



# Ornamental and Lawn Pest Control

(For Homeowners)

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Oklahoma Cooperative Extension Fact Sheets are also available on our website at: <http://osufacts.okstate.edu>

This fact sheet describes some common arthropod pest problems encountered on various ornamentals and turfgrass lawns in Oklahoma. If arthropod pest problems arise that are not covered here, consult your OSU County Extension Office for assistance.

Many arthropod pest problems are solved through natural control factors such as weather, disease, parasites, and predators. When nature either does not solve the pest problem or is slow to act, other controls may be warranted. Chemical pesticides often provide the quickest and most dependable control, and in many instances, there may be no other alternatives.

Pesticides are chemicals of plant, animal, or synthetic origin manufactured to kill pests – insects, weeds, plant disease organisms, and rodents. Materials poisonous to one organism are usually poisonous to other organisms if the dosage is large enough. Pesticides can be applied safely when a few basic rules are followed and common sense is used. Refer to OSU Extension Fact Sheets EPP-7450, EPP-7453, and EPP-7457 for more information on pesticide safety. For information on insect control in the vegetable garden, refer to OSU Extension Fact Sheet EPP-7313.

Note: Whenever possible, buy and grow pest resistant plants such as Oklahoma Proven selections (<http://oklahomaproven.okstate.edu>) or other recommended varieties. By doing so, the need for pest control measures can be greatly reduced.

## PESTS OF TREES, SHRUBS, AND FLOWERS

<i>Pest, Time Most Prevalent, &amp; Other Information</i>	<i>Pesticide Common Name</i>	<i>Pesticide Trade Name</i>	<i>Pesticide Class</i>	<i>Comments</i>
<p><b>APHIDS</b></p> <p>Measure 1/8 to 1/5 inch long.</p> <p>Pear-shaped, soft-bodied, sucking insects. Active all growing season.</p> <p>Aphids secrete honeydew (sticky, sugar-like material), which may attract ants and flies, and provide growing media for sooty mold.</p> <p>Aphids generally attack the tender terminals and leaves. Leaves may twist and curl and become distorted.</p> <p>Small infestations can often be washed off plants with strong water pressure.</p>	Acetamiprid	Ortho Max Flower, Fruit and Vegetable Insect Killer RTU	4A	Systemic insecticide. Apply as a foliar spray.
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	See note at end of section on Sevin.
	Dinotefuran	Green Light Tree and Shrub Insect Control w/ Safari 2G or Gordon's Professional Turf & Ornamental Products Zylam Liquid Systemic Insecticide	4A	Systemic insecticide. Apply to soil around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Insecticidal Soap	Garden Safe Brand Insecticidal Soap Insect Killer	NS	Carefully read label of insecticidal soap products for phytotoxicity statements.
	Imidacloprid	Bayer Advanced 12 Month Tree & Shrub Insect Control or Ferti-Lome Tree & Shrub Systemic Insect Drench	4A	Use imidacloprid as a soil drench around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid + Clothianidin	Bayer Advanced Tree & Shrub Protect and Feed RTU Granules II	4A + 4A	Apply granules around base of trunk and water in to soil. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Malathion	Gordon's Malathion 50% Spray or Hi-Yield 55% Malathion Spray	1B	Carefully read label of malathion products for phytotoxicity statements.
	Mineral Oil	Bonide All Seasons Horticultural & Dormant Spray Oil Concentrate	HO	Do not apply dormant oil concentrations to actively growing plants nor to broadleaf evergreens, maple, mountain ash, or beech.
Neem Oil	Garden Safe Brand Neem Oil Extract Concentrate or Bonide Neem Oil Fungicide/Miticide/Insecticide RTU	UN	Carefully read label of neem oil products for phytotoxicity statements.	

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<p><b>BAGWORMS</b></p> <p>Measure 1-2 inches long (bagworm case).</p> <p>Active May through September.</p> <p>Common caterpillar pests on cedars, arborvitae, and sometimes feed on bald cypress, elms, pines, willows, maples, sycamores, and other trees.</p> <p>Small infestations can be removed by hand in winter before larvae emerge in May, but be sure to destroy all bags.</p>	<p><i>Bacillus thuringiensis</i> (B.t.) subsp. <i>kurstaki</i></p> <p>Carbaryl</p> <p>Malathion</p> <p>Spinosad</p>	<p>Thuricide or Dipel</p> <p>GardenTech Sevin Concentrate Bug Killer</p> <p>Gordon's Malathion 50% Spray or Hi-Yield 55% Malathion Spray</p> <p>Ferti-Lome Borer, Bagworm, Tent Caterpillar &amp; Leafminer Spray</p>	<p>11A</p> <p>1A</p> <p>1B</p> <p>5</p>	<p>Apply B.t. early while caterpillars are still small (e.g., late May or early June). Less effective for large larvae.</p> <p>See note at end of section on Sevin.</p> <p>Carefully read label of malathion products for phytotoxicity statements.</p> <p>Apply spinosad early while caterpillars are still small (e.g., late May or early June). Less effective for large larvae.</p>
<p><b>BORERS</b></p> <p>FLATHEADED BORERS</p> <p>ROUNDHEADED BORERS</p> <p>SHOT HOLE BORERS</p> <p>Measure 1/2 to 1 3/4 inches long.</p> <p>Active spring through fall.</p> <p>See OSU Fact Sheet EPP-7326 for additional information about woodborers.</p> <p><b>ASH/LILAC BORER</b></p> <p>Measure up to 1 inch long. Adult moths are wasp mimics.</p> <p>Active spring through fall.</p> <p>As a preventative measure, it is helpful to insure health of trees with proper watering and fertilizer.</p> <p><b>IRIS BORER</b></p> <p>Larvae are pink caterpillars measuring up to 2 inches long.</p> <p>Active late April through August.</p> <p>Larvae tunnel within leaves, stems and rhizomes (roots).</p>	<p>Dinotefuran</p> <p>Imidacloprid</p> <p>Imidacloprid + Clothianidin</p> <p>Permethrin</p> <p><i>Steinernema carpocapsae</i></p> <p>Piperonyl Butoxide + Pyrethrins</p> <p>Spinosad</p>	<p>Green Light Tree and Shrub Insect Control w/ Safari 2G or Gordon's Professional Turf &amp; Ornamental Products Zylam Liquid Systemic Insecticide</p> <p>Bayer Advanced 12 Month Tree &amp; Shrub Insect Control or Ferti-Lome Tree &amp; Shrub Systemic Insect Drench</p> <p>Bayer Advanced Tree &amp; Shrub Protect and Feed RTU Granules II</p> <p>Hi-Yield Indoor/Outdoor Broad Use Insecticide</p> <p>Ecomask</p> <p>GardenTech Worry Free Brand Concentrate</p> <p>Ferti-Lome Borer, Bagworm, Tent Caterpillar &amp; Leafminer Spray</p>	<p>4A</p> <p>4A</p> <p>4A + 4A</p> <p>3A</p> <p>BLO</p> <p>NS + 3A</p> <p>5A</p>	<p>Systemic insecticide. Apply to soil around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.</p> <p>Use imidacloprid as a soil drench around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.</p> <p>Apply granules around base of trunk and water in to soil. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.</p> <p>Spray trunk when adult moths are active to target egg-laying adults and newly emerging larvae. Monitor adult activity with pheromone traps.</p> <p>Beneficial nematodes are tiny roundworms that attack a variety of insect pests. Levels of control vary, but nematodes function best at soil temperatures between 60° and 93°F.</p> <p>Apply spray to upper and lower leaf surfaces when eggs hatch, corresponding to new growth measuring 4 to 6 inches. A second spray may be needed 10 to 14 days later.</p>
<p><b>BARK BEETLES</b> (in pines)</p> <p>Adults measure 1/20 to 1/5 inch long.</p> <p>Small, cylindrical, brown to black beetles that tunnel and create feeding galleries below bark surface.</p> <p>Active spring through fall.</p>	<p>Imidacloprid</p> <p>Imidacloprid + Clothianidin</p> <p>Piperonyl Butoxide + Pyrethrins</p>	<p>Bayer Advanced 12 Month Tree &amp; Shrub Insect Control or Ferti-Lome Tree &amp; Shrub Systemic Insect Drench</p> <p>Bayer Advanced Tree &amp; Shrub Protect and Feed RTU Granules II</p> <p>GardenTech Worry Free Brand Concentrate</p>	<p>4A</p> <p>4A + 4A</p> <p>NS + 3A</p>	<p>Use imidacloprid as a soil drench around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.</p> <p>Apply granules around base of trunk and water in to soil. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.</p>

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<p><b>ELM BARK BEETLES</b></p> <p>See EPP-7602: Dutch Elm Disease for information about elm bark beetle vectors.</p>	<p><b>Only restricted use pesticides are currently available for effective control of elm bark beetle and the disease it transmits, Dutch Elm Disease. Consult a certified arborist or other tree care professional for control options.</b></p>			
<p><b>BOXELDER BUGS and RED-SHOULDERED BUGS</b></p> <p>Measure 1/2 to 1 3/4 inches long.</p> <p>Nuisance household pest in the fall. Feed on seeds of boxelder, golden raintree, and soapberry, but don't injure trees. Avoid planting host trees in close proximity to house.</p> <p>Plug openings around windows and doors, and caulk small openings that can serve as points of entry.</p> <p>Target young nymphs in early summer for best control.</p>	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	See note at end of section on Sevin.
	Cyfluthrin	Bayer Advanced Power Force Multi-Insect Killer Concentrate	3A	
	Malathion	Gordon's Malathion 50% Spray <b>or</b> Hi-Yield 55% Malathion Spray	1B	Carefully read label of malathion products for phytotoxicity statements.
	Piperonyl Butoxide + Pyrethrins	GardenTech Worry Free Brand Concentrate	NS + 3A	
<p><b>CATERPILLARS</b></p> <p>Includes cankerworms, cutworms, webworms, tent caterpillars, and leafrollers/leaf tiers.</p> <p>Measure 1/2 to 2 inches long.</p> <p>Active spring through fall.</p> <p>Larvae feed on foliage. Some species roll and tie leaves with silk and some build webs or tents around foliage or in crotches of limbs.</p> <p>Check label for specific caterpillar pests controlled by each product and use accordingly.</p>	Acetamiprid	Ortho Max Flower, Fruit and Vegetable Insect Killer RTU	4A	Systemic insecticide. Apply as a foliar spray.
	<i>Bacillus thuringiensis</i> (B.t.) subsp. <i>kurstaki</i>	Bonide Thuricide Bt <b>or</b> Ferti-Lome Dipel Dust	11A	Apply B.t. early while caterpillars are still small. Less effective for large larvae. B.t. stops larvae from feeding, but has a delayed killing action. B.t. does NOT control sawflies.
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	See note at end of section on Sevin.
	Cyfluthrin	Bayer Advanced Power Force Multi-Insect Killer Concentrate	3A	
	Esfenvalerate	Ortho Bug-B-Gon Max Garden & Landscape Insect Killer	3A	
	Insecticidal Soap	Garden Safe Brand Insecticidal Soap Insect Killer	NS	Carefully read label of insecticidal soap products for phytotoxicity statements.
	Lambda Cyhalothrin	Bonide Caterpillar Killer	3A	
	Malathion	Gordon's Malathion 50% Spray <b>or</b> Hi-Yield 55% Malathion Spray	1B	Carefully read label of malathion products for phytotoxicity statements.
	Mineral Oil	Bonide All Seasons Horticultural & Dormant Spray Oil Concentrate	HO	Do not apply dormant oil concentrations to actively growing plants nor to broadleaf evergreens, maple, mountain ash, or beech.
	Neem Oil	Garden Safe Brand Neem Oil Extract Concentrate <b>or</b> Bonide Neem Oil Fungicide/Miticide/Insecticide RTU	UN	Labeled for leafrollers only. Carefully read label of neem oil products for phytotoxicity statements.
	Spinosad	Ferti-Lome Borer, Bagworm, Tent Caterpillar, & Leafminer Spray	5	Apply spinosad early while caterpillars are still small. Less effective for large larvae.
<p><b>ELM LEAF BEETLE, WILLOW LEAF BEETLE, and ELM CALLIGRAPH BEETLE</b></p> <p>Adults measure 1/8 to 1/4 inch long. Larvae measure 1/4 to 3/8 inch long.</p> <p>These leaf-feeding beetles are active late spring to late summer. Both adults and larvae feed on foliage, but larvae cause the most damage by skeletonizing the leaves.</p>	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	See note at end of section on Sevin.
	Cyfluthrin	Bayer Advanced Power Force Multi-Insect Killer Concentrate	3A	
	Dinotefuran	Green Light Tree and Shrub Insect Control w/ Safari 2G <b>or</b> Gordon's Professional Turf & Ornamental Products Zylam Liquid Systemic Insecticide	4A	Systemic insecticide. Apply to soil around base of trunk. Determine rate based on trunk diameter or height of shrub. <b>BEE CAUTION:</b> Do not apply to plants in bloom.
	Imidacloprid	Bayer Advanced 12 Month Tree & Shrub Insect Control <b>or</b> Ferti-Lome Tree & Shrub Systemic Insect Drench	4A	Use imidacloprid as a soil drench around base of trunk. Determine rate based on trunk diameter or height of shrub. <b>BEE CAUTION:</b> Do not apply to plants in bloom.

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<b>ELM LEAF BEETLE, WILLOW LEAF BEETLE, and ELM CALLIGRAPH BEETLE (cont'd)</b>	Imidacloprid + Clothianidin	Bayer Advanced Tree & Shrub Protect and Feed RTU Granules II	4A + 4A	Apply granules around base of trunk and water in to soil. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Mineral Oil	Bonide All Seasons Horticultural & Dormant Spray Oil Concentrate	HO	Effective against larvae. Do not apply dormant oil concentrations to actively growing plants nor to broadleaf evergreens, maple, mountain ash, or beech.
	Spinosad	Ferti-Lome Borer, Bagworm, Tent Caterpillar, & Leafminer Spray	5	Apply when larvae are small and actively feeding.
<b>FLEA BEETLES</b>  Measure 1/16 to 1/8 inch long.  Tiny, black beetles with enlarged hind legs designed for jumping.  Active in summer, feeding on foliage of a wide variety of landscape plants.	Acetamiprid	Ortho Max Flower, Fruit and Vegetable Insect Killer RTU	4A	Systemic insecticide. Apply as a foliar spray.
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	See note at end of section on Sevin.
	Cyfluthrin	Bayer Advanced Power Force Multi-Insect Killer Concentrate	3A	
	Lambda Cyhalothrin	Bonide Caterpillar Killer	3A	
<b>GALLS</b>  New growth forms during growing season.  See OSU Fact Sheet EPP-7168 for detailed information about plant galls.  Gall problems can be reduced by applying the chemicals listed in early spring (bud swell), then again at bud break, and again when leaves are half grown.	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	Labeled for gall-making wasps and midges only. See note at end of section on Sevin.
	Mineral Oil	Bonide All Seasons Horticultural & Dormant Spray Oil Concentrate	HO	Do not apply dormant oil concentrations to actively growing plants nor to broadleaf evergreens, maple, mountain ash, or beech.
<b>GRASSHOPPERS</b>  Measure 1-2 inches long.  Grasshoppers feed on foliage of numerous plants but prefer grasses.  For more information, see OSU Fact Sheet EPP-7322: Grasshopper Control in Gardens and Landscapes.	Cyfluthrin	Bayer Advanced Power Force Multi-Insect Killer Concentrate	3A	
	Cypermethrin	Amdro Quick Kill Lawn & Landscape Insect Killer Concentrate	3A	
	Esfenvalerate	Ortho Bug-B-Gon Max Garden & Landscape Insect Killer	3A	
	<i>Nosema locustae</i>	Nolo Bait or Semaspore	M	Microsporidial pathogen of grasshoppers. Works best on small nymphs. Do not apply <i>Nosema locustae</i> in any manner that results in contact with fruits or vegetables.
<b>JUNE (MAY) BEETLES and JAPANESE BEETLES</b>  Measure 1/2 to 3/4 inches long.  June beetles active at night April through September. Japanese beetles active during the day late June through July.  June beetles occasionally feed on foliage of American elm and other trees. Japanese beetles are serious pests, feeding on foliage, fruits, and flowers of many landscape plants.	Acetamiprid	Ortho Max Flower, Fruit and Vegetable Insect Killer RTU	4A	Systemic insecticide. Apply as a foliar spray. Labeled for Japanese beetle only.
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	See note at end of section on Sevin.
	Cyfluthrin	Bayer Advanced Power Force Multi-Insect Killer Concentrate	3A	Recommended as a preventative treatment for Japanese beetle.
	Imidacloprid	Bayer Advanced 12 Month Tree & Shrub Insect Control or Ferti-Lome Tree & Shrub Systemic Insect Drench	4A	Use imidacloprid as a soil drench around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid + Clothianidin	Bayer Advanced Tree & Shrub Protect and Feed RTU Granules II	4A + 4A	Apply granules around base of trunk and water in to soil. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.

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<p><b>LACE BUGS</b></p> <p>Measure 1/8 inch long.</p> <p>Tiny, mottled, brown to black and gray insects with long, lace-like wings. Suck sap from undersides of leaves causing them to become mottled with grey or brown spots.</p> <p>Active spring through summer.</p> <p>Common on sycamores, elms and some oaks, pyracantha, and occasionally azaleas.</p> <p>Small infestations can be washed off plants/foliage with strong water pressure (stream of water).</p>	Bifenthrin	Ortho Bug B Gone Max Lawn and Garden Insect Killer Concentrate	3A	
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	See note at end of section on Sevin.
	Cyfluthrin	Bayer Advanced Power Force Multi-Insect Killer Concentrate	3A	
	Dinotefuran	Green Light Tree and Shrub Insect Control w/ Safari 2G <b>or</b> Gordon's Professional Turf & Ornamental Products Zylam Liquid Systemic Insecticide	4A	Systemic insecticide. Apply to soil around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid	Bayer Advanced 12 Month Tree & Shrub Insect Control <b>or</b> Ferti-Lome Tree & Shrub Systemic Insect Drench	4A	Use imidacloprid as a soil drench around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid + Clothianidin	Bayer Advanced Tree & Shrub Protect and Feed RTU Granules II	4A + 4A	Apply granules around base of trunk and water in to soil. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Insecticidal Soap	Garden Safe Brand Insecticidal Soap Insect Killer	NS	Carefully read label of insecticidal soap products for phytotoxicity statements.
Mineral Oil	Bonide All Seasons Horticultural & Dormant Oil Concentrate	HO	Do not apply dormant oil concentrations to actively growing plants nor to broadleaf evergreens, maple, mountain ash, or beech.	
<p><b>LEAFHOPPERS and TREEHOPPERS</b></p> <p>Measure 1/8 to 1/4 inch long.</p> <p>Leafhoppers and treehoppers are somewhat wedge-shaped insects that are drab to brightly colored. These sucking insects readily jump when disturbed. Treehoppers often have extreme ornamentation just behind the head.</p> <p>Active during growing season.</p> <p>Feeding results in leaf discoloration, but rarely harmful to plant. Several leafhoppers are important vectors of leaf scorch diseases.</p>	Acetamiprid	Ortho Max Flower, Fruit and Vegetable Insect Killer RTU	4A	Systemic insecticide. Apply as a foliar spray.
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	See note at end of section on Sevin.
	Cyfluthrin	Bayer Advanced Power Force Multi-Insect Killer Concentrate	3A	
	Dinotefuran	Green Light Tree and Shrub Insect Control w/ Safari 2G <b>or</b> Gordon's Professional Turf & Ornamental Products Zylam Liquid Systemic Insecticide	4A	Systemic insecticide. Apply to soil around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid	Bayer Advanced 12 Month Tree & Shrub Insect Control <b>or</b> Ferti-Lome Tree & Shrub Systemic Insect Drench	4A	Use imidacloprid as a soil drench around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid + Clothianidin	Bayer Advanced Tree & Shrub Protect and Feed RTU Granules II	4A + 4A	Apply granules around base of trunk and water in to soil. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Malathion	Gordon's Malathion 50% Spray <b>or</b> Hi-Yield 55% Malathion Spray	1B	Carefully read label of malathion products for phytotoxicity statements.
<p><b>LEAFMINERS</b></p> <p>Includes blotch, serpentine, and tentiform leafminers, so named for the shape of their tunnels.</p> <p>Larvae measure 1/8 to 1/4 inch long.</p> <p>Leafminers are the tiny larvae of several moth, fly, and sawfly species that feed between the upper and lower leaf surfaces.</p> <p>Active spring through summer. (cont'd)</p>	Acetamiprid	Ortho Max Flower, Fruit and Vegetable Insect Killer RTU	4A	Systemic insecticide. Apply as a foliar spray.
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	See note at end of section on Sevin.
	Dinotefuran	Green Light Tree and Shrub Insect Control w/ Safari 2G <b>or</b> Gordon's Professional Turf & Ornamental Products Zylam Liquid Systemic Insecticide	4A	Systemic insecticide. Apply to soil around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid	Bayer Advanced 12 Month Tree & Shrub Insect Control <b>or</b> Ferti-Lome Tree & Shrub Systemic Insect Drench	4A	Use imidacloprid as a soil drench around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.

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<b>LEAFMINERS (cont'd)</b> Seldom cause extensive damage. Prune and burn twigs or leaves when possible.	Imidacloprid + Clothianid	Bayer Advanced Tree & Shrub Protect and Feed RTU Granules II	4A + 4A	Apply granules around base of trunk and water in to soil. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Malathion	Gordon's Malathion 50% Spray <b>or</b> Hi-Yield 55% Malathion Spray	1B	Carefully read label of malathion products for phytotoxicity statements.
	Mineral Oil	Bonide All Seasons Horticultural & Dormant Spray Oil Concentrate	HO	Effective against adults only. Do not apply dormant oil concentrations to actively growing plants nor to broadleaf evergreens, maple, mountain ash, or beech.
	Spinosad	Ferti-Lome Borer, Bagworm, Tent Caterpillar, & Leafminer Spray	5	Thorough coverage of upper and lower leaf surfaces is essential for effective control.
<b>MILLIPEDES</b>  Measure up to 1 inch long. Coil up when disturbed.  Active during growing season.  Heavy mulch and continuous damp conditions favor build-up of millipedes. Apply spray to soil surface in beds and around plants.	Carbaryl	Bayer Advanced Complete Insect Killer for Gardens RTU	1A	
	Cypermethrin	Amdro Quick Kill Lawn & Landscape Insect Killer Concentrate	3A	
	Permethrin	Hi-Yield Indoor/Outdoor Broad Use Insecticide <b>or</b> Ferti-Lome Indoor/Outdoor Multi-purpose Insect Spray	3A	
<b>MITES</b>  SPIDER MITES and CYCLAMEN MITES for  Measure 1/60 inch long.  Active spring to early fall; spider mites frequently become a severe problem in hot, dry weather.  Frequently, two or more applications at 7-day intervals will be needed to reduce mite populations. Mites can be difficult to control, thus consider alternating chemicals at the different treatment intervals.	Esfenvalerate	Ortho Bug-B-Gon Max Garden & Landscape Insect Killer	3A	
	Insecticidal Soap	Garden Safe Brand Insecticidal Soap Insect Killer	NS	Carefully read label of insecticidal soap products phytotoxicity statements.
	Malathion	Gordon's Malathion 50% Spray <b>or</b> Hi-Yield 55% Malathion Spray	1B	Carefully read label of malathion products for phytotoxicity statements.
	Mineral Oil	Bonide All Seasons Horticultural & Dormant Spray Oil Concentrate	UN	Do not apply dormant oil concentrations to actively growing plants nor to broadleaf evergreens, maple, mountain ash, or beech.
	Neem Oil	Garden Safe Neem Oil Extract <b>or</b> Green Light Neem Concentrate	HO	Carefully read label of neem oil products for phytotoxicity statements.
<b>PINE TIP MOTH (larvae)</b>  Larvae measure 1/2 inch long.  Active March to September.  Larvae bore into buds and twigs. Females emerge and lay eggs from late March through late May. Larvae must be controlled before they bore into tree.  For best protection with sprays, applications should be applied at about 20-day intervals from late March through the end of June.  For more information, see OSU Fact Sheet EPP-7645: Nantucket Pine Tip Moth.	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	See note at end of section on Sevin.
	Dinotefuran	Green Light Tree and Shrub Insect Control w/ Safari 2G <b>or</b> Gordon's Professional Turf & Ornamental Products Zylam Liquid Systemic Insecticide	4A	Systemic insecticide. Apply to soil around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid	Bayer Advanced 12 Month Tree & Shrub Insect Control <b>or</b> Ferti-Lome Tree & Shrub Systemic Insect Drench	4A	Use imidacloprid as a soil drench around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid + Clothianid	Bayer Advanced Tree & Shrub Protect and Feed RTU Granules II	4A	Apply granules around base of trunk and water in to soil. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.

Pest, Time Most Prevalent, & Other Information	Pesticide Common Name	Pesticide Trade Name	Pesticide Class	Comments
<p><b>PUSS CATERPILLAR/ IO MOTH and OTHER "STINGING CATERPILLARS"</b></p> <p>Active late summer and fall.</p> <p>Tiny stinging spines are present beneath the fluffy, long, flowing body hair.</p> <p>For best results, spray foliage thoroughly.</p>	<i>Bacillus thuringiensis</i> (B.t.) subsp. <i>kurstaki</i>	Safer Brand Garden Dust	11A	Thoroughly apply dust to cover all plant surfaces.
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	See note at end of section on Sevin.
	Piperonyl Butoxide + Pyrethrins	GardenTech Worry Free Brand Concentrate	NS + 3A	
<p><b>SCALES and MEALYBUGS</b></p> <p>Includes brown elm scale, euonymus scale, and longtailed mealybug.</p> <p>Active during growing season.</p> <p>Soft scales and mealybugs produce honeydew while armored scales do not.</p> <p>Some insecticide products do not control armored scales, so consult your OSU County Extension Office if identification is in doubt.</p> <p>Most non-systemic contact insecticides cannot penetrate protective, waxy layer of scales. Thus, apply sprays to target crawler (nymph) stage.</p>	Acetamiprid	Ortho Max Flower, Fruit and Vegetable Insect Killer RTU	4A	Systemic insecticide. Apply as a foliar spray.
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	Effective against scale crawlers (nymphs) only. See note at end of section on Sevin.
	Dinotefuran	Green Light Tree and Shrub Insect Control w/ Safari 2G or Gordon's Professional Turf & Ornamental Products Zylam Liquid Systemic Insecticide	4A	Systemic insecticide. Apply to soil around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid	Bayer Advanced 12 Month Tree & Shrub Insect Control or Ferti-Lome Tree & Shrub Systemic Insect Drench	4A	Use imidacloprid as a soil drench around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid + Clothianidin	Bayer Advanced Tree & Shrub Protect and Feed RTU Granules II	4A + 4A	Apply granules around base of trunk and water in to soil. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Insecticidal Soap	Garden Safe Brand Insecticidal Soap Insect Killer	NS	Carefully read label of insecticidal soap products for phytotoxicity statements.
	Malathion	Gordon's Malathion 50% Spray or Hi-Yield 55% Malathion Spray	1B	Carefully read label of malathion products for phytotoxicity statements.
	Mineral Oil	Bonide All Seasons Horticultural & Dormant Spray Oil Concentrate	UN	Do not apply dormant oil concentrations to actively growing plants nor to broadleaf evergreens, maple, mountain ash, or beech.
<p><b>THRIPS</b></p> <p>Measure 1/16 inch long.</p> <p>Active spring and summer.</p> <p>These tiny insects are difficult to control due to their small size and tendency to hide in flowers and under foliage. The body tapers toward the end of the abdomen and both pairs of wings are fringed with hairs.</p> <p>Feeding causes small spots of discoloration on leaves and flowers. As feeding continues and population increases, small spots often coalesce into large blotches.</p> <p>Thorough coverage of sprays is important for effective thrips control.</p>	Acetamiprid	Ortho Max Flower, Fruit and Vegetable Insect Killer RTU	4A	Systemic insecticide. Apply as a foliar spray.
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	Only effective against exposed thrips. See note at end of section on Sevin.
	Dinotefuran	Green Light Tree and Shrub Insect Control w/ Safari 2G or Gordon's Professional Turf & Ornamental Products Zylam Liquid Systemic Insecticide	4A	Systemic insecticide. Apply to soil around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid	Bayer Advanced 12 Month Tree & Shrub Insect Control or Ferti-Lome Tree & Shrub Systemic Insect Drench	4A	Use imidacloprid as a soil drench around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid + Clothianidin	Bayer Advanced Tree & Shrub Protect and Feed RTU Granules II	4A + 4A	Apply granules around base of trunk and water in to soil. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Insecticidal Soap	Garden Safe Brand Insecticidal Soap Insect Killer	NS	Carefully read label of insecticidal soap products for phytotoxicity statements.
	Malathion	Gordon's Malathion 50% Spray or Hi-Yield 55% Malathion Spray	1B	Carefully read label of malathion products for phytotoxicity statements.
	Spinosad	Ferti-Lome Borer, Bagworm, Tent Caterpillar, & Leafminer Spray	5	Thorough coverage of upper and lower leaf surfaces is essential for effective control.

Photo courtesy Eric R. Day, Virginia Polytechnic Institute and State University, Bugwood.org



**Bagworm**

Photo courtesy John A. Weidhass, Virginia Polytechnic Institute and State University, Bugwood.org



**Eastern Tent Caterpillar**

Photo courtesy James Solomon, USDA Forest Service, Bugwood.org



**Poplar Borer**

Photo courtesy Frank Pears, Colorado State University, Bugwood.org



**Two-spotted Spider Mite**

Photo courtesy Whitney Cranshaw, Colorado State University, Bugwood.org



**Two-spotted Spider Mite Webbing**

Photo courtesy Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org



**Elm Leaf Beetle**

Photo courtesy Whitney Cranshaw, Colorado State University, Bugwood.org



**Elm Leaf Beetle (larvae)**

Photo courtesy Steven Katovich, USDA Forest Service, Bugwood.org



**May-June Beetle**

Photo courtesy Steven Katovich, USDA Forest Service, Bugwood.org



**May-June Beetle Larva**

Photo courtesy Rayanne Lehman, Pennsylvania Department of Agriculture, Bugwood.org



**Clover Mite**

Photo courtesy James A. Richmond, USDA Forest Service, Bugwood.org



**Pine Tip Moth (adult)**

Photo courtesy Darrell Ross, Oregon State University, Bugwood.org



**Pine Tip Moth (larvae)**

Photo courtesy Eric R. Day, Virginia Polytechnic Institute and State University, Bugwood.org



**Pine Tip Moth Damage**



Photo courtesy Eric Rebek, Oklahoma State University, Bugwood.org



Woolly Maple Aphids

Photo, courtesy Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org



Euonymus Scale

Photo courtesy United States National Collection of Scale Insects Photographs Archive, USDA Agricultural Research Service, Bugwood.org



Mealybugs

Photo, courtesy Whitney Cranshaw, Colorado State University, Bugwood.org



Harvester Ants

Photo courtesy Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org



Fall Armyworm

Photo courtesy Mat Pound, USDA Agricultural Research Service, Bugwood.org



American Dog Ticks

Photo courtesy James B. Hanson, USDA Forest Service, Bugwood.org



Spring Cankerworm

Photo courtesy Nancy Hinkle, University of Georgia, Bugwood.org



Cicada Killer Wasp

Photo courtesy Pest and Diseases Image Library, Bugwood.org



Flea

Photo courtesy David Cappaert, Michigan State University, Bugwood.org



Candy-striped Leafhopper

Photo courtesy Purdue University, Department of Entomology



Sod Webworm

Photo courtesy USDA Forest Service - Northeastern Area Archive, USDA Forest Service, Bugwood.org



Sycamore Lace Bugs

<i>Pest, Time Most Prevalent, &amp; Other Information</i>	<i>Pesticide Common Name</i>	<i>Pesticide Trade Name</i>	<i>Pesticide Class</i>	<i>Comments</i>
<p><b>WHITEFLIES</b></p> <p>Measure 1/8 inch long.</p> <p>Active summer through early fall.</p> <p>Tiny insects. Adults have yellow bodies and white wings. Adults and nymphs commonly found on underside of leaves.</p> <p>Adults and nymphs feed on plant sap with piercing-sucking mouthparts and cause yellowing of leaves. Often "white clouds" of adults fly out of disturbed foliage.</p> <p>For effective whitefly control, ensure thorough coverage by wetting plants to the dripping point. Try to ensure coverage of the plants underside of leaves and penetrate dense foliage. Repeat applications are frequently needed.</p> <p>Alternative insecticide options exist, including botanical insecticides; see Note 2 at end of section.</p>	Acetamiprid	Ortho Max Flower, Fruit and Vegetable Insect Killer RTU	4A	Systemic insecticide. Apply as a foliar spray.
	Dinotefuran	Green Light Tree and Shrub Insect Control w/ Safari 2G <b>or</b> Gordon's Professional Turf & Ornamental Products Zylam Liquid Systemic Insecticide	4A	Systemic insecticide. Apply to soil around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Esfenvalerate	Ortho Bug-B-Gon Multi-Purpose Insect Killer Ready Spray	3A	
	Imidacloprid	Bayer Advanced 12 Month Tree & Shrub Insect Control <b>or</b> Ferti-Lome Tree & Shrub Systemic Insect Drench	4A	Use imidacloprid as a soil drench around base of trunk. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Imidacloprid + Clothianidin	Bayer Advanced Tree & Shrub Protect and Feed RTU Granules II	4A + 4A	Apply granules around base of trunk and water in to soil. Determine rate based on trunk diameter or height of shrub. BEE CAUTION: Do not apply to plants in bloom.
	Insecticidal Soap	Garden Safe Brand Insecticidal Soap Insect Killer	NS	Carefully read label of insecticidal soap products for phytotoxicity statements.
	Malathion	Gordon's Malathion 50% Spray <b>or</b> Hi-Yield 55% Malathion Spray	1B	Carefully read label of malathion products for phytotoxicity statements.
	Mineral Oil	Bonide All Seasons Horticultural & Dormant Spray Oil Concentrate	HO	Do not apply dormant oil concentrations to actively growing plants nor to broadleaf evergreens, maple, mountain ash, or beech.
Neem Oil	Garden Safe Neem Oil Extract <b>or</b> Green Light Neem Concentrate	UN	Carefully read label of neem oil products for phytotoxicity statements.	
Piperonyl Butoxide + Pyrethrins	GardenTech Worry Free Brand Concentrate	NS + 3A		

## LAWN PESTS

Pest, Time Most Prevalent, & Other Information	Pesticide Common Name	Pesticide Trade Name	Pesticide Class	Comments
<p><b>ANTS</b></p> <p>Includes harvester ants, fire ants, and other nuisance ants.</p> <p>Active spring and summer.</p> <p>Ants are nuisance pests due to their mound building in lawns and foraging activity. Also, fire ants and harvester ants bite and sting.</p> <p>For best results, do not apply granular baits to mounds.</p>	<p>Acephate</p> <p>Bifenthrin</p> <p>Cyfluthrin</p> <p>Cypermethrin</p> <p>Esfenvalerate</p> <p>Hydramethylnon</p> <p>Permethrin</p> <p>Spinosad</p>	<p>Ortho Orthene Fire Ant Killer</p> <p>Ortho Bug-B-Gon Max Lawn &amp; Garden Insect Killer Concentrate</p> <p>Bayer Advanced Power Force Multi-Insect Killer Concentrate</p> <p>Amdro Quick Kill Brand Fire Ant Mound Drench</p> <p>Ortho Bug-B-Gon Max Garden &amp; Landscape Insect Killer</p> <p>Maxforce Complete Brand Granular Insect Bait</p> <p>Hi-Yield Indoor/Outdoor Broad Use Insecticide <b>or</b> Ferti-Lome Indoor/Outdoor Multi-purpose Insect Spray</p> <p>Ferti-lome Come and Get It Fire Ant Killer</p>	<p>1B</p> <p>3A</p> <p>3A</p> <p>3A</p> <p>3A</p> <p>20A</p> <p>3A</p> <p>5</p>	<p>Apply only to ant mounds.</p>
<p><b>ARMYWORMS and CUTWORMS</b></p> <p>Measure up to 1.5 inches.</p> <p>Larval stage of several moths. Some live above, and some below ground.</p> <p>Armyworm and fall armyworm are most likely to feed on turfgrass in lawns. Damage is most evident with feeding activity of large larvae.</p> <p>Monitor by using a soap flush (2 T. lemon-scented dish soap per gal water).</p> <p>Treat when damage is noticeable and 2-3 small (1/2 inch or less) caterpillars per square foot are present.</p>	<p><i>Bacillus thuringiensis</i> (B.t.) subsp. <i>kurstaki</i></p> <p>Bifenthrin</p> <p>Bifenthrin + Carbaryl</p> <p>Chlorantraniliprole</p> <p>Clothianidin</p> <p>Cyfluthrin</p> <p>Cypermethrin</p> <p>Deltamethrin</p> <p>Halofenozide</p> <p>Trichlorfon</p>	<p>Safer Garden Dust</p> <p>Ortho Bug-B-Gon Max Lawn &amp; Garden Insect Killer Concentrate</p> <p>Fortify Above and Below Insect &amp; Grub Control</p> <p>Scotts GrubEx 1</p> <p>Green Light Chinch Bug Killer with Arena</p> <p>Bayer Advanced Power Force Multi-Insect Killer Concentrate</p> <p>Amdro Quick Kill Lawn &amp; Landscape Insect Killer Concentrate</p> <p>Enforcer BugMax Insect Killer Concentrate</p> <p>Natural Guard Grub Control</p> <p>Bayer Advanced 24 Hour Grub Killer Plus RTS Granules</p>	<p>11A</p> <p>3A</p> <p>3A + 1A</p> <p>28</p> <p></p> <p></p> <p></p> <p></p> <p></p>	<p>Thoroughly apply dust to cover all plant surfaces.</p> <p>Apply as a preventative treatment in areas with a history of infestation.</p> <p>Apply as a preventative treatment in areas with a history of infestation. <b>BEE CAUTION:</b> Do not apply when flowering weeds are in bloom.</p> <p>Apply as a preventative treatment in areas with a history of infestation.</p>

<i>Pest, Time Most Prevalent, &amp; Other Information</i>	<i>Pesticide Common Name</i>	<i>Pesticide Trade Name</i>	<i>Pesticide Class</i>	<i>Comments</i>
<p><b>BILLBUGS</b></p> <p>Measure 1/4 inch long.</p> <p>Adults are typical “weevils” with elongate snout. Body is shiny black with a raised “Y”- shaped area on thorax. Larvae are legless, having a white body and brown head.</p> <p>Adults chew holes in leaves and stems to lay eggs. Larvae burrow in stems and crown. Sawdust-like frass is left behind after feeding. Plants may die and sod loses “holding power.”</p> <p>Feeding damage is sometimes mistaken for winter-kill damage.</p> <p>Treat if damage is noticeable in lawn in spring and billbug larvae are present.</p>	Bifenthrin	Ortho Bug-B-Gon Max Lawn & Garden Insect Killer Concentrate	3A	Effective against adults only.
	Bifenthrin + Carbaryl	Fortify Above and Below Insect & Grub Control	3A + 1A	Effective against adults only.
	Chlorantraniliprole	Scotts GrubEx 1	28	Apply as a preventative treatment in areas with a history of infestation.
	Clothianidin	Green Light Chinch Bug Killer with Arena	4A	Apply as a preventative treatment in areas with a history of infestation. BEE CAUTION: Do not apply when flowering weeds are in bloom.
	Cyfluthrin	Bayer Advanced Power Force Multi-Insect Killer Concentrate	3A	Effective against adults only.
	Cypermethrin	Amdro Quick Kill Lawn & Landscape Insect Killer Concentrate	3A	Effective against adults only.
	Imidacloprid	Hi-Yield Grub Free Zone III <b>or</b> Gordon’s Grub No-More Granules	4A	Apply as a preventative treatment in areas with a history of infestation. BEE CAUTION: Do not apply when flowering weeds are in bloom.
	Cyfluthrin	Killer for Soil & Turf Concentrate		
	Halofenozide	Natural Guard Grub Control	18	Apply as a preventative treatment in areas with a history of infestation.
	Permethrin	Hi-Yield Kill-A-Bug II Lawn Granules	3A	Effective against adults only.
<p><b>CHIGGERS and TICKS</b></p> <p>Chiggers are the six-legged stage of a mite that is small and pale yellow. It feeds for about 4 days then drops off and changes to a nymph and finally an adult.</p> <p>The American dog tick, lone star tick, and brown dog tick are commonly found in home awns. The brown dog tick is often found inside homes and other structures. American dog ticks are considered a major vector of Rocky Mountain Spotted Fever.</p>	Bifenthrin	Ortho Bug-B-Gon Max Lawn & Garden Insect Killer Concentrate	3A	See note at end of section on Sevin.
	Bifenthrin + Carbaryl	Fortify Above and Below Insect & Grub Control	3A + 1A	
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	
	Cyfluthrin	Bayer Advanced Power Force Multi-Insect Killer Concentrate	3A	
	Deltamethrin	Enforcer BugMax Insect Killer Concentrate	3A	
	Permethrin	Hi-Yield Kill-A-Bug II Lawn Granules <b>or</b> Enforcer Outdoor Insect Killer Concentrate	3A	
	Trichlorfon	Bayer Advanced 24 Hour Grub Killer Plus RTS Granules	1B	
<p><b>CHINCH BUGS</b></p> <p>Adults are 1/8 inch long, black with white wings folded over the back into an “hour glass” shape. Nymphs are reddish to brown, with a white stripe across their “shoulders.”</p> <p>Chinch bugs suck plant juices and clog phloem and xylem. As they feed, they also inject a toxin. Symptoms resemble drought injury; patchy with yellowing and dying leaves.</p> <p>Keep thatch to a minimum and maintain proper levels of water and fertilizer.</p>	Bifenthrin	Ortho Bug-B-Gon Max Lawn & Garden Insect Killer Concentrate	3A	BEE CAUTION: Do not apply when flowering weeds are in bloom.
	Bifenthrin + Carbaryl	Fortify Above and Below Insect & Grub Control	3A + 1A	
	Clothianidin	Green Light Chinch Bug Killer with Arena	4A	
	Cyfluthrin	Bayer Advanced Power Force Multi-Insect Killer Concentrate	3A	
	Cypermethrin	Amdro Quick Kill Lawn & Landscape Insect Killer Concentrate	3A	
	Deltamethrin	Enforcer BugMax Insect Killer Concentrate	3A	
	Imidacloprid + Cyfluthrin	Bayer Advanced Complete Brand Insect Killer for Soil & Turf Concentrate	4A + 3A	
Permethrin	Hi-Yield Kill-A-Bug II Lawn Granules <b>or</b> Enforcer Outdoor Insect Killer Concentrate	3A		

<i>Pest, Time Most Prevalent, &amp; Other Information</i>	<i>Pesticide Common Name</i>	<i>Pesticide Trade Name</i>	<i>Pesticide Class</i>	<i>Comments</i>
<p><b>DIGGER WASPS</b></p> <p>Includes cicada killer, scoliid, and typhiid wasps.</p> <p>Typical wasp appearance and often colorful. Males often harass people who enter their breeding territory. Females rarely sting and sometimes nest in groups. Wasps prefer nesting in bare ground versus mulched landscapes.</p> <p>Treat nest openings when wasps are not active. Repeat treatments may be needed in 2 or 3 days.</p>	Cyfluthrin	Bayer Advanced Power Force Multi-Insect Killer RTS Granules	3A	Consider not treating unless they become a major nuisance.
	Deltamethrin	Enforcer BugMax Insect Killer Concentrate	3A	
	Permethrin	Hi-Yield Kill-A-Bug II Lawn Granules	3A	
	Piperonyl Butoxide + Pyrethrins	GardenTech Worry Free Brand Concentrate	NS + 3A	
<p><b>FLEAS</b></p> <p>Small (up to 2/5 inch) brown, wingless insects that are flattened on both sides.</p> <p>Treat areas where pets frequent.</p> <p>Fleas feed on blood using sucking mouthparts. Bites cause small hardened bumps that are itchy and/or painful.</p>	Bifenthrin	Ortho Bug-B-Gon Max Lawn & Garden Insect Killer Concentrate	3A	See note at end of section on Sevin.
	Bifenthrin + Carbaryl	Fortify Above and Below Insect & Grub Control	3A + 1A	
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	
	Deltamethrin	Enforcer BugMax Insect Killer Concentrate	3A	
	Permethrin	Hi-Yield Kill-A-Bug II Lawn Granules <b>or</b> Enforcer Outdoor Insect Killer Concentrate	3A	
<p><b>GRASSHOPPERS</b></p> <p>1-2 inches long, outer wings leathery, inner wings clear or colored. Enlarged hind legs designed for jumping.</p> <p>Grasshoppers feed on foliage of numerous plants but prefer grasses.</p> <p><b>GRASSHOPPERS (cont'd)</b> For additional management suggestions, see EPP-7322: Grasshopper Control in Gardens and Landscapes.</p>	Bifenthrin	Ortho Bug-B-Gon Max Lawn & Garden Insect Killer Concentrate	3A	See note at end of section on Sevin.
	Bifenthrin + Carbaryl	Fortify Above and Below Insect & Grub Control	3A + 1A	
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	
	Cypermethrin	Amdro Quick Kill Lawn & Landscape Insect Killer Concentrate	3A	
	<i>Nosema locustae</i>	Nolo Bait <b>or</b> Semaspore	M	
	Permethrin	Hi-Yield Kill-A-Bug II Lawn Granules <b>or</b> Enforcer Outdoor Insect Killer Concentrate	3A	
<p><b>LEAFHOPPERS</b></p> <p>Tiny, wedge-shaped insects that are yellow, brown, or green. When disturbed, they fly or hop short distances. They feed by sucking sap from leaves and stems.</p> <p>Damaged grass may appear slightly yellow or off white.</p>	Bifenthrin	Ortho Bug-B-Gon Max Lawn & Garden Insect Killer Concentrate	3A	
	Bifenthrin + Carbaryl	Fortify Above and Below Insect & Grub Control	3A + 1A	
	Cypermethrin	Amdro Quick Kill Lawn & Landscape Insect Killer Concentrate	3A	
	Deltamethrin	Enforcer BugMax Insect Killer Concentrate	3A	
	Permethrin	Hi-Yield Kill-A-Bug II Lawn Granules <b>or</b> Enforcer Outdoor Insect Killer Concentrate	3A	
	Trichlorfon	Bayer Advanced 24 Hour Grub Killer Plus RTS Granules	1B	

<i>Pest, Time Most Prevalent, &amp; Other Information</i>	<i>Pesticide Common Name</i>	<i>Pesticide Trade Name</i>	<i>Pesticide Class</i>	<i>Comments</i>	
<p><b>MILLIPEDES</b></p> <p>Measure up to 1 inch long.</p> <p>Round body and many (80 to 400) legs.</p> <p>Reduce or eliminate moist areas and harborage (grass clippings, leaves, wood debris). Water lawn during early morning to increase the time that turf is dry during a 24-hour period. Dethatch high-maintenance lawns.</p> <p>Millipedes rarely cause damage, but can invade households when conditions become dry.</p>	Bifenthrin	Ortho Bug-B-Gon Max Lawn & Garden Insect Killer Concentrate	3A	See note at end of section on Sevin.	
	Bifenthrin + Carbaryl	Fortify Above and Below Insect & Grub Control	3A + 1A		
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A		
	Cypermethrin	Amdro Quick Kill Lawn & Landscape Insect Killer Concentrate	3A		
	Permethrin	Hi-Yield Kill-A-Bug II Lawn Granules or Enforcer Outdoor Insect Killer Concentrate	3A		
	Trichlorfon	Bayer Advanced 24 Hour Grub Killer Plus RTS Granules	1B		
<p><b>SOD WEBWORMS</b></p> <p>Measure 1/2 to 1 inch long.</p> <p>Larvae vary from gray to light green to brown. Adult moths with wingspans 1/2 to 3/4 inch, many with a snout-like projection, and fly in a zigzag pattern when disturbed.</p> <p>Larvae chew on tender leaves, may cut off grass blades as they get older. Injury can be mistaken for disease or drought injury. Most likely to occur during late summer.</p> <p>Bermudagrass usually can outgrow damage. Young larvae present about 2 weeks after peak moth flights. Monitor by using a soap flush (2 T. lemon-scented dish soap per gal water).</p>	Bifenthrin	Ortho Bug-B-Gon Max Lawn & Garden Insect Killer Concentrate	3A	See note at end of section on Sevin.	
	Bifenthrin + Carbaryl	Fortify Above and Below Insect & Grub Control	3A + 1A		
	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A		
	Chlorantraniliprole	Scotts GrubEx 1	28		Apply as a preventative treatment in areas with a history of infestation.
	Clothianidin	Green Light Chinch Bug Killer with Arena	3A		Apply as a preventative treatment in areas with a history of infestation. BEE CAUTION: Do not apply when flowering weeds are in bloom.
	Cypermethrin	Amdro Quick Kill Lawn & Landscape Insect Killer Concentrate	3A		
	Deltamethrin	Enforcer BugMax Insect Killer Concentrate	3A		
	Halofenozide	Natural Guard Grub Control	18		Apply as a preventative treatment in areas with a history of infestation.
	Trichlorfon	Bayer Advanced 24 Hour Grub Killer Plus RTS Granules	1B		
<p><b>WHITE GRUBS</b></p> <p>Large, "C"-shaped larvae with a white body and a brown head. Larval stage of several beetle species.</p> <p>White grubs feed on grass roots at or just below the thatch layer. Grass takes on droughty appearance. Damage may be seen throughout growing season but more pronounced in fall. Vertebrate predators cause secondary damage as they dig for grubs.</p> <p>Monitor by cutting back several 1 square foot sections of lawn and count grubs.</p> <p>Treat when lawn has 15-20 masked chafer grubs per square foot or 4-5 May/June beetle grubs per square foot.</p>	Carbaryl	GardenTech Sevin Concentrate Bug Killer	1A	Apply as a curative treatment in spring or fall to control active white grubs.	
	Chlorantraniliprole	Scotts GrubEx 1	28	Apply as a preventative treatment in areas with a history of infestation.	
	Clothianidin	Green Light Chinch Bug Killer with Arena	4A	Apply as a preventative treatment in areas with a history of infestation. BEE CAUTION: Do not apply when flowering weeds are in bloom.	
	Imidacloprid	Hi-Yield Grub Free Zone III or Gordon's Grub No-More Concentrate	4A	Apply as a preventative treatment in areas with a history of infestation. BEE CAUTION: Do not apply when flowering weeds are in bloom.	
	Imidacloprid + Cyfluthrin	Bayer Advanced Complete Brand Insect Killer for Soil & Turf Concentrate	4A + 3A	Apply as a preventative treatment in areas with a history of infestation. BEE CAUTION: Do not apply when flowering weeds are in bloom.	
	Halofenozide	Natural Guard Grub Control	18	Apply as a preventative treatment in areas with a history of infestation.	
	Trichlorfon	Bayer Advanced 24 Hour Grub Killer Plus RTS Granules	1B	Apply as a curative treatment in spring or fall to control active white grubs.	

\* The numbers associated with the pesticide class column were developed by the Insecticide Resistance Action Committee, (IRAC) in 2005. It is intended to help in the selection of insecticides for preventative resistance management. If you make multiple applications for a specific pest or group of pests during a growing sequence, simply select a registered insecticide with a different number for each generation (14-21 days). You can rotate within the same number if more than one subgroup is available (Example: 2A and 2B). To further delay resistance from developing, integrate other control methods into your pest management programs.

1A= Carbamates	14= Nereistoxin analogues
1B= Organophosphates	15= Benzoylureas
2A= Cyclodiene organochlorines	16= Buprofezin
2B= Phenylpyrazoles (Fiproles)	17= Cyromazine
3A= Pyrethroids, Pyrethrins	18= Diacylhydrazines
3B= DDT, Methoxychlor	19= Amitraz
4A= Neonicotinoids	20A= Hydramethylnon
4B= Nicotine	20B= Acequinocyl
4C= Sulfoxaflor	20C= Flucrypyrim
4D= Butenolides	21A= METI acaricides and insecticides
5= Spinosyns	21B= Rotenone
6= Avermectins, Milbemycins	22A = Indoxacarb
7A= Juvenile hormone analogues	22B= Metaflumizone
7B= Fenoxycarb	23= Tetric acid and tetric acid derivatives
7C= Pyriproxyfen	24A= Phosphine
8A= Alkyl halides	24B= Cyanides
8B= Chloropicrin	25= Beta-ketonitrile derivatives
8C= Sulfuryl fluoride (fumigant)	26= (unassigned)
8D= Borax	27= (unassigned)
8E= Tartar emetic	28= Diamides
8F= Methyl isothiocyanate generators	UN= Unknown mode of action
9B= Pymetrozine	NS= Non-specified, multi-site
9C= Flonicamid	M= Microbials
10A= Clofentezine, Hexythiazox, Diflovidazin	BLO= Biological organisms
10B= Etoxazole	
11A= <i>Bacillus thuringiensis</i> and the insecticidal proteins they produce	
11B= <i>Bacillus sphaericus</i>	
12A= Diafenthiuron	
12B= Organotin miticide	
12C= Propargite	
12D= Tetradifon	
13= Chlorfenapyr, DNOC, Sulfluramid	

NOTES:

1. Sevin - Not all Sevin (carbaryl) labels allow for homeowner use or labels may state "for non-residential use only on trees and ornamentals." The "non-residential use only" restriction limits the use of those products to areas like shelter belts, forests, parks, recreational areas, etc. One should read the Sevin product label carefully prior to purchase to see if these restrictions apply.
2. Botanical Insecticides - Some organic gardeners prefer to use botanicals. Materials that may be available in your area or from garden supply catalogues for these individuals are: Rotenone, Ryania, Sabadilla, Neem products and natural pyrethrum (apply any of these per label directions).

## The Oklahoma Cooperative Extension Service

### *Bringing the University to You!*

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, gender, age, religion, disability, or status as a veteran in any of its policies, practices, or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

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