

Insect Control in Commercial Turf

Will Hudson, Extension Entomologists

Note on insecticide selection and use for various turfgrass sites:

Not all turfgrass sites are created equal. It is important to read the label on the product before purchasing an insecticide for a particular site use. An insecticide may not be labeled for all turfgrass uses (e.g., lawns, athletic field, sod farms, or golf course). Some products are only labeled for use on golf courses or sod farms. For example, Dursban 50W (chlorpyrifos) is not labeled for use on residential or commercial lawns. Furthermore, Orthene (acephate) formulations are labeled for use against fire ants in residential and commercial lawns, but not other pests.

In some instances, manufacturers will add “GC” as part of the title to inform users that a product can be used on golf courses when other formulations of that product are not labeled for that site. For example, Allectus SC is not labeled for use on golf courses but Allectus GC SC is. Labeling for sod farms will also follow similar rules. For example, Merit 0.5 G is not to be used on sod farms, but Merit 2 and Merit 75WP are labeled for use on sod farms.

If product restrictions are noted on the label, they may appear as a note next to the product names in this publication. For example, when you read, “landscape turf only” that product is not available for use on golf course or sod farms. When a product labeled for these other sites is available it is included but it may not have any restrictions noted. If no restrictions are noted, the product is likely labeled for general use on turfgrass or on all turfgrass sites. The label on your individual product may vary from the online version of the manufacturer’s labels, therefore abide by all restrictions on the product label if they differ from those presented in this guide.

Restricted Use Pesticides (RUPs), those that only a certified pesticide applicator may use, supervise the use of, or purchase, will be noted. Uncertified pesticide applicators may not purchase, use or supervise the use of these products.

PESTS	INSECTICIDE AND FORMULATION	RATE	REMARKS AND PRECAUTIONS
Imported Fire Ants/ Ants	Bait treatments:		<p>The Most effective method for control of ants over a broad area is the use of a broadcast bait two times per year (spring/fall) coupled with individual mound treatments as needed.</p> <p><u>Broadcast Bait Treatments</u> Broadcast baits when ants are actively foraging for food (typically, warm, dry days in spring and fall). Some baits work within 48 hrs., some may take a month. Avoid applying baits just before or after irrigation or rain.</p> <p><u>Individual Mound Treatments</u> Do not disturb mounds before treatment. <i>Drenches:</i> Drench mounds when queen and brood are located close to soil surface on warm, dry days. Generally, it takes 1-2 gallons of water to drench a fire ant mound effectively. <i>Granules:</i> Scatter granules around the edge of the nest, not on top. <i>Dusts:</i> Dust evenly over top mound.</p> <p><u>Products cleared for pasture/rangeland use</u> Amdro (hydromethlnon) Award (fenoxycarb) Extinguish (methoprene) Distance (pyriproxyfen) Logic (fenoxycarb) Pounce (Permethrin) Pyrenone (Pyrethrins, Piperonyl Butoxide) Seige Pro (hydromethlnon)</p>
	indoxacarb Advion	4 Tbps/ mound or 1.5 lb/acre	
	hydromethlnon Amdro	5Tbps/ mound or 1-1.5 lb/acre	
	fenoxycarb Award	1-3 Tbps/ mound or 1-1.5 lb/acre	
	fipronil Chipco FireStar	5 Tbps/ mound or 1.5-15 lb/acre	
	Mound Drench Treatments:		
	acephate Orthene TTO 75WP	1 oz/5 gal	
	Orthene TTO 97	0.75 oz/5 gal	
	bifenthrin Talstar GC Flowable	RUP 1 tsp/gal	
	carbaryl Sevin SL	0.75 fl. oz./gal	
	chlorpyrifos Dursban 50W <i>(golf course and sod farms only)</i>	RUP 0.24 oz/gal	
	Dursban Pro	1 fl. oz./2 gal	
	deltamethrin DeltaGard GC 5SC	RUP 1.5 fl. oz./gal	
	imidacloprid + bifenthrin Allectus GC SC <i>(golf course and sod farms only)</i>	RUP 0.33 fl. oz./gal	
	Allectus SC <i>(landscape turf only)</i>	0.33 fl. oz./gal	
	lambda-cyhalothrin Scimitar CS <i>(landscape turf only)</i>	RUP 0.5 fl. oz./2.5 gal	
	Scimitar GC	0.5 fl. oz./2.5 gal	
	permethrin Astro <i>(landscape turf only)</i>	RUP 1.6 fl. oz./gal	
	spinosad Conserve	0.1 fl. oz./gal	

PESTS	INSECTICIDE AND FORMULATION	RATE	REMARKS AND PRECAUTIONS
Imported Fire Ants/ Ants (cont.)	Dry mound treatments:		
	acephate Orthene TTO 75WP	1-2 tsp/mound	
	cyfluthrin Bayer Fire Ant Killer	1 tsp/mound	
	deltamethrin Bengal Ultra Dust Fire Ant Killer (0.05%)	RUP 1 Tbsp/mound	
	Terro Fire Ant Killer (0.05%)	1 Tbsp/mound	
	DeltaGard G (<i>landscape turf only</i>)	2 Tbsp/mound**	
	imidacloprid + bifenthrin Allectus GC (<i>golf course and sod farms only</i>)	RUP 4 oz/mound**	
	Allectus G (<i>landscape turf only</i>)	4 oz/mound**	
	Broadcast Treatments:		
	bifenthrin Talstar GC Flowable	RUP 0.5 fl. oz./1,000ft ²	
	Talstar EZ Golf Granular	2.3-4.6 lb/1,000ft ²	
	carbaryl Sevin SL	3 fl. oz./1,000ft ²	
	chlorpyrifos Dursban 50W (<i>golf course and sod farms only</i>)	RUP 16 lb/acre	
	Dursban Pro	1.5 fl. oz./1,000ft ²	
	cyfluthrin Tempo SC Ultra (<i>landscape turf only</i>)	RUP 8 mL/1,000ft ²	
	Tempo WP Ultra (<i>landscape turf only</i>)	5-10 g (1-2 scoops)/1,000ft ²	
	Tempo WP GC (<i>golf course and sod farms only</i>)	1 packet/7,800ft ²	
	deltamethrin DeltaGard GC 5SC	RUP 1.5 fl. oz./gal	
	DeltaGard T&O 5SC (<i>landscape turf only</i>)	1.5 fl. oz./gal	
	DeltaGard G (<i>landscape turf only</i>)	1.5 fl. oz./gal	
	fipronil	<i>(Label indicates one spring application will provide season long control)</i>	
	Chipco Topchoice	2 lb/1,000ft ²	
	Gardentech Over 'n Out!	87 lb/acre	
	imidacloprid + bifenthrin Allectus GC SC	RUP 1.32-1.65 fl. oz./1,000ft ²	
	Allectus SC (<i>landscape turf only</i>)	1.32-1.65 fl. oz./1,000ft ²	
	Allectus GC	1.7-2.9 lb/1,000ft ²	
	Allectus G (<i>landscape turf only</i>)	1.7-2.9 lb/1,000ft ²	
	lambda cyhalothrin Scimitar CS (<i>landscape turf only</i>)	RUP 7 mL/1,000ft ²	
Scimitar GC	7 mL/1,000ft ²		

** Follow with 1-2 gallons water for best results

PESTS	INSECTICIDE AND FORMULATION	RATE	REMARKS AND PRECAUTIONS
Bees and Wasps (burrowing)	acephate Surrender	1-2 tsp/hole (<i>do not exceed this amount in 1ft²</i>)	Apply in late afternoon or early evening at insect entrance/exit holes.
	Orthene TTO 75WP	1-2 tsp/hole (<i>do not exceed this amount in 1ft²</i>)	Bee, wasp, and hornet sprays in pressurized cans are also effective. Follow label instructions.
	carbaryl 10% Sevin granules	1.4-1.9 lb/1,000ft ² (<i>Water in after application</i>)	
	various pyrethroids*	See label	
Chinch bugs	acephate Orthene TTO 75WP	1.2-2.4 oz/1,000ft ²	Reducing the number of treatments and applying spot treatments (which is most effective especially early in the season) will allow for the conservation of natural enemies, as native parasites and predators can play a significant role in chinch bug management.
	Orthene TTO 97 (<i>golf course and sod farm only</i>)	0.9-1.8 oz/1,000ft ²	
	bifenthrin	RUP	Pyrethroids are effective, but they provide no residual control and evidence of resistance has already surfaced for bifenthrin (Talstar, Bifen), with cross-resistance to other pyrethroids expected. Rotation of chemistries is, therefore, important.
	Talstar EZ Golf Granular	2.3-4.6 lb/1,000ft ²	
	Talstar GC Flowable	0.25-0.5 fl. oz./1,000ft ²	In most cases, irrigate turf area prior to application unless noted otherwise on the product label.
	carbaryl Sevin 80 WSP	7.5-10 lb/acre	
	Sevin SL	6-8 fl. oz./1,000ft ²	Granules can be used but must be watered in thoroughly. Use high volume application (5 gal/1000 ft ²) especially with pyrethroids.
	clothianidin Arena 50WDG	10.67 oz./acre	
	Arena 0.5G	66.67 lb/acre	
	cyfluthrin	RUP	
	Tempo SC Ultra (<i>landscape turf only</i>)	8 mL/1,000ft ²	
	Tempo WP Ultra (<i>landscape turf only</i>)	7.7-15.4 oz./acre	
	Tempo 20 WP (<i>golf course only</i>)	1 packet/7,800ft ²	
	deltamethrin	RUP	
	DeltaGard T&O 5SC (<i>landscape turf only</i>)	0.6-0.9 fl. oz./1,000ft ²	
	DeltaGard GC 5SC	0.6-0.9 fl. oz./1,000ft ²	
	DeltaGard G (<i>landscape turf only</i>)	2-3 lb/1,000ft ²	
	DeltaGard T&O Granular	2-3 lb/1,000ft ²	
	imidacloprid + bifenthrin	RUP	
	Allectus SC (<i>landscape turf only</i>)	0.4-1.65 fl. oz./1,000ft ²	
Allectus GC	1.7-2.9 lb/1,000ft ²		
lambda-cyhalothrin	RUP		
Scimitar CS (<i>landscape turf only</i>)	19.2 oz/acre		
Scimitar GC	19.2 oz/acre		
trichlorofon	RUP		
Dylox 80	3.75 oz/1,000ft ²		
Turf caterpillars (cutworms, armyworms, webworms, loopers)	acephate	RUP	Caterpillar pests are best controlled with insecticides in the early instars when they are still small. Higher rates must be used for larger caterpillars. Reduced-risk products like <i>B.t.</i> , Mach 2, and Conserve are also more effective against younger caterpillars. On larger caterpillars even higher rates of these products may not be effective.
	Orthene TTO 75WP	0.5-1.2 oz/1,000ft ²	
	Orthene TTO 97 (<i>golf course and sod farm use only</i>)	0.4-0.9 oz/1,000ft ²	A number of chemicals listed for control are broad-spectrum and fairly economical, especially chlorpyrifos, acephate, carbaryl and several labeled pyrethroids.
	bifenthrin	RUP	
	Talstar GC Flowable	0.25-0.5 fl. oz./1,000ft ² or 10 fl. oz./acre	Newer products such as spinosad and halofenozide are also effective but not as economical as some of the other choices.
	carbaryl Sevin 80 WSP	2.5-5 lb/acre	
	Sevin SL	1.5-3 fl. oz./1,000 or 2-4 qt/acre	Treat in late afternoon. DO NOT cut grass for 1-3 days after application.
	cyfluthrin	RUP	
Tempo SC Ultra (<i>landscape turf only</i>)	4-8 mL/1,000ft ² or 6-12 fl. oz./acre		
Tempo 20 WP (<i>golf course only</i>)	55 g/7,800-11,000ft ²		
deltamethrin	RUP		
DeltaGard GC 5SC	0.2-0.4 fl. oz./1,000ft ² or 8.75-17.5 fl. oz./acre		

PESTS	INSECTICIDE AND FORMULATION	RATE	REMARKS AND PRECAUTIONS
Turf caterpillars (cont.)	halofenozide Mach 2 2SC	1.5 fl. oz./1,000ft ² or 2 qt/acre	<p><i>B.t.</i> is not toxic to non-lepidopterous pests.</p> <p>Cleared for pasture/rangeland use Lepinox (<i>Bacillus thuringiensis</i>)</p>
	lambda-cyhalothrin Scimitar CS (<i>landscape turf only</i>)	RUP 3.4-7 mL/1,000ft ² or 5-10 fl. oz./acre	
	spinosad Conserve 1SC	0.25-0.8 fl. oz./1,000ft ² or 10-35 fl. oz./acre	
	trichlorfon Dylox 80 T&O	2.5-3.75 oz/1,000ft ² or 6.8-10.2 lb/acre	
Ground Pearls	None		No effective chemical control. Practice good management.
Mole Crickets	acephate Orthene TTO 75WP	1-1.9 oz/1,000ft ²	Best results with early instar nymphs.
	Orthene TTO 97 (<i>golf course and sod farm use only</i>)	0.8-1.4 oz/1,000ft ²	Fipronil is a widely used insecticide that has proven to be the most effective and most expensive single application approach. Since it provides season long control the economics must be considered in that context.
	bifenthrin Talstar GC Flowable	RUP 0.25-0.5 fl. oz./1,000ft ²	
	Talstar GC Granular	2.3-4.6 lb/1,000ft ²	Indoxacarb, acephate, the bifenthrin + imidacloprid combination and chlorpyrifos baits are available for use against larger nymphs in late summer.
	carbaryl Mole Cricket Bait	0.75-0.9 lb/1,000ft ²	
	clothianidin Arena 50 WDG	<i>Suppression only</i> 10.67 oz./acre	The pyrethroids and imidacloprid are less effective, particularly on larger nymphs and adults. Imidacloprid should be applied at or just before egg hatch.
	Arena 0.5G	66.67 lb/acre	
	cyfluthrin Tempo WP Ultra	RUP 7.7-15.4 oz./acre	Clothianidin less susceptible to photodegradation than imidacloprid.
	Tempo SC Ultra	8 mL/1,000ft ² or 12 fl. oz./acre	
	deltamethrin DeltaGard GC 5SC	RUP 0.6-0.9 fl. oz./1,000ft ²	For most treatments irrigate 24 hrs. before treatment if soil is dry. Apply in late afternoon to dry turf, then do not irrigate for 48 hrs.
	DeltaGard T&O Granular (<i>landscape turf only</i>)	2-3 lb/1,000ft ²	
	fipronil Chipco Topchoice	2 lb/1,000ft ²	
	imidacloprid Merit 75 WSP	1.6 oz/8,250ft ²	
	Merit 0.5G (<i>not for sod farms</i>)	1.8 lb/1,000ft ²	
	imidacloprid + bifenthrin Allectus SC (<i>landscape turf only</i>)	RUP 1.32-1.65 fl. oz./1,000 ft ²	
	Allectus GC	2.9 lb/1,000ft ² or 4.6-5.7 lb/1,000ft ²	
	lambda-cyhalothrin Scimitar CS (<i>landscape turf only</i>)	RUP Nymphs: 7 mL/1,000ft ² Adults: 14 mL/1,000ft ²	
	Scimitar GC	Nymphs: 7 mL/1,000ft ² Adults: 14 mL/1,000ft ²	
	permethrin Astro (<i>landscape turf only</i>)	RUP 1.6 fl. oz./gal	
	trichlorfon Dylox 80 T&O	3.75 oz./1,000ft ²	
Dylox 6.2 G	3 lb/1,000ft ²		
Spittlebugs	acephate Orthene TTO 75WP	1 – 1.9 oz./1,000ft ²	Pesticides used to suppress two-lined spittlebugs have historically included chlorpyrifos, acephate and diazinon. With their removal from the residential turf arena, very few effective chemical options are available.
	Orthene TTO 97	0.8 – 1.4 oz./1,000ft ²	
	bifenthrin Onyx	RUP 0.07 – 0.15 fl. oz./1,000ft ²	Pyrethroids applied with sufficient volume of water have been effective but not always consistent.
	carbaryl Sevin SL	1.5 – 3 fl. oz./1,000ft ² or 2 - 4 qt./acre	
	Sevin 80 WSP	2.5 – 5 lb/acre	Cut grass to its recommended height and remove clippings prior to application.
	deltamethrin DeltaGard GC 5SC	RUP 0.2 – 0.4 fl. oz./1,000ft ² or 8.75 – 17.5 fl. oz./acre	

PESTS	INSECTICIDE AND FORMULATION	RATE	REMARKS AND PRECAUTIONS	
Spittlebugs (cont.)	DeltaGard T&O 5 SC <i>(landscape turf only)</i>	0.2 – 0.4 fl. oz. / 1,000ft ² or 8.75 – 17.5 fl. oz./acre		
White Grubs (Japanese Beetle, Chafers, Green June Beetle)	carbaryl Sevin SL	6 fl. oz./1,000ft ² or 8 qt./acre	Best results can be expected if early instars are treated.	
	Sevin 80 WSP	10 lb/acre	The number of grubs per ft ² or damage threshold varies by grub species, grass species and variety, and management intensity or use.	
	clothianidin Arena 50WDG	8 oz/acre	Identification of pest grub species is important for effective control recommendations. Consult your County Extension Agent.	
	Arena 0.5G	50 lb/acre	Carbaryl and chlorpyrifos excellent for Green June beetle grub control, not effective on other species. Generally a good adult control	
	halofenozide Mach 2 1.5 G	133 lb/acre	Clothianidin may not be as effective on grubs or have as long of a residual as imidacloprid.	
	Mach 2 SC	2.9 fl. oz./1,000ft ²	In areas with historical grub infestations, preventive treatments of imidacloprid or halofenozide provide excellent control of young grubs.	
	imidacloprid Merit 75 WSP	8.6 oz./acre	Curative control of older larvae is excellent with trichlorfon for most grub species and good with bifenthrin, chlorpyrifos and carbaryl against Green June beetle grubs.	
	Merit 0.5 G	1.4 lb/1,000ft ² or 60 lb/acre		
	imidacloprid + bifenthrin Allectus SC <i>(landscape turf only)</i>	RUP 1.32 – 1.65 fl. oz./1,000ft ²		
	Allectus GC	2.3 – 2.9 lb/1,000ft ²		
	trichlorfon Dylox 80 T&O	3.75 oz./1,000ft ² or 10.2 lb/acre		
	Dylox 6.2 G	3 lb/1,000ft ² or 130 lb/acre		
Billbugs	bifenthrin Talstar EZ Golf Granular	RUP 1.15 – 2.3 lb/1,000ft ²	The sporadic occurrence and multiple generation of this pest make its appearance unpredictable. Some areas that consistently experience billbug injury may be treated in a prophylactic manner.	
	Talstar GC flowable	0.25 – 0.5 fl. oz./1,000ft ²		
	carbaryl Sevin SL	6 fl. oz./1,000ft ² or 8 qt/acre		
	Sevin 80 WSP	10 lb/acre		
	chlorpyrifos Dursban 50W	RUP 2 – 4 lb/acre		
	chlorthiandin Arena 50WDG	8 oz./acre		
	Arena 0.5G	50 lb/acre		
	halofenozide Mach 2 1.5 G	133 lb/acre		
	Mach 2 SC	2.9 fl. oz./1,000ft ²		
	imidacloprid Merit 75 WSP	1.6 oz./8250ft ² or 8.6 oz./acre		
	Merit 0.5 G	1.4 lb/1,000ft ² or 60 lb/acre		
	imidacloprid + bifenthrin Allectus GC SC	RUP 0.4 – 1.65 fl. oz./1,000ft ²		
	Allectus GC	1.7 – 2.9 lb/1,000ft ²		
	trichlorfon Dylox 80 T&O	3.75 oz/1,000ft ² or 10.2 lb/acre		
	Dylox 6.2 G	3 lb/1,000ft ² or 130 lb/acre		
	NOTE: Premixed formulations of systemic insecticides with pyrethroids are available (Allectus, Aloft). These may provide control of multiple pests with a single spray.			

PESTS	INSECTICIDE AND FORMULATION	RATE	REMARKS AND PRECAUTIONS
Mites/ Eriophyid mites	Dicofol	See Label	Materials that are labeled provide only marginal control. Resistances to dicofol seems to be common among spidermites. Dicofol is highly toxic to fish, aquatic invertebrates and algae.
Slugs and Snails	Metaldehyde or mesurol	Follow label directions for mixed baits	Apply late in afternoon. Fall applications will help control slugs and snails before egg laying.
Millipedes owbugs and pillbugs	bifenthrin Talstar F, GC, G	RUP 0.25-0.5 fl. oz./1,000ft ²	
	carbaryl Sevin 80 WSP	1.5-3.0 oz/1,000ft ²	
	various pyrethroids*	See label	

*NOTE: A number of pyrethriod materials are available in a variety of formulations for use as broad-spectrum contact insecticides. Common names include permethrin, bifenthrin, cyflythrin, lambda-cyhalothrin, and deltamethrin.