.  |
|                                | Kelthane 50% WP                                   | 1 Tbs                           |  |
|                                | Mavrik 22.3% F                                    | 1.33-3 tsp/5 gal                |  |
|                                | Avid 0.15 lb/gal EC                               | 0.24 tsp                        |  |
|                                | Floramite 50% WP                                  | 1/3-2/3 tsp.                    |  |
|                                | Talstar 7.9% F                                    | 0.66-3 tsp                      |  |
|                                | Safer Insecticidal Soap                           | 5 Tbs                           |  |
|                                | Ovation SC  | see label                       |  |
| Isotox IV                      | 3 Tbs   |                                 |  |

**Table 2. Insect and Mite Control Recommendations for Flowers**

| <b>Pest</b>          | <b>Insecticide Formulation</b>                    | <b>Amount to Use per Gallon</b> | <b>Precautions and Remarks</b>  |
|----------------------|---|---------------------------------|---|
| SPITTLEBUGS          | Orthene 9.4% EC                                   | 3 Tbs                           | Spray foliage when infestation occurs.  |
| SCALE INSECTS        | horticultural oil (SunSpray Ultra-Fine Spray Oil) | 2.5-5 Tbs                       | Spray when infestation occurs. Spray when scale crawlers are migrating on plants.   |
|                      | Malathion 57% EC                                  | 2 tsp                           |   |
|                      | Safer Insecticidal Soap                           | 5 Tbs                           |   |
|                      | Marathon 60% WP                                   | see label                       |   |
|                      | Marathon II                                       | see label                       |   |
|                      | Merit 75% WP                                      | 0.25 tsp/2.5 gal                |   |
|                      | Merit 2 lb/gal F                                  | 0.46-0.6 fl oz per 1000 sq ft   |   |
|                      | Discus  | see label                       |   |
| MEALYBUGS            | horticultural oil (SunSpray Ultra-Fine Spray Oil) | 2.5-5 Tbs                       |   |
|                      | Malathion 50% EC, 57% EC                          | 2 tsp                           |   |
|                      | Safer Insecticidal Soap                           | 5 Tbs                           |   |
|                      | Orthene 9.4% EC                                   | 3 Tbs                           |   |
|                      | Marathon 60% WP                                   | see label                       |   |
|                      | Marathon II                                       | see label                       |   |
|                      | Merit 75% WP                                      | 0.25 tsp/2.5 gal                |   |
|                      | Merit 2 lb/gal F                                  | 0.46-0.6 fl oz per 1000 sq ft   |   |
| NARCISSUS BULB FLIES | Dylox 80% SP                                      | 0.2 oz                          |   |
| THRIPS               | Azatin XL 3% EC                                   | 0.6-1 tsp                       | Spray foliage and buds when pest occurs. Repeat sprays will be needed. Only use Dimethoate on plants listed on the label.<br><b>Dimethoate is for commercial (nursery) use.</b> |
|                      | Bioneem 0.3% EC                                   | 2.5-5 tsp                       |   |
|                      | Orthene 9.4% EC                                   | 3 Tbs                           |   |
|                      | Malathion 57% EC                                  | 2 tsp                           |   |
|                      | Sevin 50% WP                                      | 2 Tbs                           |   |
|                      | Dimethoate 400 4 lb/gal EC                        | see label                       |   |
|                      | Conserve 1 lb/gal SC                              | 0.06 fl oz (2 ml)               |   |

**Table 2. Insect and Mite Control Recommendations for Flowers**

| <b>Pest</b> | <b>Insecticide Formulation</b>                    | <b>Amount to Use per Gallon</b> | <b>Precautions and Remarks</b>  |
|-------------|---|---------------------------------|---|
| WHITEFLIES  | Orthene 9.4% EC                                   | 1 Tbs                           | Spray underside of leaves when pests appear. Repeat when infestation occurs throughout season. Only use Dimethoate on plants listed on the label. Dimethoate is for commercial (nursery) use. |
|             | Dibrom 8 lb/gal EC                                | 2 tsp                           |   |
|             | Dimethoate 400 4 lb/gal EC                        | 2 tsp                           |   |
|             |   | see label                       |   |
|             | Bioneem 0.3% EC                                   | 2.5-5 tsp                       |   |
|             | horticultural oil (SunSpray Ultra-Fine Spray Oil) | 2.5-5 Tbs                       |   |
|             | insecticidal soap                                 | 5 Tbs                           |   |
|             | Marathon 60% WP                                   | see label                       |   |
|             | Marathon II                                       | see label                       |   |
|             | Merit 75% WP                                      | 0.25 tsp/2.5 gal                |   |
|             | Merit 2 lb/gal F                                  | 0.46-0.6 fl oz per 1000 sq ft   |   |
| Discus      | see label   |                                 |   |
| WEBWORMS    | Dylox 80% SP                                      | 0.2-0.3 oz                      | Spray foliage when insects appear.  |



## Preparing A Spray

Pesticides are formulated as emulsifiable concentrates or wettable powders for dilution in water or as granules to be applied on or in the soil. Accurately measure the amount recommended for the volume of dilute spray you need. The concentrates may contain either one, two, three, four or seven pounds per gallon of the active insecticidal ingredient. The safety margin is reduced considerably when too much insecticide is added to the dilute spray. Injury to plants and overexposure to the home gardener frequently results from using too much insecticide.

Read the label thoroughly before you mix a spray. The four most important minutes in any pest control project are the time required to read and understand the label.

Overexposure to insecticides can result from oral ingestion, inhalation or absorption through the skin.

The amount any one individual can tolerate without becoming ill may vary according to age, weight, sex and health. The potential toxicity is based on test results with experimental animals. The insecticides Di-Syston, Metasystox-R2 and Diazinon have a high dermal absorption potential. The oral poisoning potential for these insecticides is extremely high. Observe the caution and warning statements on all insecticide labels. Wear the prescribed protective equipment and apply the insecticides in recommended situations according to label directions.

The potential toxicity is increased many times when the amount recommended for a spray application is doubled. Mixing two or more insecticides together can also greatly increase the potential toxicity of a spray.

**Table 3. Spray Estimate Chart**

Estimate the amount of dilute spray material required to thoroughly cover your infested plants to the point of run-off. When the spray begins to drip off, you have applied a sufficient amount. A fine-mist spray will give a better, more uniform coverage to the plant.

| Spraying Trees or Shrubs | Height of Plant (Feet)                            | Spread of Plant | Square Feet of Bark Surface | Volume Needed (Gallons) |
|--------------------------|---|-----------------|-----------------------------|-------------------------|
| Foliage Spray            | 50  | 60              |                             | 25                      |
| Dilute Spray             | 30  | 35              |                             | 20                      |
| Fine-Mist Spray          | 25  | 30              |                             | 15                      |
|                          | 19  | 26              |                             | 14                      |
|                          | 16  | 24              |                             | 13                      |
|                          | 13  | 20              |                             | 12                      |
|                          | 10  | 16              |                             | 8                       |
|                          | 8   | 12              |                             | 6                       |
|                          | 6   | 8               |                             | 4                       |
|                          | 4   | 3               |                             | 1/2                     |
| Bark Spray               |   |                 | 80-125                      | 1 pint                  |
| Borers                   | Trunk up to and including lower limbs of scaffold |                 | 80-125                      | 1 pint                  |

**Table 4. Pesticide Formulations**

| Common Name            | Class    | Brand Names   | Formulations                                    | Amounts to Use   |                                       |
|------------------------|----------|---|---|--|---------------------------------------|
|                        |          |   |   | 100 gallons  | 1 gallon                              |
| acephate               | OP       | Orthene Turf, Tree & Ornamental Spray                           | 75% SP  | 1/3-1 1/3 lb   | 1-4 tsp                               |
| acephate plus hexakis  | OP<br>OG | Isotox IV   | 8% acephate plus<br>0.5% hexakis                | ----   | 3 Tbs                                 |
| acetamiprid            | CN       | TriStar 70WSP   | 70% WSP   | 1 packet for aphids, European pine sawflies, 2 packets for tentform leafminer, mealybug, leafhopper, 2-4 packets for whiteflies, 3-6 packets for citrus thrips         | ----                                  |
| avermectin B1          | B        | Avid  | 0.15% EC  | 4 fl oz  | 0.24 tsp                              |
| azadirachtin           | BOT      | Ornazin 3% EC<br>OHP Azatin XL<br>Bioneem                       | 3% EC<br>3% EC<br>0.3% EC                       | 8-10 fl oz<br>10-16 fl oz<br>10-16 fl oz   | 0.5-0.6 tsp<br>0.6-1 tsp<br>2.5-5 tsp |
| Bacillus thuringiensis | B        | Dipel Pro DF  | 54% DF  | 0.25-2 lb/acre   | 0.5-4 tsp                             |
| bifenazate             | CBZ      | Floramite   | 50% WP  | 2-4 oz   | ----                                  |
| bifenthrin             | P        | Talstar F<br><br>Talstar One<br><br>Talstar Nursery<br><br>Onyx | 7.9% F<br><br>7.9% F<br><br>7.9% F<br><br>23.4% | 5.4-43.5 fl oz<br><br>5.4-43.5 fl oz<br><br>5-40 fl oz per acre<br><br>0.26-1.28 fl oz/10 gal<br>6.4-12.8 fl oz/100 gal<br>for clearwing borers and Coleopteran borers | ----                                  |
| carbaryl               | Car      | Carbaryl<br>Sevin   | 80% S<br>4 lb/gal SL                            | 1 1/4 lb<br>1 qt   | 1 1/4 Tbs<br>2 tsp                    |
| carbofuran             | Car      | Furadan 4F  | 4lb/gal F                                       | 1-2 fl oz<br>Apply as a soil drench to container grown ornamentals   | ---                                   |

**Table 4. Pesticide Formulations**

| Common Name     | Class | Brand Names  | Formulations                              | Amounts to Use   |                          |
|-----------------|-------|--|---|--|--------------------------|
|                 |       |  |   | 100 gallons  | 1 gallon                 |
| chlorpyrifos    | OP    | Chlorpyrifos 4E AG   | 4 lb/gal EC                               | 1 qt per acre, 3 qt as a cut stump drench for pales weevil. For use on listed firs, spruce, and tree species     | 1/3 fl oz, 1 fl oz       |
|                 |       | Dursban 50 W   | 0% WSP                                    | 0.5-1 lb<br>2 lb<br>6 lb<br>16 lb  | ---<br>---<br>---<br>--- |
|                 |       | Lorsban 4E   | 4 lb/gal EC                               | 1 qt/acre<br>3 qt as a cut stump drench for pales weevil<br>For use on listed fir, spruce, and pine tree species | 1/3 fl oz<br>1 fl oz     |
| Clofentezine    |       | Ovation SC   | 4 lb/gal SC                               | 2 fl oz  | ----                     |
| beta-cyfluthrin | P     | Tempo SC Ultra   | 1 lb/gal SC                               | 1.5 fl oz (45 ml)  | ---                      |
| cyfluthrin      | P     | Tempo 20 WP  | 20% WP                                    | 1.3-1.9 oz   | ---                      |
|                 |       | Decathlon 20WP   | 20% WP                                    | 1.3-1.9 oz   | ---                      |
| deltamethrin    | P     | DeltaGard G  | 0.1% G                                    | 2-3 lb/1,000 sq ft   | ---                      |
|                 |       | DeltaGard T&O  | 4.75% SC                                  | 4-8 oz   | ---                      |
| diazinon        | OP    | D-264 4EC<br>Diazinon Insecticide  | 4 lb/gal EC                               | 1-3 pt   | 1-3 tsp                  |
| diflubenzuron   | IGR   | Dimilin  | 25 W                                      | 2-8 oz/acre  | ----                     |
|                 |       |  | 4 L                                       | 1-4 fl oz/acre   | ----                     |
| dicofol         | CH    | Kelthane   | 50% WSP                                   | 0.5-1 lb   | ----                     |
| dinotefuran     | CN    | Safari   | 20 SG                                     | Foliar spray   | ----                     |
|                 |       |  |   | 0.25-0.5 lb<br>Drench<br>0.75-1.5 lbs  | ----                     |
| dimethoate      | OP    | Dimethoate   | 2.67 lb/gal EC                            | ----   | 0.75-3 fl oz/6 gal water |
| dormant oil     | misc. | Volck-Saybolt reading of 90-150 sec. (viscosity test 60 cc through standard opening at 1000 F.)<br>90-92% unsulfonatable residues = Superior; 60-85% = Regular | 70-90 sec.<br>80-90 % oil<br>+ emulsifier | 2-4% oil in finished spray mixture   |                          |
| endosulfan      | CH    | Thiodan  | 50% WP                                    | 1-2 lb   | 1-2 Tbs                  |
| esfenvalerate   | P     | Asana XL   | 0.66 lb/gal EC                            | 5.8-9.6 fl oz  | 0.35-0.58 tsp            |
| etoxazole       | IGR   | TetraSan 5 WPG   | 5% WDG                                    | 8-16 oz<br>(4-8 packets)   | ---                      |

**Table 4. Pesticide Formulations**

| Common Name                   | Class   | Brand Names   | Formulations                                | Amounts to Use  |  |
|-------------------------------|---------|---|---|---|--|
|                               |         |   |   | 100 gallons   | 1 gallon   |
| fenpropathrin                 | P       | Tame 2.4 EC   | 2.4 lb/gal EC                               | 5.33-10.66 fl oz<br><br>8-16 fl oz for two-spotted spider mite, Southern red mite                     |  |
| fluvalinate                   | P       | Mavrik Aquaflow   | 22.3% F                                     | 4-10 fl oz  | 1.33-3 tsp/5 gal                                       |
| gamma isomer of BHC - lindane | CH      | Lindane   | 20% EC                                      | 1 pt  | 1 tsp  |
| hexythiazox                   | CAR     | Hexygon   | 50% WP                                      | 1-2 oz  | --   |
| horticultural oil             | misc.   | SunSpray Ultra-Fine Oil<br>Saybolt reading of 45-85 sec.<br>90-98% unsulfonatable residues<br><br>Superior oils have a high content of paraffinic hydrocarbons with relatively small amounts of aromatic or naphthalenic constituents. These oils are less phytotoxic than the aromatic or naphthalenic oils. | 98.8% paraffinic oil                        | 1-2% oil in finished spray mixture<br><br>Use 4 gallons oil in 100 gallons water for a dormant spray. | 2.5-5 Tbs<br><br>10 Tbs                                |
| imidacloprid                  | CN      | Merit 2<br><br>Merit 75 WP<br>Marathon 1% Granular<br>Marathon 60WP   | 2 lb/gal F<br><br>75% WP<br>1% G<br>60% WSP | 1.5 fl oz for foliar sprays<br>See label drench rate<br>3.5 Tbs<br>See label<br>See label             | --<br>--<br>0.25 tsp/2.5 gal<br>See label<br>See label |
| imidacloprid plus cyfluthrin  | CN<br>P | Discus  | 2.94% L<br>0.70% L                          | see label   | see label  |
| insecticidal soap             | misc.   | M-Pede  | 49% a.i.                                    | 1-2% insecticidal soap in finished spray mixture. (i.e. 2 gal soap in 98 gal water)                   |  |
|                               |         | Insecticidal Soap   | 49.52% CF                                   | see label   | --   |
|                               |         | Safer Insecticidal Soap   | 49% a.i.                                    | --  | 5 Tbs  |
| lambda-cyhalothrin            | P       | Scimitar<br>Scimitar CS<br>Scimitar GC  | 10% WP<br>9.7% CS<br>9.7% GC                | 1.2-4.8 oz<br>1.5-5 fl oz<br>1.5-5 fl oz  | ----<br>----<br>----                                   |
| malathion                     | OP      | Malathion   | 57% EC<br>50% EC                            | 1-4 pt<br>1-4 pt  | 2-4 tsp<br>1-4 tsp                                     |
| methiocarb                    | CAR     | Mesurol   | 75% WP                                      | 2 lb/acre in 50 gal water   | --   |
| naled                         | OP      | Dibrom 8 Emulsive   | 8 lb/gal EC                                 | 1 pt  | 1 tsp  |
| oxydemeton-methyl             | OP      | Metasystox-R2   | 2 lb/gal EC                                 | 1-1.5 oz/inch of trunk diameter   | --   |
| parasitic nematode            | B       | Guardian<br>Nemasys H   | Steinernema spp.<br>Heterorhabditis megidis | see label<br>see label  | see label<br>see label                                 |

**Table 4. Pesticide Formulations**

| Common Name              | Class | Brand Names                                   | Formulations   | Amounts to Use  |                      |
|--------------------------|-------|---|--|---|----------------------|
|                          |       |   |  | 100 gallons   | 1 gallon             |
| permethrin               | P     | Astro T & O, Pounce, Ambush, Dragnet, Perm-Up | 25% WP<br>3.2 lb/gal EC  | 0.1-0.2<br>4-8 oz<br>1-2 qts (Dragnet for listed bark beetles and borers)<br>1-2 qts (Perm-Up for clearwing moth borers)<br>2-5 qts (Perm-Up for bark beetles, bronze birch borer and flatheaded appletree borer) | --<br>--<br>--<br>-- |
| phosmet                  | OP    | Imidan  | 70% WSB  | 0.75-1 lb for deciduous shade and ornamental trees.<br>1.33 lb/acre for Christmas tree plantations. 4% top dip, dripping down to and including root collar only for white, slash and loblolly pine seedlings.     | --                   |
| propargite               | misc. | Ornamite                                      | 30% WSB  | 3-7.5 lb/acre/100 gal for Christmas trees and conifers only.<br>2-5 lb/acre/50-300 gal for field grown roses.<br>1 lb/100 gal for other ornamentals (field & nursery).  | --                   |
| pymetrozine              | PYAZ  | Endeavor                                      | 50% WDG  | 2.5-5 oz with a 7 day retreatment interval for severe insect pressure.<br>10 oz/acre with a 14 day retreatment interval for normal insect pressure.   | ---<br>---           |
| pyrethrins               | BOT   | Pyrenone                                      | 6% Pyrethrin plus<br>60% PBO EC                                      | 12-24 oz  | 1-2 tsp              |
| pyrethrins plus rotenone | BOT   | Pyrellin E.C.                                 | 0.6% pyrethrins plus<br>0.5% rotenone plus<br>0.5% other cube resins | 1-2 pt/acre   | --                   |

**Table 4. Pesticide Formulations**

| Common Name  | Class | Brand Names     | Formulations | Amounts to Use   |   |
|--------------|-------|-----------------|--------------|--|---|
|              |       |                 |              | 100 gallons  | 1 gallon  |
| spinosad     | spin  | Conserve SC     | 1 lb/gal SC  | 6 fl oz for chrysomelid leaf feeding beetles, lepidopterous larvae, sawfly larvae and thrips.<br>11 fl oz for dipterous gall midges<br>22 fl oz for dipterous leafminers and spider mites. Addition of a nonionic spray adjuvant such as DYNE-AMIC at 0.1% v/v in greenhouse settings and at label rate in outdoor settings has been shown to enhance control of spider mites. | 0.06 fl oz (2 ml)<br><br>0.1 fl oz (3 ml)<br>0.2 fl oz (6 ml) |
|              |       | SpinTor 2SC     | 2 lb/gal SC  | 2-8 fl oz per acre for Lepidopterous larvae such as fall webworm, gypsy moth and others and sawfly larvae, such as European pine sawfly, pear sawfly and redhead pine sawfly.  | ---   |
| spiromesifen | tet   | Judo, Forbid 4F | 4 lb/gal F   | 2-4 fl oz  | 3-6 ml/5 gallons of spray solution                            |

**Table 4. Pesticide Formulations**

| Common Name  | Class | Brand Names   | Formulations                  | Amounts to Use  |          |
|--------------|-------|---------------|-------------------------------|---|----------|
|              |       |               |                               | 100 gallons   | 1 gallon |
| tebufenozide | IGR   | Mimic 2 LV    | 2 lb/gal LV                   | 4-8 fl oz per acre for browntail moth, elm spanworm, fall cankerworm, fall webworm, forest tent caterpillar, Eastern tent caterpillar, gypsy moth, puss caterpillar, Zimmerman pine moth, spruce budworm and tussock moths.                               | ---      |
|              |       | Confirm 2F    | 2 lb/gal water-based flowable | 8 fl oz per acre for pine tip moths such as Nanutket pine tip moth, European pine shoot moth and several others.<br><br>For Christmas trees only.<br>4-8 fl oz/acre for gypsy moth, spruce budworm, and tussock moth. 8-16 fl oz/acre for pine tip moths. | ---      |
| thiamethoxam | CN    | Flagship 25WG | 25% WG                        | 2-4 oz for aphids, lace bugs, white- flies, mealybugs, soft scales, sawflies.<br>4 oz for leafhoppers, plant bug, honeylocust pod gall, hemlock woolly adelgid, nipple gall and blister gall.   | ---      |
| trichlorfon  | OP    | Dylox 80      | 80% SP                        | 20-30 oz for Nantucket pine tip moth and zimmerman pine moth. 20-30 oz for bagworms, dipterous leafminers, tarnished plant bugs and other listed pests.   | ---      |

OP - Organophosphate  
P - Pyrethroid  
IGR - Insect Growth Regulator  
B - Biological agent  
Misc. - Miscellaneous  
PYAZ - Pyridine azomethine  
OG - Organotin  
tet - tetronic acid derivative

CH - Chlorinated Hydrocarbon  
Bot - Botanical  
Car - Carbamate  
CN - Chloro-nicotinyl  
CBZ - Carbazate  
Spin - Spinosyn

## Dilution Tables — A Guide to Accurate Measures

### Wettable Powders

Number of ounces of wettable powder to use in small sprayers when amount per 100 gallons is known.

| 100 Gal | 10 Gal | 5 Gal | 2 Gal | 1 Gal |
|---------|--------|-------|-------|-------|
| 0.5 lb  | 0.8    | 0.4   | 0.2   | 0.1   |
| 1 lb    | 1.6    | 0.8   | 0.3   | 0.2   |
| 2 lb    | 3.2    | 1.6   | 0.6   | 0.3   |
| 3 lb    | 4.8    | 2.4   | 1.0   | 0.5   |
| 4 lb    | 6.4    | 3.2   | 1.3   | 0.6   |
| 5 lb    | 8.0    | 4.0   | 1.6   | 0.8   |

### Emulsifiable Concentrates

Number of fluid ounces of emulsifiable concentrate to use in small sprayers when amount per 100 gallons is known.

| 100 Gal | 10 Gal | 5 Gal | 2 Gal | 1 Gal |
|---------|--------|-------|-------|-------|
| 1 pt    | 1.6    | 0.8   | 0.3   | 0.2   |
| 1 qt    | 3.2    | 1.6   | 0.7   | 0.3   |
| 2 qt    | 6.4    | 3.2   | 1.3   | 0.6   |
| 1 gal   | 12.8   | 6.4   | 2.6   | 1.3   |

### Mist Blower

Quantity of emulsifiable concentrate (EC) needed to make a 25X concentration.

| If Amount per 100 Gal for a High volume Sprays is: | Use This Amount in a Mist Blower for: |         |         |         |
|--|---------------------------------------|---------|---------|---------|
|  | 25 Gal                                | 10 Gal  | 2 Gal   | 1 Gal   |
| 1 pt   | 6.25 pt                               | 2.5 pt  | 8 fl oz | 4 fl oz |
| 1 qt   | 6.25 qt                               | 5.0 pt  | 1 pt    | 8 fl oz |
| 2 qt   | 3.13 gal                              | 5.0 qt  | 1 qt    | 1 pt    |
| 1 gal  | 6.25 gal                              | 2.5 gal | 2 qt    | 1 qt    |

### Table of Measures

#### Liquids

- 1 level tablespoonful = 3 level teaspoonfuls
- 1 fluid ounce = 2 tablespoonfuls = 29.57 milliliters
- 1 cupful = 8 fluid ounces
- 1 pint = 2 cupfuls = 16 fluid ounces
- 1 quart = 2 pints = 32 ounces
- 1 gallon = 4 quarts = 128 fluid ounces

#### Weights

- 1 ounce = 28.3 grams
- 1 lb = 16 ounces = 454 grams
- 1 ton = 2,000 pounds

### Rates to Use To Treat One Acre

| Pounds Actual Pesticide Per Gallon of Liquid Concentrate | Pounds of Pesticide Needed                  |     |     |     |      |    |      |
|--|---|-----|-----|-----|------|----|------|
|  | 1/4   | 1/2 | 3/4 | 1   | 2    | 3  | 4    |
|  | Pints of Liquid Concentrate to Use Per Acre |     |     |     |      |    |      |
| 1  | 2   | 4   | 6   | 8   | 16   | 24 | 32   |
| 1 1/2  | 1.3   | 2.6 | 4   | 5.3 | 10.6 | 16 | 21.3 |
| 2  | 1   | 2   | 3   | 4   | 8    | 12 | 16   |
| 4  | 0.5   | 1   | 1.5 | 2   | 4    | 6  | 8    |

### Rates to Use To Treat One Acre

| Percent Formulation of Wettable Powder | Pounds of Pesticide Needed                |      |      |     |      |     |      |
|--|---|------|------|-----|------|-----|------|
|  | 1/4                                       | 1/2  | 3/4  | 1   | 2    | 3   | 4    |
|  | Pounds of Wettable Powder to Use Per Acre |      |      |     |      |     |      |
| 15%                                    | 1.75                                      | 3.33 | 5    | 6.5 | 13   | 20  | 26.5 |
| 25%                                    | 1   | 2    | 3    | 4   | 8    | 12  | 16   |
| 40%                                    | 0.6                                       | 1.25 | 1.75 | 2.5 | 5    | 7.5 | 10   |
| 50%                                    | 0.5                                       | 1    | 1.5  | 2   | 4    | 6   | 8    |
| 75%                                    | 0.4                                       | 0.7  | 1    | 1.3 | 2.66 | 4   | 5.33 |

### Rates to Use To Treat One Acre

| Percent Formulation of Dust or Granules | Pounds of Pesticide Needed              |     |      |    |    |     |     |
|---|---|-----|------|----|----|-----|-----|
|   | 1/4                                     | 1/2 | 3/4  | 1  | 2  | 3   | 4   |
|   | Pounds of Dust Granules to Use Per Acre |     |      |    |    |     |     |
| 2.5%                                    | 10                                      | 20  | 30   | 40 | 80 | 120 | 160 |
| 5%                                      | 5                                       | 10  | 15   | 20 | 40 | 60  | 80  |
| 10%                                     | 2.5                                     | 5   | 7.5  | 10 | 20 | 30  | 40  |
| 20%                                     | 1.25                                    | 2.5 | 3.75 | 5  | 10 | 15  | 20  |
| 25%                                     | 1                                       | 2   | 3    | 4  | 8  | 12  | 16  |

### Small Gallonage Rates

If an insecticide recommendation is given on the basis of 100 gallons of finished spray but only 1 gallon is wanted, follow this general rule to prepare that 1 gallon of spray:

#### Dry Formulations —

For each 1 pound of powder that is recommended per 100 gallons of water, use 1 level tablespoonful (Tbs) per 1 gallon of spray.

#### Liquid Formulations —

For each 1 pint that is recommended per 100 gallons of water, use 1 teaspoonful (tsp) per gallon of spray.



**Table 5. Information About Insecticides/Miticides**

| Pesticide<br>(Common Chemical Name)     | Trade Name(s)                                     | Classification  | Oral<br>LD <sub>50</sub> <sup>1</sup><br>(mg/kg) <sup>2</sup> | Dermal<br>LD <sub>50</sub> <sup>1</sup><br>(mg/kg) <sup>2</sup> | Manufacturer        |
|---|---|---|---|---|---------------------|
| abamectin                               | Avid  | microbial toxins                                      | 650   | >2000   | Syngenta            |
| acephate                                | Isotox IV, Orthene                                | organophosphate                                       | 980   | 10,250  | Valent, Ortho       |
| acetamiprid                             | TriStar   | chloronicotinyl                                       | 1,064   | >2000   | Cleary              |
| azadiractin (=neem, azatin)             | Bioneem, Azatin XL                                | botanical   | >5000   | >2000   | OHP, Safer          |
| Bacillus thuringiensis<br>var. kurstaki | Biobit,<br>Dipel, Javelin,<br>and possibly others | spores + crystalline<br>delta-endotoxin,<br>microbial | none  | none  | Valent,<br>Syngenta |
| bifenazate                              | Floramite   | carbazate   | ---   | ---   | Chemtura Corp.      |
| bifenthrin                              | Talstar, Onyx                                     | pyrethroid  | 375   | >2000   | FMC                 |
| carbaryl                                | Carbaryl, Sevin                                   | carbamate   | 246   | >4000   | Baxter, Drexel      |
| chloryrifos                             | Dursban, Lorsban                                  | organophosphate                                       | 270   | 2000  | Dow AgroSciences    |
| cryolite                                | Kryocide  | inorganic fluoroine                                   | practically nontoxic  |   | Atochem             |
| cyfluthrin                              | Decathlon, Tempo                                  | pyrethroid  | 826   | >2000   | Dow AgroSciences    |
| deltamethrin                            | DeltaGard G                                       | pyrethroid  | 128.5 to<br>>5000   | >2000   | Aventis             |
| diazinon                                | Diazinon, Spectracide                             | organophosphate                                       | 400   | 3600  | Drexel, Syngenta    |
| dicofol                                 | Kelthane  | chlorinated<br>hydrocarbon                            | 595   | >5000   | Dow AgroSciences    |
| dicrotophos                             | INJECT-A-CIDE B                                   | organophosphate                                       | 17  | 224   | DuPont, Mauget      |
| diflubenzuron                           | Dimilin   | insect growth<br>regulator                            | >4640   | >10,000   | Chemtura Corp.      |
| dimethoate                              | Dimethoate  | organophosphate                                       | 235   | >400  | Platte, Loveland    |
| dinotefuran                             | Safari  | chloronicotinyl                                       | >2000   | >2000   | Valent              |
| endosulfan                              | Phaser, Thiodan                                   | chlorinated<br>hydrocarbon                            | 160   | 359   | FMC, Hoechst        |
| esfenvalerate                           | Asana XL  | pyrethroid  | 458   | >2000   | DuPont              |
| etoxazole                               | TetraSan  | insect growth<br>regulator                            | 4,500<br>(male<br>rat)<br>2,600<br>(female<br>rat)            | >5,000  | Valent              |
| fenetrothion                            | Pestroy   | organophosphate                                       | 800   | 1300  | PBI-Gordon          |
| fluvalinate                             | Mavrik Aquaflo                                    | pyrethroid  | 282   | 20,000  | Syngenta            |
| hexythiazox                             | Hexygon   | carboxamide   | 5000  | >5000   | Gowan               |
| imidacloprid                            | Marathon, Merit                                   | chloronicotinyl                                       | 2591  | >2000   | Bayer, OHP          |
| imadacloprid plus cyfluthrin            | Discus  | chloronicotinyl plus<br>pyrethroid                    | >5,000  | >5,030  | OHP                 |
| lambda-cyhalothrin                      | Scimitar  | pyrethroid  | 79  | 632   | Syngenta            |
| malathion                               | Cythion, Malathion                                | organophosphate                                       | 1000  | 4100  | Setre, Drexel, UAP  |
| metaldehyde                             | Bug-Geta, Deadline, Slug-<br>Geta                 | metacetaldehyde                                       | 360   | ---   | Valent              |
| methiocarb                              | Mesuroi   | carbamate   | 20  | >5000   | Gowan               |
| naled                                   | Dibrom  | organophosphate                                       | 272   | 1100  | Valent              |
| oxydemeton-methyl                       | Harpoon, Metasystox-R2                            | organophosphate                                       | 48  | 112   | Gowan               |

**Table 5. Information About Insecticides/Miticides**

| Pesticide<br>(Common Chemical Name) | Trade Name(s)  | Classification   | Oral<br>LD <sub>50</sub> <sup>1</sup><br>(mg/kg) <sup>2</sup> | Dermal<br>LD <sub>50</sub> <sup>1</sup><br>(mg/kg) <sup>2</sup> | Manufacturer                        |
|-------------------------------------|--|--|---|---|-------------------------------------|
| permethrin                          | Ambush, Pounce, Astro,<br>Perm-Up                        | pyrethroid   | 4000  | >4000   | FMC, Syngenta, United<br>Phosphorus |
| petroleum oils                      | Dormant, Summer, Superior<br>Oils, etc.                  | hydrocarbon oils                                       | exempt  |   | numerous                            |
| phosmet                             | Imidan   | organophosphate  | 147   | >4640   | Gowan                               |
| propargite                          | Ornamite   | sulfite ester  | 4029  | 2940  | Chemtura Corp.                      |
| pyrethrum                           | Pyrethrin, Pyrellin,<br>Pyrenone, etc.                   | botanical  | 1500  | 1800  | Fairfield, Prentiss, etc.           |
| rotenone, cube'                     | Prentox, Rotenone  | botanical  | 1500  | ---   | Fairfield, Prentiss                 |
| spinosad                            | Conserve SC, SpinTor 2 SC                                | spinosyn   | >5000   | ---   | Dow Agro Sciences                   |
| soaps, pesticidal                   | Aphid-Mite Attack,<br>Insecticidal Soap,<br>M-Pede, etc. | Fatty acid salts                                       | practically nontoxic  |   | Mycogen, Ringer                     |
| tebufenozide                        | Confirm 2F, Mimic 2LV                                    | insect growth<br>regulator (benzoic<br>acid hydrazide) | >2150   | ---   | Dow AgroSciences                    |
| thiamethoxam                        | Flagship   | neonicotinoid  | >5000   | >2000   | Syngenta                            |
| trichlorfon                         | Dylox  | organophosphate  | 250   | >2100   | Bayer                               |
| spiromesifen                        | Judo, Forbid   | Tetronic acid<br>derivatives                           | >2000   | >2000   | Bayer, OHP                          |

<sup>1</sup>Farm Chemicals Handbook '93 (Meister Publishing Co., Willoughby, OH), and technical data information where available.

<sup>2</sup>Equals milligrams per kilogram of body weight applied orally or dermally. (1 milligram = 1/1,000 of a gram, 454 grams = 1 lb.)

## PRODUCTS LISTED IN TABLES AND TYPE OF REGISTRATION <sup>\a</sup>

|                         |                                  |   |
|-------------------------|----------------------------------|---|
| Asana XL (†)            | Harpoon (†)                      | Spectracide 25% EC  |
| Avid (*)                | Hexygon 50-WP (*)                | SpinTor 2SC   |
| Bioneem                 | Imidan 70-WSB (*)                | <i>Steinernema</i> spp. – entomopathogenic nematodes  |
| “Bt” (kurstaki)         | Inject-A-Cide (†)                | Talstar T&O (*)   |
| Bug-Geta                | Inject-A-Cide B (†)              | Talstar 10WP (*)  |
| Carbaryl 5D             | Isotox IV                        | Tempo 2   |
| Carbaryl 10D            | Judo 4F                          | Tempo 20WP  |
| Carbaryl 4L             | Kelthane 50 WSP (*)              | TetraSan 5WDG   |
| Carbaryl 50WP (*)       | Kryocide 96% WP                  | Thiodan 50WP (*)  |
| Chlorpyrifos Pro 4 (@)  | Lorsban-4E                       | Thiodan 3EC (*)   |
| Chlorpyrifos Pro 2 (@)  | Malathion 50                     |   |
| Confirm 2F              | Malathion 57                     |   |
| Conserve 1 SC           | Marathon 1% Granular             |   |
| Cygon 2E                | Marathon 60 WP                   | <sup>\a</sup> Products without symbols are general use products.  |
| Cythion 5EC             | Mavrik Aquaflow                  | Products with (*) are designated on labels as “Commercial or Agricultural Use Only”   |
| Cythion 8EC             | Mesuroil 75% WP                  | Products with (†) are designated on labels as “Restricted Use Pesticide”  |
| Deadline Bullets        | Merit 75WP                       | Products with (#) are designated on labels as for use by individuals/firms licensed or registered by state to apply termiticide products.   |
| Deadline Granules       | Merit 2                          | Products with (@) are to be applied only by or under the direct supervision of trained applicators responsible for insect control programs. |
| Decathlon 20% WP (*)    | Merit 0.5G                       | Products with (&) are for sale to, use and storage by commercial applicators only.  |
| DeltaGard G (&)         | Metasystox-R2 (†)                |   |
| Dendrex                 | Mimic 2LV                        |   |
| Diazinon 50W (*)        | Oils                             |   |
| Diazinon 2E             | Onyx                             |   |
| Diazinon 4E & AG500 (*) | Ornamite                         |   |
| Di-Syston 15% G (†)     | Orthene 75% SP                   |   |
| Dicofol 4EC             | Orthene 9.4%EC                   |   |
| Dibrom 8 Emulsive       | Ovation SC                       |   |
| Dimethoate 2.67EC       | Pestroy 4EC                      |   |
| Dimethoate 400          | Pounce 3.2EC (†)                 |   |
| Dimilin 4L (†)          | Pounce 25WP (†)                  |   |
| Dimilin 25W (†)         | Pyrethrin (+PBO)                 |   |
| Dursban Pro (†)         | Resmethrin EC26                  |   |
| Dursban 50W (†)         | Rotenone + Pyrethrin             |   |
| Dursban TNP (@)         | Rockland Shade Tree Insect Spray |   |
| Dylox (*)               | Scimitar WP (*)                  |   |
| Flagship 25WG           | Sevin Liquid 2F                  |   |
| Floramite               | Sevin 50W                        |   |
| Forbid 4F               | Sevin 5 Dust                     |   |
| Furadan 4F (†)          | Slug-Geta                        |   |
| Guthion 2S (†)          | Soaps                            |   |

### Precautionary Statement

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator’s responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication.

### Disclaimer Statement

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