



# Current Report

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## Commercial Management of Turfgrass Insects and Mites

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Arthropod pests of turfgrass are varied and sometimes difficult to manage. Damage caused by arthropod pests can be mistaken for disease, drought stress, or other environmental disorders, so proper identification of the causal agent is an essential component of integrated pest management (IPM) of turfgrass pests. Chemical control should not be used as a substitute for good horticultural practices or as “preventative insurance” because it is usually not economically or environmentally justifiable. Careless pesticide use also can encourage the development of insecticide resistance. Many turfgrass pest problems can be avoided by following good horticultural practices such as selection of Oklahoma-adapted varieties that are resistant or tolerant to commonly encountered pests. Other cultural control methods include effective thatch management, mowing heights and frequencies that do not stress turfgrass, proper fertilization and irrigation, and weed and disease control. Keep in mind that insecticides with a broad spectrum of activity can harm more than the intended target pest, including pollinators and natural enemies (predators and parasites) of pests. Whenever possible, choose a “reduced risk” insecticide that is not harmful to the environment or non-target organisms when used correctly. Rotate among different pesticide classes to delay or prevent resistance among target pest populations. Chemical recommendations made within this publication are current as of the revised date and are intended for commercial use by golf course superintendents, lawn and landscape professionals, and parks and recreation managers. Always check the insecticide label for the most

current application rates and methods, and any use restrictions. Refer to the following OSU publications for additional information.

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| E-1020   | A Pocket Guide to Oklahoma Turfgrass Diseases, Insects, and Other Disorders (\$5 and available through Oklahoma Cooperative Extension Service) |
| HLA-6418 | Selecting A Lawn Grass for Oklahoma  |
| HLA-6419 | Establishing A Lawn in Oklahoma  |
| HLA-6420 | Lawn Management in Oklahoma  |
| HLA-6421 | Controlling Weeds in Home Lawns  |
| HLA-6423 | Controlling Grassy Weeds in Home Lawns   |
| HLA-6600 | Turfgrass Management of Bermudagrass Football Fields   |
| HLA-6601 | Broadleaf Weed Control for Lawns in Oklahoma   |
| CR-6602  | Performance of Tall Fescue Turfgrasses at Stillwater, Oklahoma   |
| CR-6603  | Trade Publications for Professional Turfgrass Managers   |
| HLA-6604 | Thatch Management in Lawns   |
| CR-6605  | 2006 Oklahoma Turfgrass Sod Source Directory (revised 2009)  |
| HLA-6608 | Managing Turfgrass in the Shade in Oklahoma  |
| EPP-7324 | Large Patch (Zoysia Patch) of Warm-Season Turfgrasses  |
| EPP-7658 | Dollar Spot of Turfgrass   |
| EPP-7665 | Spring Dead Spot of Bermudagrass   |

<i>Pest, Damage, and Management</i>	<i>Pesticide Common Name</i>	<i>Pesticide Trade Name and Formulation</i>	<i>Pesticide Class</i>	<i>Comments</i>	
<p><b>Ants (including Red Imported Fire Ant)</b></p> <p>Social insects that live in colonies. Size and color variable, depending on species. All have characteristic narrow "waist."</p> <p><u>Damage:</u> Build mounds, sometimes clear bare areas in turf. Red imported fire ants and red harvester ants can inflict a painful sting. Some people are hypersensitive to the sting.</p> <p><u>Management:</u> No specific threshold has been established. Ants can be managed with baits or registered turf insecticide applications as mound drenches or perimeter sprays.</p>	<b>Baits</b>			Baits may be applied as a broadcast or perimeter treatment around individual mounds. Apply when ants are foraging. Follow specific label instructions. See end of publication for control notes on red imported fire ants.	
	abamectin	Varsity	6		
	fenoxy carb	Award	7B		
	fipronil	Chipco Choice/ Quali-Pro Fipronil 0.0143G	2B		
		hydramethylnon	Amdro Pro	20A	
		S-methoprene	Extinguish	7A	
		spinosad	Justice	5	
		<b>Sprays and Granulars</b>			Sprays may be applied as a perimeter spray around the outside of a building or a mound drench. Follow specific label instructions.
		acephate	Orthene T, T&O WSP	1B	
		bifenthrin	Talstar <sup>†</sup> / UP-Star Gold <sup>†</sup>	3	
		bifenthrin + clothianidin	Aloft GC SC	3 + 4A	Only for use against nuisance ants.
		bifenthrin + imidacloprid	Allectus GC <sup>†</sup>	3 + 4A	
		carbaryl	Sevin 80 WSP	1A	Observe phytotoxicity precautions.
		chlorpyrifos	Dursban 50 W <sup>†</sup>	1B	
		cypermethrin	ProBuild TC	3	Treat ant nests early morning or late evening when it is cool.
		cyfluthrin	Tempo 20 WP/Tempo SC	3	Use high rate for fire ant nests.
		cyfluthrin + imidacloprid	Discus	3 + 4A	
		deltamethrin	Deltagard T&O/ Deltagard G	3	
		lambda- cyhalothrin	Demand CS	3	
		permethrin	Perm-up 3.2 EC <sup>†</sup>	3	
	spinosad	Conserve SC T&O	5		
<p><b>Armyworms and Cutworms</b></p> <p>Larval stage of several moths. Measure up to 1.5 inches.</p> <p><u>Damage:</u> These caterpillars chew grass blades and often live belowground during the day, especially in bentgrass greens. Damage is most evident with feeding activity of large larvae.</p> <p><u>Management:</u> Treat when damage is noticeable and 2-3 small (1/2 inch or less) caterpillars per square foot are present.</p>	acephate	Orthene T, T&O WSP	1B		
	azadirachtin	Ornazin 3% EC	18B		
	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i>	Dipel Pro/Javelin WG	11B2	Insects must consume material. Most effective against young caterpillars.	
	bifenthrin	Talstar <sup>†</sup> / UP-Star Gold <sup>†</sup>	3		
	bifenthrin + clothianidin	Aloft GC SC	3 + 4A		
	bifenthrin + imidacloprid	Allectus GC <sup>†</sup>	3 + 4A		
	carbaryl	Sevin 80 WSP	1A	Do not irrigate or mow treated areas within 24 hours post-application.	
	chlorantraniliprole	Acelepryn SC/ Acelepryn G	28		
	chlorpyrifos	Dursban 50 W <sup>†</sup>	1B		
	clothianidin	Arena 50 WDG/Arena 0.5 G	4A		

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Disclosing solution can be used to monitor larvae hiding in burrows. Mix 1 Tbsp. of lemon-scented dish detergent in 1 gal of water. Pour solution over infested turf and wait a few minutes. Larvae become agitated by soapy water and exit burrows.	cyfluthrin	Tempo 20 WP/Tempo SC	3	Do not irrigate or mow treated areas within 24 hours post-application.
	cyfluthrin + imidacloprid	Discus	3 + 4A	
	deltamethrin	Deltagard T&O/ Deltagard G	3	
	halofenozide	Mach 2 SC/Grubex	18A	
	indoxacarb	Provaunt	22	
	lambda- cyhalothrin	Demand CS	3	
	permethrin	Perm-up 3.2 EC <sup>†</sup>	3	
	spinosad	Conserve SC T&O	5	
	trichlorfon	Dylox 80 T&O/Dylox 6.2 G	1B	
<b>Billbugs</b>	bifenthrin	Talstar <sup>†</sup> / UP-Star Gold <sup>†</sup>	3	Active against adults.
Adults are typical “weevils” with elongate snout measuring 0.25 inches, and having a shiny black body with raised “Y”- shaped area on thorax. Larvae: legless, having a white body with a brown head capsule.	bifenthrin + clothianidin	Aloft GC SC	3 + 4A	Active against larvae. Do not irrigate treated areas within 24 hours post-application.
	bifenthrin + imidacloprid	Allectus GC <sup>†</sup>	3 + 4A	
<u>Damage:</u> Adults chew holes in leaves and stems to lay eggs. Larvae burrow in stems, crown. Feeding leaves sawdust. Plants may die, and sod will not hold together when rolled up. Sometimes mistaken for winter-kill damage. <u>Management:</u> No threshold established. Treat if damage is noticeable in lawn in spring and billbug larvae are present.	carbaryl	Sevin 80 WSP	1A	Active against larvae. Do not irrigate treated areas within 24 hours post-application.
	chlorantraniliprole	Acelepryn SC/Acelepryn G	28	
	chlorpyrifos	Dursban 50 W <sup>†</sup>	1B	
	clothianidin	Arena 50 WDG/Arena 0.5 G	4A	
	cyfluthrin	Tempo 20 WP/Tempo SC	3	
	cyfluthrin + imidacloprid	Discus	3 + 4A	
	deltamethrin	Deltagard T&O/ Deltagard G	3	
	halofenozide	Mach 2 SC/Grubex	18A	
	imidacloprid	Merit 75 WP	4A	
	lambda- cyhalothrin	Demand CS	3	
<b>Chiggers</b>	bifenthrin + clothianidin	Aloft GC SC	3 + 4A	
Small (0.5 mm) mite larvae.	carbaryl	Sevin 80 WSP	1A	
<u>Damage:</u> Bites cause reddish welts, accompanied by intense itching that can persist for 7 to 10 days. Bites usually occur in areas where clothing fits tightly to the skin. <u>Management:</u> Regular mowing of grass and removal of weeds and brush can reduce chigger numbers. Repellents can be used for personal protection. If working in a chigger infested area, take a soapy bath immediately.	chlorpyrifos	Dursban 50 W <sup>†</sup>	1B	
	cyfluthrin	Tempo 20 WP/Tempo SC	3	
	deltamethrin	Deltagard T&O/ Deltagard G	3	
	lambda- cyhalothrin	Demand CS	3	

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<p><b>Chinch bugs</b></p> <p>Adults are 1/8 inch long, black with white wings that are folded over the back into an “hour glass” shape. Nymphs are reddish to brown, with a white stripe across their “shoulders.”</p> <p><u>Damage:</u> More of a problem in St. Augustinegrass. Aggregations of chinch bugs suck plant juices and clog phloem and xylem. As they feed, they also inject a toxin. Symptoms resemble drought injury; patchy with chlorotic and necrotic leaves.</p> <p><u>Management:</u> No threshold established. Scout by flotation using a coffee can with both ends cut away; sink one end into the ground and fill can with 3/4 inch of water. Adults and nymphs will float to top. Keep thatch to a minimum and maintain proper levels of water and fertilizer.</p>	acephate	Orthene T, T&O WSP	1B	
	bifenthrin	Talstar <sup>†</sup> / UP-Star Gold <sup>†</sup>	3	Higher application rates of UP-Star may be needed when adults and nymphs are present in mid-summer.
	bifenthrin + clothianidin	Aloft GC SC	3 + 4A	
	bifenthrin + imidacloprid	Allectus GC <sup>†</sup>	3 + 4A	
	carbaryl	Sevin 80 WSP	1A	Do not irrigate treated areas within 24 hours post-application.
	chlorantraniliprole	Acelepryn SC/Acelepryn G	28	
	chlorpyrifos	Dursban 50 W <sup>†</sup>	1B	
	clothianidin	Arena 50 WDG/Arena 0.5 G	4A	
	cyfluthrin	Tempo 20 WP/Tempo SC	3	
	cypermethrin	ProBuild TC	3	
deltamethrin	Deltagard T&O/ Deltagard G			
lambda- cyhalothrin	Demand CS	3		
permethrin	Perm-up 3.2 EC <sup>†</sup>	3		
trichlorfon	Dylox 80 T&O/Dylox 6.2 G	1B		
<p><b>Digger wasps (Cicada Killer, Scoliid, and Typhiid Wasps)</b></p> <p>Typical wasp appearance, often colorful. Males often harass people who enter their breeding territory.</p> <p><u>Damage:</u> Female wasps dig holes that they provision with cicadas. Not social, but sometimes nest in groups. Prefer bare ground.</p> <p><u>Management:</u> No threshold established. Wasps prefer bare ground over mulched landscapes. Control with spray or dust of the nest entrances.</p>	bifenthrin	Talstar <sup>†</sup> / UP-Star Gold <sup>†</sup>	3	
	carbaryl	Sevin 80 WSP	1A	
	chlorpyrifos	Dursban 50 W <sup>†</sup>	1B	
	cyfluthrin	Tempo 20 WP/Tempo SC	3	
	deltamethrin	Deltagard T&O/ Deltagard G	3	
	lambda- cyhalothrin	Demand CS	3	
<p><b>Fleas</b></p> <p>Small (0.03 to 0.4 inch), brown, wingless insects that are flattened on both sides.</p> <p><u>Damage:</u> Fleas feed on blood using sucking mouthparts. Bites cause small hardened bump that is itchy and/or painful.</p>	acephate	Orthene T, T&O WSP	1B	
	bifenthrin	Talstar / UP-Star Gold <sup>†</sup>	3	
	bifenthrin + imidacloprid	Allectus GC <sup>†</sup>	3 + 4A	
	carbaryl	Sevin 80 WSP	1A	
	chlorpyrifos	Dursban 50 W <sup>†</sup>	1B	
	cyfluthrin	Tempo 20 WP/Tempo SC	3	

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<b>Fleas (cont'd)</b>				
Bites typically located on lower legs and ankles.	cypermethrin	ProBuild TC	3	
	deltamethrin	Deltagard T&O/ Deltagard G	3	
Treat areas where pets frequent (indoor and outdoor). Flea hotspots can be easily detected by wearing white athletic socks, or taking a white rag attached to a stick and dragging it over areas that might have infestations.	lambda- cyhalothrin	Demand CS	3	
	permethrin	Perm-up 3.2 EC <sup>†</sup>	3	
	spinosad	Conserve SC T&O	5	
<b>Grasshoppers</b>	acephate	Orthene T, T&O WSP	1B	
1-2 inches, outer wings leathery, inner wings clear or colored. Enlarged hind legs designed for jumping.	bifenthrin	Talstar <sup>†</sup> / UP-Star Gold <sup>†</sup>	3	
	bifenthrin + clothianidin	Aloft GC SC	3 + 4A	
	carbaryl	Sevin 80 WSP	1A	
<u>Damage:</u> Grasshoppers feed on foliage of numerous plants.	chlorpyrifos	Dursban 50 W <sup>†</sup>	1B	
	cyfluthrin	Tempo 20 WP/Tempo SC	3	
<u>Management:</u> No threshold established. See EPP-7322: Grasshopper Control in Gardens and Landscapes.	cyfluthrin + imidacloprid	Discus	3 + 4A	
	deltamethrin	Deltagard T&O/ Deltagard G	3	
	indoxacarb	Provaunt	22	
	lambda- cyhalothrin	Demand CS	3	
<b>Millipedes</b>	bifenthrin	Talstar <sup>†</sup> / UP-Star Gold <sup>†</sup>	3	
Long, with round body and many (80 to 400) legs.	bifenthrin + imidacloprid	Allectus GC <sup>†</sup>	3 + 4A	
	carbaryl	Sevin 80 WSP	1A	
<u>Damage:</u> Millipedes rarely cause damage, but can invade households when populations build and conditions become dry.	chlorpyrifos	Dursban 50 W <sup>†</sup>	1B	
	lambda- cyhalothrin	Demand CS	3	
	permethrin	Perm-up 3.2 EC <sup>†</sup>	3	
<u>Management:</u> 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.				

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<b>Mites:</b> <b>(Bermudagrass and Zoysiagrass mites)</b>	bifenthrin	Talstar <sup>†</sup> / UP-Star Gold <sup>†</sup>	3	Optimal control may be achieved by mixing bifenthrin with the labeled rate of an appropriate surfactant such as a penetrant.
Small (less than 1/100 inch), white, cigar-shaped mites.	bifenthrin + clothianidin	Aloft GC SC	3 + 4A	Works on clover mite only.
<b>Damage:</b> Alter the growth of grass, cause stunting, and shortening of nodes in bermudagrass (“buggy whipping” in zoysiagrass). Plants may become yellow, weakened.	bifenthrin + imidacloprid	Allectus GC <sup>†</sup>	3 + 4A	Works on clover mite only.
	chlorpyrifos	Dursban 50 W <sup>†</sup>	1B	
	cyfluthrin + imidacloprid	Discus	3 + 4A	Works on clover mite only.
	lambda- cyhalothrin	Demand CS	3	Works on clover mite only.
<b>Management:</b> Cultural practices, including fertility and mowing, can reduce problem. Spray timing not currently known for most effective control. Resistant turfgrass varieties are available.				
<b>(Clover mites)</b>				
Spider-like mites, dark green with orange-red markings, less than 1 mm long, unusually long front legs.				
<b>Damage:</b> Minor turf pest, but can become nuisance when large numbers build and move to buildings for shelter in early spring and fall.				
<b>Management:</b> Cultural practices that enhance lawn health help limit damage and build up. Spot treat areas where mites accumulate.				
<b>Mole Crickets</b>	acephate	Orthene T, T&O WSP	1B	
Adults cylindrical, 1.3 to 1.4 inches, body covered with dense coat of fine hair, and spade like front legs that resemble a mole’s front legs.	bifenthrin	Talstar <sup>†</sup> / UP-Star Gold <sup>†</sup>	3	Apply late in the day followed by irrigation with up to 1/2 inch of water.
	bifenthrin + clothianidin	Aloft GC SC	3 + 4A	
<b>Damage:</b> Northern mole cricket and prairie mole cricket are Oklahoma residents and are not considered major pests of turf. Can injure turf by feeding on turf and tunneling.	bifenthrin + imidacloprid	Allectus GC <sup>†</sup>	3 + 4A	
	clothianidin	Arena 50 WDG/Arena 0.5 G	4A	
	cyfluthrin	Tempo 20 WP/Tempo SC	3	
	cypermethrin	ProBuild TC	3	
	cyfluthrin + imidacloprid	Discus	3 + 4A	Irrigate after application with 1/4 to 1/2 inch of water.
<b>Management:</b> Define injured areas, and treat with insecticide. Normally control not required.	deltamethrin	Deltagard T&O/ Deltagard G	3	Irrigate after application.
	fipronil	Chipco Choice/ Quali-Pro Fipronil 0.0143G	2B	

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	imidacloprid	Merit 75 WP	4A	
	indoxacarb	Provaunt	22	
	lambda- cyhalothrin	Demand CS	3	Use higher rate for populations comprised of mostly adults.
	permethrin	Perm-up 3.2 EC <sup>†</sup>	3	
	trichlorfon	Dylox 80 T&O/Dylox 6.2 G	1B	Thoroughly irrigate lawn following treatment.
<b>Slugs and Snails</b>	mesurol	Mesurol Pro <sup>†</sup>	1A	Not for use on residential lawns.
Soft bodied, with shell (snail) or bare (slug). Leave slime trail where they have been feeding.	metaldehyde	Metarex 4% Snail and Slug Bait	n/a	Rotate with mesurol to help avoid development of resistance in slugs and snails.
<u>Damage:</u> Chew leaves, scrape leaf tissue.				
<u>Management:</u> Treat with bait. Don't overwater lawn.				
<b>Sod Webworms</b>	acephate	Orthene T, T&O WSP	1B	
Larvae vary from gray to light green to brown. Measure 0.6 to 1 inch. Adult moths with wingspans about 0.5 to 0.75 inch, many with a snout-like projection, and fly in a zigzag pattern when disturbed.	azadirachtin	Ornazin 3% EC	18B	
	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i>	Dipel Pro/Javelin WG	11B2	Insects must consume material. Most effective against young caterpillars.
	bifenthrin	Talstar <sup>†</sup> / UP-Star Gold <sup>†</sup>	3	
	bifenthrin + clothianidin	Aloft GC SC	3 + 4A	
<u>Damage:</u> 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.	bifenthrin + imidacloprid	Allectus GC <sup>†</sup>	3 + 4A	
	carbaryl	Sevin 80 WSP	1A	Delay watering and mowing for 12 to 24 hours post-application.
	chlorantraniliprole	Acelepryn SC/Acelepryn G	28	
	chlorpyrifos	Dursban 50 W <sup>†</sup>	1B	
<u>Management:</u> 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).	clothianidin	Arena 50 WDG/Arena 0.5G	4A	
	cyfluthrin	Tempo 20 WP/Tempo SC	3	
	cyfluthrin + imidacloprid	Discus	3 + 4A	
	deltamethrin	Deltagard T&O/ Deltagard G	3	
	halofenozide	Mach 2 SC/Grubex	18A	
	indoxacarb	Provaunt	22	
	lambda- cyhalothrin	Demand CS	3	
	methomyl	Lannate <sup>†</sup>	1A	For use on sod farms only.
	permethrin	Perm-up 3.2 EC <sup>†</sup>	3	
	spinosad	Conserve SC T&O	5	Spinosad applied early morning or late afternoon can maximize control. Delay watering or mowing 12 to 24 hours post-application.
	trichlorfon	Dylox 80 T&O/Dylox 6.2 G	1B	

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<p><b>Sowbugs/ Pillbugs</b></p> <p>Small, gray, and “armored” arthropods.</p> <p><u>Damage:</u> Sowbugs rarely cause damage but can invade households when populations build and conditions become dry.</p> <p><u>Management:</u> 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>	bifenthrin	Talstar <sup>†</sup> / UP-Star Gold <sup>†</sup>	3	
	bifenthrin + clothianidin	Aloft GC SC	3 + 4A	
	bifenthrin + imidacloprid	Allectus GC <sup>†</sup>	3 + 4A	
	carbaryl	Sevin 80 WSP	1A	
	chlorpyrifos	Dursban 50 W <sup>†</sup>	1B	
	deltamethrin	Deltagard T&O/ Deltagard G	3	
	lambda- cyhalothrin	Demand CS	3	
	permethrin	Perm-up 3.2 EC <sup>†</sup>	3	
<p><b>Ticks</b></p> <p>Small, 8-legged arthropod, appearing flattened when unfed. Body color ranges from red to brown to nearly black. Four life stages: egg, larva (six legs), nymph, and adult.</p> <p><u>Damage:</u> Feeding results in inflammation, swelling, and potential secondary infection. Ticks can transmit disease, including Lyme’s Disease, Rocky Mountain Spotted Fever, tularemia, ehrlichiosis, and babesiosis to humans.</p> <p><u>Management:</u> Manage ticks on household pets and pet resting areas. Use physical inspection of anyone who is active in tick-infested areas during “tick season.” Use repellents such as DEET, and treat premises as needed.</p>	bifenthrin	Talstar <sup>†</sup> / UP-Star Gold <sup>†</sup>	3	
	bifenthrin + imidacloprid	Allectus GC <sup>†</sup>	3 + 4A	
	carbaryl	Sevin 80 WSP	1A	
	chlorpyrifos	Dursban 50 W <sup>†</sup>	1B	
	cyfluthrin	Tempo 20 WP/Tempo SC	3	
	cyfluthrin + imidacloprid	Discus	3 + 4A	
	cypermethrin	ProBuild TC	3	
	deltamethrin	Deltagard T&O/ Deltagard G	3	
lambda- cyhalothrin	Demand CS	3		

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<b>White Grubs</b>	bifenthrin + clothianidin	Aloft GC SC	3 + 4A	
<p>Large, "C"-shaped grub with a white body and a brown head. Larval stage of several beetle species.</p> <p><u>Damage:</u> White grubs feed on grass roots at or just below the thatch layer. Grass takes on droughty appearance. Damage more pronounced in fall. Predator activity from armadillos, skunks, moles, and birds indicates infestations and causes secondary damage.</p> <p><u>Management:</u> Masked chafer: 15 to 20 per square foot</p> <p>May/June beetle: 4 to 5 per square foot</p> <p>Many insecticides are most effective when white grubs are small and feeding near the soil surface, usually July through August.</p>	bifenthrin + imidacloprid	Allectus GC†	3 + 4A	
	carbaryl	Sevin 80 WSP	1A	
	chlorantraniliprole	Acelepryn SC/Acelepryn G	28	
	clothianidin	Arena 50 WDG/Arena 0.5 G	4A	
	imidacloprid	Merit 75 WP	4A	
	halofenozide	Mach 2 SC/Grubex	18A	
	thiamethoxam	Meridian 25 WG/ Meridian 0.33 G	4A	
trichlorfon	Dylox 80 T&O/Dylox 6.2 G	1B	Thoroughly irrigate lawn following treatment. Can be applied as a rescue treatment in late summer or early fall.	

## Control Notes for Red Imported Fire Ants

### Individual mound treatment

Generally, non-chemical methods are not effective against fire ants. Digging or tilling up mounds simply moves them around. Boiling water (3 gallons per mound) may be effective for treating individual mounds, but it must be done carefully to avoid killing plants and not suffering from serious burns.

Best control has been achieved with chemical treatment of nests and surrounding areas. The best time to individually treat mounds with contact insecticides is on a sunny morning after a cool night, when ants are near the surface of the mound. Such treatments can be accomplished with drenches, surface sprays, granules, or baits.

Most mound drenches involve mixing the insecticide in 1-2 gallons of water. The treatment should be applied to the mound with a watering can that sprinkles the treatment on the mound much like a gentle rain. If the drench begins to cause the dirt on the mound to run off, stop and allow the liquid to soak into the mound, then resume drenching until all of the liquid is used.

Dust formulations like Pinpoint can be sprinkled on and around the mound, according to label instructions. If the label states that the treatment should be watered in, then do so with a watering can. Other products may state that the products should not be watered in.

### Baits

Most ant baits contain a slow-acting insecticide, such as an insect growth regulator (IGR) that can be taken back to the mound and fed to other members of the colony, including the queen. They can be applied as a broadcast, or used as individual mound treatments. If they are used to treat individual mounds, the bait should be placed about 1-3 feet around, but not directly on, the mound.

Baits work best if applied when workers are actively foraging. This can be determined by leaving some greasy food, such as some chunks of tuna fish, or hot dog pieces, potato chips, or peanut butter near a mound and checking if for ant activity after 15-20 minutes. During the summer, worker ants forage at night and are actually inactive during the day. The best time to apply baits is in late afternoon or early evening. Moisture and rain will dissolve bait particles, so use baits only when grass and soil are dry, and no rain is expected within several hours after treatment.

A proven approach for managing red imported fire ants is to make a broadcast bait application in late spring when soil temperatures are above 70° F and ants are actively foraging. This bait application should be followed up by treating individual problem mounds about 1-2 weeks later. For best results, always avoid disturbing the mound before or during treatment since it will cause the ants to move away and avoid the chemical.

For downloadable documents on red imported fire ant control options and more information on red imported fire ants in Oklahoma, check the Oklahoma State University Department of Entomology and Plant Pathology's Fire Ant Website at <http://entopl.okstate.edu/fireants/fireants.html>.

\* 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.

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1A=Carbamate	12A=Diaphenthiuron
1B=Organophosphate	12A=Organotin miticide
2A=Cyclodiene organochlorine	12C=Propargite
2B=Phenylpyrazole	13=Chlorfenapyr, DNOC
3=Pyrethroid	14=
4A=Neonicotinoid	15=Benzoylureas
4B=Nicotine	16=Buprofezin
5=Spinosyns	17=Cyromazine
6=Avermectins	18A=Diacylhydrazine
7A=Juvenile hormone analogues	18B=Azadirachtin
7B=Fenoxycarb	19=Amitraz
7C=Pyriproxyfen	20A=Hydramethylnon
8A=Methyl bromide (fumigant)	20B=Acequinocyl
8B=Aluminum phosphide (fumigant)	20C=Fluacrypyrim
8C=Sulfuryl fluoride (fumigant)	21=METI acaricides, Rotenone
9A=Cryolite	22=Indoxacarb
9B=Pymetrozine	23=Tetronic acid derivatives
9C=Flonicamid	24A=Aluminum phosphide
10A=Clofentezine	24B=Cyanide
10B=Hexythiazox	24C=Phosphine
11A1=Bt var. israelensis	25=Bifenazate
11A2=Bt. var. sphaericus	26=Fluroacetate
11B1=Bt. var. aizawai	27A=P450 monooxygenase inhibitors
11B2=Bt. var. kurstaki	27B=Esterase inhibitors
11C=Bt. var. tenebrionis	28=Anthranilic diamides
BLO=Biological Organism	NS=Non-specific, multi-site
M=Microbial	UN=Unknown MOA

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#### NOTES:

1. Before purchasing and using any pesticide, read the label carefully for registered use(s), rates, and application frequency. Also note toxicity category on the label of each pesticide since toxicity ratings may affect re-entry intervals and note any ventilation requirements. Wear protective clothing as recommended on each pesticide label.
2. Insecticides having a broad spectrum of activity (e.g., pyrethroids, organophosphates, carbamates, neonicotinoids) may not be compatible with biological control because they can harm some natural enemies. Some broad-spectrum insecticides are more selective than others, and selectivity further depends on how, when, and where the insecticide is applied. Be sure to check the label for the kinds of insects controlled by the product, or contact your county extension educator for information on compatibility with biological control.



## 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.

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