

Ornamental and Lawn Pest Control

(For Homeowners)



Oklahoma Cooperative Extension Service • Division of Agricultural Sciences and Natural Resources

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

Many of our arthropod pest problems are solved through natural controls such as weather, other forms of plant and animal life, 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 are 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 form of life are usually poisonous to other forms 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 Facts 7450, 7453, and 7454 for more information on pesticide safety. For information on insect control in the garden, refer to OSU Extension Facts 7313.

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

Pests of Trees, Shrubs, and Flowers

Pest (Approximate Sizes Noted, See Picture)	Description & Damage	Suggested Chemical Formulation and Mixing Instructions with Water	Comments
APHIDS (1/8 - 1/5 in)	Small, pear-shaped, soft-bodied, sucking insects that cause leaves to curl (pucker). They are commonly found on the underside of leaves.	Bayer Advanced Garden Tree & Shrub Insect Control diazinon - 2 tsp of 25% EC/gal * malathion - 2 tsp of 50% EC/gal Orthene - 2 tbs of 9.4% EC/gal insecticidal soap - per label neem - e.g. Bioneem or Neemesis - per label	Aphids secrete honeydew (sticky, sugar-like substance), which may attract ants, flies, provide media for sooty mold, and make spots on parked cars under infested plants. May need to repeat applications at 7 to 10 day intervals. For small infestations, aphids can frequently be knocked from foliage with forceful water pressure from a hose.
BAGWORM Bagworm case (1-2 in)	Larvae hatch from eggs that overwinter in old bags remaining on the foliage from the previous year. Larvae start to feed in late spring (end of May to early June). Young worms spin silken sacs and attach bits of leaves as they feed.	Bacillus thuringiensis - B.t. "bacterial insecticide" - Various trade names, use rates/mixing instructions on the label Bayer Advanced Garden Tree & Shrub Insect Control diazinon - 2 tsp of 25% EC/gal * malathion - 2 tsp of 50% EC/gal Orthene - 3 tbs (1oz) of 9.4% EC/gal Sevin - 2 tbs of 50% WP/gal Liquid Sevin 27% - 1 tbs/gal	NOTE: Control with B.t. often is slower than other insecticides. Apply chemical early while worms are small. Hand picking and destroying bags during winter will help reduce bagworm infestations the next season. Bagworms may be more common on deciduous plants when evergreens are sprayed or absent from the landscape.
BORERS (1/2 - 1 3/4 in) (e.g. flat-headed, round-headed wood borers, and shot-hole borers).	Flat- or round-headed borers (larvae) make tunnels under the bark. Shot-hole borers make pin-sized holes in twigs or limbs and often the emergence holes of adults make the bark appear as if pierced by shotgun pellets. Generally, trees in a state of decline or unhealthy state, often due to being planted in tight or heavy soils, are more susceptible to attack. Borer activity should not be confused with holes made by species of woodpeckers (refer to Fact Sheet 7315 for more information on borers).	Also see Comments column. [Help prevent borers with proper timing or spray scheduling by killing adults before or during egg laying period(s); however, check the label before treatment to insure the product can be used on the borer infested plants you intend to treat. These treatments will not control borers inside the plant.]	Spray trunk or lower branches to point of runoff. Cut and burn infested twigs when possible. Water and fertilize trees. See OSU Fact Sheet 6412, "Fertilizing Shade and Ornamental Trees"; Fact Sheet 6409, "Pruning Ornamental Trees and Shrubs"; and Fact Sheet 7315, "Shade Tree Borers" for details.

Pest (Approximate Sizes Noted, See Picture)	Description & Damage	Suggested Chemical Formulation and Mixing Instructions with Water	Comments
BOXELDER BUG / REDSHOULDERED BUG (1/2-1 3/4 in)	Nuisance household pest in the fall. Feed on boxelder, golden raintree, and soapberry, but don't injure the tree. Avoid planting host trees in close proximity to house. Plug openings around windows and doors, and caulk small openings that can serve as points of entry.	Bayer Advanced Lawn & Garden Multi-Insect Killer diazinon 2 tsp of 25% EC/gal * Bug-B-Gon Multi-Purpose Insect Killer	Treat ground cover and tree trunk when bugs are first seen (March, April, and September). Repeated treatments may be required.
CATERPILLARS (e.g. webworms, tent caterpillars, cankerworms, leafrollers / tiers, and leafminers) (1/2 - 1 1/2 in)	Larvae that feed on foliage. Some species roll and tie with silk and some build webs or tents around foliage or in crotches of limbs	neem - e.g. Bioneem or Neemesis - per label Bacillus thuringiensis (B.t.) (bacterial insecticide, liquid, or WP for webworms, tent caterpillars, and cankerworms). Check label for rate. diazinon - 1-2 tbs of 25% EC/gal * malathion 50% EC - 2tsp/gal Orthene - 3 tbs (1 1/2 oz) of 9.4% EC/gal Sevin - 2 tbs of 50% WP/gal or Liquid Sevin 27% - 1 tbs/gal	Adequate pressure and volume for spray needs to be applied to break up webbing or tents. Apply spray to the point of runoff. Check product label before use to insure it is labeled for the plant and pest. NOTE: B.t. normally stops worms from feeding, but has a delayed killing action. NOTE: Do not use Orthene 9.4% EC on American elm, redbud, flowering crabapple, sugar maple, or red maple.
ELM LEAF BEETLE / WILLOW LEAF BEETLE Adults (1/4 in) Larvae (1/4 - 3/8 in)	Elm leaf beetles lay orange-yellow eggs on the undersides of leaves in May or early June. Eggs hatch into larvae that does most of the damage by skeletonizing leaves. In Oklahoma, there are three or four complete generations of elm leaf beetles per year. Willow leaf beetle adults and larvae inflict similar damage to willows in May or early June.	Bayer Advanced Garden Tree & Shrub Insect Control Orthene - 3 tbs (1 1/2 oz) of 9.4% EC/gal Sevin - 2 tbs of 50% WP/gal Liquid Sevin 27 % - 1 tbs/gal Di-Syston granules for elm leaf beetles - the 15% granules are restricted and can only be applied by certified applicators. Homeowners may be able to find 2% granules. Apply granules during March and water immediately after application. A second application in May will help control later generations of beetles.	Elm leaf beetles mainly damage Siberian elms and Japanese zelcova. For best results, apply chemicals (except Di-Syston) when the small larvae are first observed on the under-sides of leaves. In the early fall, adults migrate to homes or buildings and crawl under shingles and into cellars, attics, or similar areas to overwinter. NOTE: Do not use Orthene 9.4% EC on American elm. Bacillus thuringiensis 'strains' are now available for control of some beetles.
HOUSE PLANT PESTS (e.g. spider mites, mealy bugs, fungus gnats, whiteflies, aphids, and thrips - these pests may also be present on outdoor plantings.)	Most of these pests suck plant fluids and cause leaf discoloration and leaf cupping/malformation. Fungus gnat larvae attack roots. Allowing soil to dry thoroughly between waterings often kills larvae.	ready-to-use spray or aerosols that contain: pyrethrins + piperonyl butoxide, tetramethrin + sumithrin, resmethrins, or rotenone or combinations of these. NOTE: Alcohol soaked cotton swabs can also be used to remove pests from house plants. insecticidal soap - per label directions is registered for control of many house plant pests. neem products - per label	Repeat applications may be needed at 5 to 7 day intervals. NOTE: Use caution on young plants and new growth, and check label for plants that can be treated. Sometimes light pest infestations can be wiped from foliage with mild detergent solutions (e.g. 2 tsp of detergent/gal of water). For nonpesticide methods of pest control on house plants refer to Fact Sheet 6411, "House Plant Care."
JAPANESE BEETLE Adult (1/2 in) Larvae (1/2 in)	Adult beetles have been consistently collected from a few locations in the state. Adult beetles feed on foliage and fruits of many plants and the larvae feed on turf much like other white grubs. Adults are active from late June through July.	Bayer Advanced Garden Rose and Flower - 1 tbs/gal Sevin - 1 1/2 - 2 tbs of 50% WP/gal malathion - 2 tsp of 50% EC/gal	Roses, crape-myrtle, apple, linden, and hibiscus are most susceptible to feeding.
MAY / JUNE BEETLES (1/2 - 3/4 in)	Adults of white grubs sometimes feed on leaves of American elm and a few other trees.	Sevin - 2 tbs of 50% WP/gal diazinon - 2 tsp of 25% EC/gal *	Trees growing close to street or yard lights are generally most attractive to the beetles or areas where soil contains a high amount of organic matter.
LACE BUGS (1/8 in)	Tiny, mottled, brown to black and grey with long lace-like wings. Suck sap from undersides of leaves causing leaves to become grey or brown spotted. Common on sycamores, pyracantha, azalea, some oaks, and elms.	Bayer Advanced Lawn & Garden Multi-Insect Killer malathion - 2 tsp of 50% EC/gal Orthene - 3 tbs (1 1/2 oz) of 9.4% EC/gal Sevin - 2 tbs of 50% WP/gal insecticidal soap - 49% or 50.5% - 5 to 6 tbs/gal of water (check label) or 2% ready-to-use spray.	Undersides of leaves often bear small blackish, varnish-like excrement spots. Provide thorough coverage with spray directed to undersides of leaves. Repeat applications may be necessary. NOTE: Do not use Orthene 9.4% EC on American elms.
MITES (1/60 in)	Small, yellow-brown or red. Mites suck plant juices, usually from the undersides of leaves, producing pale blotches on upper and lower surfaces of leaves. The foliage may turn brown and plants gradually lose vigor and die. A fine silken web may be present. NOTE: Spraying foliage when watering (with water pressure) helps keep down mite populations.	diazinon - 2 tsp of 25% EC/gal * Kelthane - per label directions malathion - 2 tsp of 50% EC/gal rotenone - dust or spray per label directions insecticidal soap - per label isotox - 3 tbs/gal	May need 2 or 3 applications at 7 to 10 day intervals. May need to alternate the chemical from one application to the next. Hot, dry weather favors mite build up. Also using Sevin had been reported to increase chances of having mite problems. Junipers, marigolds, sweet peas, violets, and many house plants are very susceptible to mites.
PINE TIP MOTH Larvae (1/2 in)	First female moths of the season emerge and lay eggs from late March through April. Upon hatching, larvae bore into buds and twigs. Most species of 2 and 3 needle pines are subject to longer attack; however, slash, Austrian, and long leaf pines are somewhat resistant. Infested shoots usually turn yellow and later, red and brown. Dead, hollowed-out buds and twigs are usually present.	Orthene - 3 tbs (1 1/2 oz) of 9.4% EC/gal or other materials that are labeled for homeowner use (e.g. dimethoate or Sevin 50 W.) Mix per label instructions. Di-Syston granules - the 15% granules are restricted and can only be applied by a certified applicator. Homeowners may be able to buy 2% granules. Apply granule in November and December. A second application in March or April will help control later generations of tip moths. Water in the granules immediately after application.	Once larvae bore into buds and twigs, it is difficult to control them with sprays. Preventive spot programs should begin in late March with applications repeated on about a 20 day schedule until late June. There are 4 to 5 generations of tip moths per year, but first brood is generally the most damaging. See Fact Sheet 7645 for more details on pine tip moths and monitoring with pheromone traps. NOTE: Austrian pine is highly resistant to tip moths, but may be similarly affected by pine tip blight. Refer to Fact Sheet 7618, "Common Diseases of Conifers."



Aphids



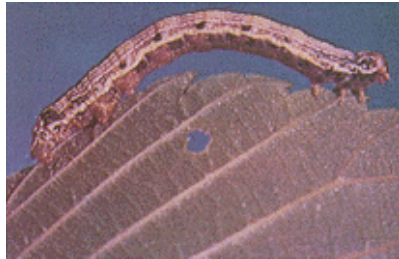
Bagworm



Borer Damage



Tent Caterpillar



Canker Worm



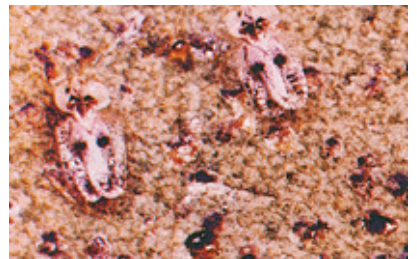
Elm Leaf Beetle



Elm Leaf Beetle (larvae)



June Beetle



Lace Bugs



Mite



Pine Tip Moth (adult)



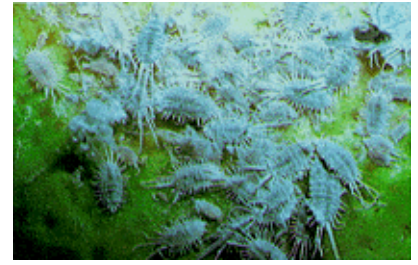
Pine Tip Moth (larvae)



Pine Tip Moth Damage



Euonymus Scale



Mealybugs



Ants



Armyworm



American Dog Ticks



Clover Mite



**Cicada Killer Wasp (R)
and Cicada (L)**



Flea



Leafhopper



Sod Webworm



White Grub

Pest (Approximate Sizes Noted, See Picture)	Description & Damage	Suggested Chemical Formulation and Mixing Instructions with Water	Comments
PLANT GALLS	See OSU Fact Sheet 7168 for details. Gall producing insects that affect stems, twigs, or branches, such as gouty, horned, and oak-potato galls are generally considered more damaging to the health of the tree than are gall insects that affect leaves.	<p>diazinon - 2 tsp of 25% EC/gal * malathion - 2 tsp of 50% EC/gal</p> <p>dormant oil 98% - 3 oz/gal dormant lime sulfur - 32% - 1 pt/gal</p> <p>NOTE: See comments for scales/mealybugs below with regard to selection of oil spray.</p>	Prune and destroy infested branches before spring. Also rake and dispose of fallen leaves in the fall. Suppression and aid can be achieved by applying a properly labeled chemical at bud swell, when leaves are half grown. Growths from gall insects already on a plant will not be removed by treatment. New growth, pruning, and possible use of sprays to prevent further spread are the requirements for actual removal. These materials may help control the overwintering stage of gall forming insects. Apply dormant oil only when plants are dormant.
SCALES AND MEALYBUGS	Usually very small. Most species remain immobile, feeding in place, for at least part of their life cycle. Scales are covered with a protective shell of waxy material. This may be a hardened structure covering the body of the insects, e.g. San Jose, oyster shell, obscure, and Euonymus scales. Mealybugs are small, oval insects that are covered with a white powdery material. Often they have wax-like filaments projecting from the body. The young of these pests are called crawlers and are the easiest stage to control. The crawlers and adults suck sap from plants. They produce honeydew and this sticky-sugary material may coat foliage or fall from the infested plants onto sidewalks, cars, etc.	<p>dormant oil - 3 oz of 98% gal summer or growing season oil - 5 tsp/gal</p> <p>NOTE: Spray oils should be labeled as superior grade 60 or 70 or one specifying unsulfonated residue or 91 or 92%. For Euonymus scale: Consider use of summer oil plus one of the insecticides listed for crawler stage in late April and again in late May.</p> <p>Bayer Advanced Garden Tree & Shrub Insect Control diazinon - 2 tsp of 25% EC/gal * malathion - 2 tsp of 50% EC/gal Orthene - 3 tbs (1 1/2 oz) of 9.4 % EC/gal dimethoate - 2 tbs of 8% EC/gal insecticidal soap - per label</p>	<p>Apply dormant oil only when plants are dormant (before spring growth). Check label carefully for a list of plants that can be treated.</p> <p>Do not apply dormant oil spray on evergreens. Summer or growing season oil can be used during the growing season alone or mixed with one of the listed insecticides: Don't apply oil spray in hot weather. Note on obscure scale: Crawler activity can occur from mid-July through September; thus pin oaks should be treated in mid-July and again in mid-August.</p> <p>For best results apply chemical at first sign of infestation. Spray 2-3 times about 7 to 10 days apart. Additional sprays may be needed if plants become reinfested. For nonpesticide control of mealybugs and scale on house plants see Fact Sheet 6411, "House Plant Care."</p>
WHITEFLIES	Whiteflies suck plant juices and cause the yellowing of leaves. Often "white clouds" of adults boil out of disturbed foliage.	Bayer Advanced Garden Tree & Shrub Insect Control neem, diazinon, Orthene - per label	
MISC. PESTS Found in ornamentalbeds or turf SLUGS & SNAILS	Heavy mulch and continuous damp conditions favor build-up of these pests.	metaldehyde - 15% dust or other properly labeled formulation mesuroil - 2% bait	Use sanitation program and apply dust or baits at 2 week intervals.
SOWBUGS, PILLBUGS & MILLIPEDES		diazinon - 8 oz of 25% EC/3 gal * malathion - 1 tsp of 50% EC/gal	Apply spray to soil surface, turf, and around plants.

Lawn Pests

ANTS (1/6 - 1/3 in) NOTE: For information on Red Imported Fire Ants, ask your County Extension Ag Educator.	Several species may establish nests in home lawns. Red Harvester ants are the largest, approximately 1/3 in long. They may denude vegetation in the area of the nest. They also inflict a vicious sting.	Bayer Advanced Lawn Power Force granules diazinon - 2 tbs (1 oz) of 25% EC/ 3 gal or 1 tbs/ 1 1/2 gal * diazinon 5% granules * Orthene 75 S (Fire Ant Killer) - per label Sevin - 1 tbs of 50% WP/gal	Labeled for band treatment around buildings. Spray hills thoroughly or use as a drench on red harvester ant mounds. Apply to 100 sq ft of established lawn. For granules - apply 1 1/2 tsp over and around each ant hill. Ants also may occur on ornamental plants, e.g. peonies, sunflowers, etc.
ARMYWORMS and CUTWORMS (1 - 1 1/2 in)	The armyworm and the fall armyworm are the species most likely to feed on turfgrass. The fall armyworm, which may be present in large numbers from mid-August through September. It is light brown to black with several stripes and a prominent white inverted "Y" mark on the front of the head. Armyworms feed on stems and leaves.	<p>diazinon - 2 tbs of 25% EC/gal * Sevin - 1 tbs of 50% WP/gal Orthene - 9.4 % at 1 1/2 oz/gal of water applied at 6 gal spray/1000 sq. ft. of turf (for fall armyworms).</p> <p>Bacillus thuringiensis (B.t. products - per label) Bayer Advanced Lawn and Garden Multi-Insect Killer Bug-B-Gon Multi-Purpose Insect Killer</p>	<p>Use 3 gal of mixed diazinon for 125 sq ft of turf</p> <p>Use 4 gal of mixed Sevin for 100 sq ft</p>
BERMUDAGRASS MITE (1/100 in)	Microscopic four-legged pests that are off-white and cigar shaped. They suck up sap from stems, causing stunting and short internodes (sometimes resulting in rosetted growth).	diazinon 2 tbs (1 oz) of 25% EC/ 3 gal * Kelthane - 2 tbs of 18.5 % EC/gal	3 gal finished spray per 125 sq ft 2 or more applications, 10 to 14 days apart, may be necessary to achieve control. These mites usually start to build up in July.
CHIGGERS and TICKS Chigger (1/100 in) Tick (1/8 - 1/2 in)	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 nymph and finally adult. The American dog tick, lone star tick, and brown dog tick are species commonly found around or inside home lawns. The brown dog tick is often found inside homes and other structures. American dog ticks are considered a major vector for Rocky Mountain Spotted Fever. NOTE: See Fact Sheet 7010.	<p>diazinon - 2 tbs of 25% EC/ 3 gal or 1 tbs/1 1/2 gal * malathion - 5 oz of 50% EC/gal - ticks only</p> <p>Sevin - 1 tbs of 50% WP/gal</p>	<p>Diazinon is labeled for chiggers and brown dog ticks.</p> <p>Sevin for chiggers and ticks (4 gal of mix for 100 sq ft). Keep the lawn and surrounding areas mowed. See Fact Sheet 7312 for insecticide suggestions for control of ticks inside the home.</p>
CLOVER MITES (1/32 in)	Red-brown mites that feed on clover and other nongrass plants in a lawn. Commonly a nuisance in the spring and fall when they migrate from lawns into homes. When this mite is squashed on a piece of white paper or between fingers, it leaves a red spot or stain.	<p>diazinon - 2 tbs of 25% EC/ 3 gal *</p> <p>Kelthane - 2 tsp of 18.5% EC/gal</p>	<p>Three gal of finish spray per 125 sq ft. Apply a band of spray around the house and on the foundation to help reduce migration into the home and keep grass mowed around the foundation.</p> <p>Apply 2 1/2 gal of Kelthane spray mixture per 1000 sq ft.</p>

Pest (Approximate Sizes Noted, See Picture)	Description & Damage	Suggested Chemical Formulation and Mixing Instructions with Water	Comments
DIGGER WASPS (Cicada Killer) (1 - 2 in)	Large black and yellow, vicious looking wasps that dig holes in soil. Mounds of soil outside their burrows may be seen in turf or ornamental beds during July or August.	diazinon - 2 tbs (1 oz) 25% EC/ 3 gal * Sevin 50 WP - per label	Treat in ground nest openings when wasps are not active or use soil drench of pesticide mix [pour slowly over openings (soil nest holes) and let material soak in]. Repeated treatment may be needed in 2 or 3 days if wasp activity continues. These wasps rarely sting. Consider not treating unless they become a major nuisance.
FLEAS (1/10 in)	Red-brown insects that hop. They often build up in turf where pets are present.	diazinon - 2 tbs (1 oz) of 25% EC/3 gal * malathion - 5 oz of 50% EC/gal Sevin - 1 tbs of 50% WP/ gal see Fact Sheet 7312 for control in the home	Apply 3 gal of mixed diazinon per 125 sq ft Apply 1 gal of malathion per 1000 sq ft Apply 4 gal of finish spray for each 100 sq ft of lawn area. Pets and their quarters should be treated with properly labeled chemicals at the same time the lawn is treated.
GRASSHOPPERS (1 - 2 in)	Tall grass and weeds favor build up of hoppers. Grasshoppers often move from tall grass or weed areas surrounding the lawn into the lawn or ornamentals.	diazinon - 2 tbs (1 oz) of 25% EC/3 gal * Sevin - 3-4 tbs of 50% WP/3 gal Orthene - 2 tbs pf 9.4% EC/gal	Treatments should be made when nymphs/immature hoppers are first seen. The larger the hoppers grow, the harder they are to kill. Additionally, they easily move between areas and pesticide residues rarely last long enough to kill hoppers more than a few days after treatment.
LEAFHOPPERS (1/8 - 1/4 in)	Tiny, wedge-shaped insects that are yellow, brown, or green in color. When disturbed, they fly or hop short distances about the turf. They suck sap from the leaves and stems. Damaged grass may show a slight yellowing or appear off-white.	diazinon - 2 tbs (1 oz) of 25% EC/3 gal * Sevin - 3-4 tbs of 50% WP/gal Orthene - 3 tbs of 9.4% ECgal	3 gal covers 125 sq ft 4 gal covers 100 sq ft 6 gal of mix per 1000 sq ft Treat when leafhoppers are abundant, but before grass is discolored. Newly seeded or sprigged lawns are most susceptible.
SOD WEBWORMS Larva (3/4 - 1 in)	Larvae are grey to green with a dark brown head and dark spots over the body. Caterpillars build silk lined tunnels of earth near the soil surface. They chew off grass stems and leaves at the soil line. Heavy damage results in small dead spots that appear as if closely cut by a "dull" lawn mower.	diazinon - 2 tbs (1 oz) of 25% EC/3 gal * diazinon - 2 lbs of 5% granules/1000 sq ft * Sevin - 1 tbs of 50% WP/gal Orthene - 3 tbs of 9.4% EC/gal BioSafe - per label beneficial nematodes - per label	Apply 1 gal of spray mix over 60 sq ft Apply 3 gal of spray mix over 125 sq ft Apply 4 gal of finish spray for 100 sq ft of lawn Mow lawn and water well 1 to 2 days before treatment. The generations that appear in July and August generally cause the most damage.
WHITE GRUBS ** (1 - 1 1/2 in)	White C-shaped larvae with 6 legs and a brown head. Feed on roots and underground tender parts of plants. The name white grub often applies to the larvae of species of beetles (e.g. May / June beetles, Japanese beetles, etc.). Since adults are attracted to light, grubs often become well established in the soil under or close to outdoor lights.	Bayer Advanced Lawn Grub Control Ortho Grub-B-Gone Sevin - 3 tbs of 50% WP/150 gal of water diazinon - 2 tbs of 25% EC/3 gal * diazinon - 2 1/2 lbs of 5% granules per 1000 sq ft * Oftanol - 3 lbs of 1.5% (or 0.9 lb of 5% granules/1000 sq ft) Biosafe - per label beneficial nematodes - per label	Apply 1 gal of spray mix over 60 sq ft Apply the mixed 150 gal over 5000 sq ft of turf (or equivalent ration for smaller areas). Apply 3 gal over 125 sq ft [Note: Some 25% diazinon labels suggest 10 lbs (5 oz) in 15 gal of water for 500 sq ft]. Treat damaged areas and where grubs are present in soil. Water in thoroughly, to the point of drenching the root zone.

*Diazinon registration for homeowners use in lawns and gardens will be phased out by December, 2003.

**Control comments: Primary control comes from chemical application in late summer or early fall (e.g. from mid-August through September). NOTE: Good soil moisture is needed for grubs to be up in the root zone during this period. One should sample the area for grubs prior to making any treatments. One or more grubs per sq ft of turf is a suggested treatment level. NOTE: "Milky Spore" disease agent will control Japanese beetle grubs ONLY.

Abbreviations and measurements used in the tables are: WP = wettable powder; EL = emulsifiable liquid; EC = emulsifiable concentrate; LS = liquid solution; tbs = tablespoon; tsp = teaspoon; and 1 tbs = 1/2 fl oz or 3 tsp.

NOTE: During period of hot, humid weather, wettable powder (WP) formulations are less likely to burn plant foliage than liquid formulations.

BEE CAUTIONS: Many of the suggested insecticides are highly toxic to bees exposed to direct treatment or residues on plants. Do not use an insecticide on your plants when value of bees as pollinators is more important than insect control. Applications after sunset will generally reduce hazards to bees.

The pesticide information in this publication was current with federal and state regulations at the time of printing. The user is responsible for determining that the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label directions. The information given herein is for educational purposes only. References to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Oklahoma Cooperative Extension Service is implied.

OSU Extension Facts are also available on the World Wide Web at: <http://agweb.okstate.edu/pearl/>

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