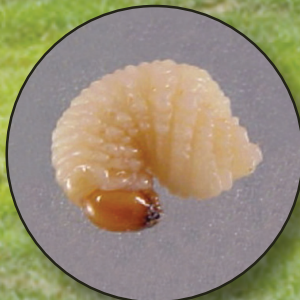


# ***Commercial Turfgrass Insect Control***





# Commercial Turfgrass Insect Control

*Frank A. Hale, Professor  
Entomology and Plant Pathology*

*Originally prepared by Jaime Yanes Jr.  
Former Assistant Professor, Entomology and Plant Pathology*

---

## Table of Contents

Commercial Turfgrass Insect Control Calendar .....	3
ANTS .....	4
YELLOW JACKETS .....	5
BILLBUGS .....	5
CHINCH BUGS .....	6
CUTWORMS, ARMYWORMS .....	6
EARTHWORMS .....	8
FALL ARMYWORMS .....	8
GRASSHOPPERS .....	9
WHITE GRUBS .....	9
GREEN JUNE BEETLE GRUBS .....	10
IMPORTED FIRE ANTS .....	10
LEAFHOPPERS and SPITTLEBUGS .....	13
MILLIPEDES .....	13
MOLE CRICKETS .....	13
SOWBUGS, PILLBUGS .....	14
SLUGS and SNAILS .....	14
SOD WEBWORMS .....	14
Sampling and Aesthetic Thresholds for Turfgrass Insect Pests .....	17
References .....	17

---

## Commercial Turfgrass Insect Control Calendar

PESTS	+	++	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Ants	II	a	***** S,G, or B *****											
Armyworms, Cutworms	III	a	***** S or G *****											
Yellowjackets	III	a	***** S *****											
Bees and Wasps	II	a	***** S or G *****											
Billbugs	III	d,e,f	***** S or G *****											
Chinch Bugs	III	b	***** S or G *****											
White Grubs	I	a	*** S or G ***                      ***** S or G *****											
Green June Beetle	I	a	** S or G **                      ***** S or G *											
Leafhoppers & Spittlebugs	II	a	***** S *****											
Mole Crickets	III	g	*** S, G or B ***                      **** B *****											
Sod Webworms	I	c,d, e,g	***** S or G *****											

**+ Degree of importance of pest:**

- I - Important pest, frequent occurrence
- II - Usually present but generally not a pest
- III - An occasional pest

- S - Sprays
- G - Granules
- B - Baits

**++ Preferred grass species:**

- a - Fescue and many other grasses
- b - St. Augustine
- c - Fescue
- d - Bluegrass
- e - Bermudagrass
- f - Zoysiagrass
- g - Bentgrass

## Commercial Turfgrass Insect Control

Pest	Insecticide and Formulation	Amount per 1,000 sq ft	Precautions and Remarks
<b>ANTS</b> (Also see imported fire ants.)	chlorpyrifos (Dursban Pro) 2 E (Dursban 50W) 50 WSP	1.5 fl oz 2 lb./acre	For turfgrass use on golf courses, road medians and industrial plant sites. Dursban 50 W can be used in addition on turfgrass grown for sod or seed. Treat mounds and surrounding areas or apply broadcast to entire area.
	carbaryl (Sevin Brand SL) 4 SL	1 1/2 to 3 fl oz	
	lambda-cyhalothrin (Scimitar CS, Scimitar GC) 9.7 CS		Use 0.5 fl. oz. per 2.5 gallons of water and thoroughly cover and soak each mound and treat a 4-foot diameter circle around the mound. Scimitar GC can be used on golf courses.
	deltamethrin (DeltaGard G) 0.1 G	2 to 3 lb	Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.
	cyfluthrin (Tempo 20 WP) 20 WP	(1 packet) 50 gm per 7,500 to 10,000 sq ft	Tempo 20 WP not for use on sod farms or golf courses.
	(Tempo 20 WP GC) 20 WP	55 gm (1 packet ) per 11,000 sq ft	Tempo 20 WP GC for use on residential and commercial sites including golf courses.
	beta-cyfluthrin (Tempo SC Ultra) 1 SC	4-6 ml	Not for use on sod farms or golf courses.
	bifenthrin (Talstar Lawn & Tree) 7.9 F (Talstar GC) 7.9 F	0.5-1 fl oz 1 fl oz	
	fipronil (Topchoice) 0.0143% G	2 lb or 87 lb/acre	For best results, treated turf should be watered or irrigated after application.
	thiamethoxam 11.6% plus lambda-cyhalothrin 3.5% (Tandem)	28 fl oz/acre (single application) 14 fl oz/acre On a 3 to 5 week interval (two applications)	
	Imidacloprid 5.0% plus bifenthrin 4.0% (Allectus SC)	1.32 to 1.65 fl oz or 3.6 to 4.5 Pint / acre.	

Pest	Insecticide and Formulation	Amount per 1,000 sq ft	Precautions and Remarks
<b>Ants (cont'd.)</b>	clothianidin 24.7% bifenthrin 12.3% (Aloft GCSC)	0.27–0.44 oz or 11.65–19 fl oz/acre	For use on athletic fields, residential turf, golf courses, sod farms and other listed sites. Make an application in the fall before ants stop foraging or after they become active in the spring.
	Aloft (LCSC)	0.27-0.54 fl oz or 11.65-23.3 fl oz/acre	Excluding fire, harvester, pharaoh and carpenter ants; <b>not</b> for use on golf courses and sod farms.
	clothianidin 50 WDG (Arena 50WDG)	9.6-12.8 oz/acre	Apply when pest first appears.
	zeta-cypermethrin 2.70% bifenthrin 7.87% imidacloprid 13.83% (Triple Crown T&O)	0.46-0.80 20-35 fl oz / acre	
<b>YELLOW JACKETS (Also other burrowing bees and wasps)</b>	carbaryl (Carbaryl 80 S) 80 WP (Sevin Brand SL) 4 SL	4 oz 3 fl oz per gallon of water	Most burrowing wasps and bees are parasitic on other insects. Treatment is seldom needed. Water in thoroughly and apply in late afternoon. Bee, wasp and hornet sprays in pressurized cans are also effective.
<b>BILLBUGS</b>	bifenthrin (Talstar Lawn & Tree) 7.9 F (Talstar GC) 7.9 F	0.25-0.5 fl oz 0.25-0.5 fl oz	For control of adult billbugs when they are first observed during April or early May.
	clothianidin (Arena 50 WDG) 50WDG	6.4-12.8 oz/acre	Do not apply more than 12.8 oz of Arena 50 WDG per acre per season.
	chlorantraniliprole (Acelepryn) 1.67 SC 0.2% G	0.184 - 0.46 fl oz 8 - 20 fl oz/acre 1.15 - 2.3 lb 50 - 100 lb/acre	Apply when overwintered adult billbugs are first observed in April. This application will also provide white grub control.
	imidacloprid (Merit 75WP) 75 WP (Merit 0.5 G) 0.5 G	6.4 to 8.6 oz/acre 1.4 to 1.8 lb	For optimum control, make application prior to egg hatch, followed by sufficient irrigation or rainfall within 24 hours of application. Not for use on commercial sod farms.
	deltamethrin (DeltaGard G) 0.1 G	2 to 3 lb	Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.
	halofenozide (MACH 2) 1.5 G 2 L	2.3 lb 2.2 fl oz	MACH 2 Granular is labeled for use on all turfgrass sites while MACH 2 Liquid is registered for use on commercial sites including golf courses, sod farms, commercial lawns and cemeteries. Make only one application.
	zeta-cypermethrin 2.70% bifenthrin 7.87% imidacloprid 13.83% (Triple Crown T&O)	0.23-0.46 10-20 fl oz / acre	

Pest	Insecticide and Formulation	Amount per 1,000 sq ft	Precautions and Remarks
<b>CHINCH BUGS</b>	cyfluthrin (Tempo 20 WP) 20 WP	(1 packet) 50 gm per 7,500 sq ft	Tempo 20 WP not for use on sod farms or golf courses.
	zeta-cypermethrin 2.70% bifenthrin 7.87% imidacloprid 13.83% (Triple Crown T&O)	0.46-0.80 20-35 fl oz / acre	
	(Tempo 20 WP GC) 20 WP	55 gm (1 packet ) per 7,800 sq ft	Tempo 20 WP GC for use on residential sites including golf courses.
	beta-cyfluthrin (Tempo SC Ultra) 1 SC	6 ml	Not for use on sod farms or golf courses.
	chlorpyrifos (Dursban Pro) 2 EC (Dursban 50W) 50 WSP	1.5 fl oz 2 lb/acre	For turfgrass use on golf courses, road medians, and industrial plant sites. Dursban 50 W can be used in addition on turfgrass grown for sod or seed.
	clothianidin (Arena 50 WDG) 50 WDG	12.8 oz/acre	Do not apply more than 12.8 oz of Arena 50 WDG per acre per season.
	dinotefuron (Zylam) 20 SG	1 oz or 2.7 lb/acre	For suppression of chinch bugs, make application prior to hatching of first instar nymphs.
<b>CUTWORMS, ARMYWORMS</b>	carbaryl (Sevin Brand SL) 4 SL	1 1/2 to 3 fl oz	Treat in late afternoon. Apply in adequate water for good coverage, but do not flood or water in. Do not cut grass for one to three days after treatment.
	acephate (Orthene Turf, 75 SP Tree & Ornamental Spray)	0.5 to 2.4 oz	For golf course and sod farm turfgrass. Use higher labeled rates for cutworms. Not for homeowners lawn uses except for imported fire ant mound treatments.
	chlorpyrifos (Dursban Pro) 2 EC (Dursban 50W) 50 WSP	1.5 fl oz 2 lb/acre	For turfgrass use on golf courses, road medians and industrial plant sites. Dursban 50 W can be used in addition on turfgrass grown for sod or seed.

Pest	Insecticide and Formulation	Amount per 1,000 sq ft	Precautions and Remarks
<b>CUTWORMS, ARMYWORMS</b>  (cont'd.)	trichlorfon (Dylox 80) 80 SP	2.5 to 3.75 oz	
	bifenthrin (Talstar Lawn & Tree) 7.9 F (Talstar GC) 7.9 F	0.18-0.25 fl oz 0.25 fl oz	Delay watering or mowing for 24 hours after application.
	cyfluthrin (Tempo 20 WP) 20 WP	(1 packet) 50 gm per 7,500 to 10,000	Delay watering or mowing for 24 hours for optimum control. Tempo 20 WP not for use on sod farms or golf courses.
	(Tempo 20 WP GC) 20 WP	55 gm (1 packet) per 7,800 to 11,000 sq ft	Tempo 20 WP GC for use on residential and commercial sites including golf courses.
	beta-cyfluthrin (Tempo SC Ultra) 1 SC	4-6 ml	Not for use on sod farms or golf courses.
	spinosyn A and spinosyn D (Conserve SC) 1 SC	0.25 fl oz-small armyworm larvae 1.25 fl oz-large armyworm larvae 0.8 fl oz-small cutworm larvae 1.25 fl oz-large cutworm larvae	Conserve SC is labeled for use on all turfgrasses.
	azadirachtin (Turplex BioInsecticide) 3% EC	0.25 to 0.5 fl oz	Use 1-5 gallons of water per 1,000 square feet. Irrigate well before applying.
	<i>Steinernema</i> sp. Entomopathogenic nematodes	see label	Application should be made when small larvae or damage is first detected.
	lambda-cyhalothrin (Scimitar WP) 10 WP (Scimitar CS) 9.7 CS (Scimitar GC) 9.7 CS	3 to 6 grams 3.4 to 7 ml 3.4 to 7 ml	Scimitar GC can be used on golf courses.
	dinotefuron (Zylam) 20 SG	1 oz or 2.7 lb/acre	For cutworms only.

Pest	Insecticide and Formulation	Amount per 1,000 sq ft	Precautions and Remarks
<b>CUTWORMS, ARMYWORMS</b>  (cont'd.)	halofenozide (MACH 2) 1.5G 2 L	1.55 lb 1.5 fl oz	MACH 2 Granular is labeled for use on all turfgrass sites, while MACH 2 Liquid is registered for use on commercial sites including golf courses, sod farms, commercial lawns and cemeteries. A single repeat application can be made if needed.
	deltamethrin (DeltaGard G) 0.1 G	2 to 3 lb	Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.
	chlorantraniliprole (Acelepryn) 1.67 SC 0.2%G	0.046-0.092 fl oz 2-4 fl oz/acre 1.15 - 2.3 lb 50 - 100 lb/acre	Delay watering or mowing for 24 hours after application of Acelepryn 1.67 SC. If a mowing height of greater than 1 inch is used, then the higher rate may be required during periods of high pest pressure for either of the formulations.
	zeta-cypermethrin 2.70% bifenthrin 7.87% imidacloprid 13.83% (Triple Crown T&O)	0.23-0.34 10-15 fl oz / acre	
<b>EARTHWORMS</b>			Usually not a problem, except on greens. No labeled controls available.
<b>FALL ARMYWORMS</b>	chlorpyrifos (Dursban Pro) 2 EC (Dursban 50W) 50 WSP	1.5 fl oz 2 lb/acre	Treat in late afternoon. Use adequate water for good coverage, but do not flood. Do not cut grass for one to three days after treatment. Not for residential use.
	zeta-cypermethrin 2.70% bifenthrin 7.87% imidacloprid 13.83% (Triple Crown T&O)	0.23-0.34 10-15 fl oz / acre	
	chlorantraniliprole (Acelepryn) 1.67 SC 0.2%G	0.046-0.092 fl oz 2-4 fl oz/acre 1.15 - 2.3 lb 50 - 100 lb/acre	Delay watering or mowing for 24 hours after application of Acelepryn 1.67 SC. If a mowing height of greater than 1 inch is used, then the higher rate may be required during periods of high pest pressure for either of the formulations.



Pest	Insecticide and Formulation	Amount per 1,000 sq ft	Precautions and Remarks
<b>GRASSHOPPERS</b> (refer to UT Extension fact sheet SP 290-X)	chlorpyrifos (Dursban Pro) 2 EC (Dursban 50W) 50 WSP	1.5 fl oz 2 lb/acre	For turfgrass use on golf courses, road medians and industrial plant sites. Dursban 50 W can be used in addition on turfgrass grown for sod or seed.
	deltamethrin (DeltaGard G) 0.1 G	2 to 3 lb	Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.
	zeta-cypermethrin 2.70% bifenthrin 7.87% imidacloprid 13.83% (Triple Crown T&O)	0.23-0.46 10-20 fl oz / acre	
<b>WHITE GRUBS</b> (May beetle, masked chafers, green June beetle, Japanese beetle and others)	trichlorfon (Dylox 80) 80 SP (Dylox 6.2G) 6.2 G	3.75 oz 3 lb	Dylox not for use on sod farms. Thoroughly irrigate following application.
	imidacloprid (Merit 75 WP) 75 WP (Merit 0.5 G) 0.5 G	6.4 oz/acre 1.4 lb	For optimum control, make application prior to egg hatch, followed by sufficient irrigation or rainfall within 24 hours of application. Not for use on commercial sod farms.
	clothianidin (Arena 50 WDG) 50 WDG	6.4-12.8 oz/acre	Do not apply more than 12.8 oz of Arena 50 WDG per acre per season.
	halofenozide (MACH 2) 1.5 G 2 L	2.3 lb 2.2 fl oz	MACH 2 Granular is labeled for use on all turfgrass sites, while MACH 2 Liquid is registered for use on commercial sites including golf courses, sod farms, commercial lawns and cemeteries. Make only one application.
	thiamethoxam (Meridian) 25WG 0.33G	1.5-1.95 oz/5,000 sq ft 12.7-17 oz/acre 7.1-9.4 lb/5,000 sq ft 60-80 lb/acre	Apply up to 45 days before the historical peak of adult flight to second instar grub of the species being targeted. For optimum control, treat from peak flight to peak egg hatch.
	chlorantraniliprole (Acelepryn) 1.67 SC 0.2 G	0.184 - 0.367 fl oz 8-16 fl oz/acre 1.15 - 2.3 lb 50 - 100 lb/acre	May be applied from early April to early September for preventative and early curative control of white grubs infesting turfgrass. The higher rate listed for white grub control may be required in late August or early September when less sensitive mid-instar grubs are present at time of application.
	zeta-cypermethrin 2.70% bifenthrin 7.87% imidacloprid 13.83% (Triple Crown T&O)	0.46-0.80 20-35 fl oz / acre	

Pest	Insecticide and Formulation	Amount per 1,000 sq ft	Precautions and Remarks
<b>GREEN JUNE BEETLE GRUBS (only)</b>	carbaryl (Sevin Brand SL) 4 SL	1 1/2 to 3 fl oz	Water in, but do not flood.
<b>IMPORTED FIRE ANTS</b>	hydramethylnon (Amdro Pro Fire Ant Bait, Siege Fire Ant Bait) 0.73% bait	2.0-3.0 oz/5,000 sq ft or 1.0-1.5 lb/acre	Uniformly broadcast 1-1.5 lb of bait per acre with ground equipment on pastures, range grass, lawns, sod farms, golf courses, athletic fields, noncropland, container- and field-grown ornamental nonbearing nursery stock, and other listed sites. Or uniformly distribute 2-5 level tablespoons of bait around the base of each mound. Do not apply directly to the top of the mound. Do not exceed 1.5 lb/acre.  A blend of Amdro Pro Fire Ant Bait plus Extinguish Profesional Five Ant Bait can be used to control imported fire ants in non-agricultural levels.
	abamectin (PT370 Ascend Fire Ant Stopper Bait) 0.011% bait	0.4 oz	Broadcast: Uniformly apply 1 lb of bait per acre to turf, lawns and noncrop areas. Individual mound: Use 5-7 tablespoons of bait per mound. Apply evenly over mound and for a distance of about 2 feet out from the base. Do not use in pastures, rangelands or croplands.
	(Varsity Fire Ant Bait) 0.011% bait	1 lb/acre	
	fenoxycarb (Award Brand of Logic Fire Ant Bait) 1% bait		Do not apply on pasture or range grass to be grazed. Broadcast 1-1.5 lb per acre or apply 1-3 level tablespoons uniformly 3-4 feet around the mound. May need to retreat in three to four months. Do not apply during excessively hot periods of the day or when heavy rainfall is expected within two to three hours after application.
	pyriproxyfen (Distance Fire Ant Bait) 0.5% bait  (Spectracide Fire Ant Bait) 0.05% bait	0.35-0.5 oz or 1-1.5 lb/acre or 1-4 Tbsp/mound  1 lb/4,400 sq ft	For use on sod farms, uncultivated nonagricultural areas, non-grazed pastures and rangeland, and other listed sites. For mound treatment, do not apply to top of mound. Instead uniformly distribute bait 3-4 feet around the mound.  For Spectracide Fire Ant Bait use 2-4 tablespoons of bait per mound. Evenly sprinkle bait in a 1-foot circle around the center of each mound.

Pest	Insecticide and Formulation	Amount per 1,000 sq ft	Precautions and Remarks
<b>IMPORTED FIRE ANTS (cont'd.)</b>	s-methoprene (Extinguish Professional Fire Ant Bait) 0.5% bait	3.5 Tbsp or 1-1.5 lb/acre or 3-5 Tbsp/mound to a perimeter of 4 ft.	For use on turfgrass and landscapes, golf courses, school grounds, roadsides, sports fields, pastures, rangeland, cropland, sod farms, commercial nurseries including field-grown and container stock, and other listed sites.
	fipronil (Ceasefire) 0.00015% bait  (Topchoice) 0.0143% G	1.5-15 lb/acre or 5 Tbsp/mound  2 lb or 87 lb/acre	For use on home lawns, golf courses and commercial and recreational turf and sod farms. May make a total of four applications per year if necessary.  For best results, treated turf should be watered or irrigated after application. Do not apply more than one application per year of 87 pounds of product per acre. Two applications (87 lbs/acre per application) may only be used on sodfarms within USDA APHIS Quarantine areas.
	Indoxacarb (Advion Fireant bait) 0.045 G	0.5 oz or 1.5 lb/acre	For use on home lawns, golf courses, athletic fields, and recreational turf, parks, cemeteries and other listed sites.
	thiamethoxam (Meridian 25WG) 25 WG		Prepare drench solution at a concentration of 1-3 oz of Meridian 25 WG per 10 gallons water. Thoroughly mix solution and apply directly to the mounds. For optimum control of small ant mounds (less than 6 in diameter at surface) apply 1 gallon of the drench solution per mound. For optimum control of larger ant mounds apply 2-3 gallons of drench solution per mound. The drench application should be directed at the center of the mound and include a 6-inch diameter circle around the center of the mound.
	chlorpyrifos (Dursban Pro) 2 EC (Dursban 50W) 50 WSP		For individual fire ant mounds: Apply 2 fl oz of Dursban Pro per 4 gallons of water as a drench. Dilute 0.75 lb of Dursban 50W per 50 gallons of water. Sprinkle 1-2 gallons of the diluted insecticide over the surface of each mound and surrounding areas to a 2-foot diameter. Not for residential use. For imported fire ants on sod farms, apply 16 lb (64 4-oz packets) Dursban 50W as a spray to the area of sod to be cut. Immediately after application, irrigate treated area with at least 1/2 acre-inch of water or a sufficient volume to thoroughly soak below the cut line. Do not apply a volume or rate of water to cause runoff. Sod can be cut when vegetation has dried and when soil is moist but not wet.
	lambda-cyhalothrin (Scimitar CS, Scimitar GC) 9.7 CS		Use 0.5 fl oz per 2.5 gallons of water and thoroughly cover and soak each mound and treat a 4-foot diameter circle around the mound. Scimitar GC can be used on golf courses.

Pest	Insecticide and Formulation	Amount per 1,000 sq ft	Precautions and Remarks
IMPORTED FIRE ANTS (cont'd.)	acephate (Orthene Turf, Tree & Ornamental Spray) 75 SP		For residential recreational and commercial turf. Mix 1 oz in 5 gallons of water. Apply one gallon of mix per mound with sprinkler can. Thoroughly wet 4-foot diameter area around the mound.
	75 SP		Evenly distribute 1-2 tsp without water over the mound.
	deltamethrin (DeltaGard G) 0.1 G	2 to 3 lb	Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.
	bifenthrin (Talstar One)	1.0 oz (Broadcast Treatment)	For mound treatment, dilute 1 teaspoon per gallon of water and apply 1-2 gallons of finished spray per mound. Allow the Talstar One insecticide to flow into the ant tunnels and also treat a 4-foot circle around the mound. Talstar One not for use on sod farms, golf courses or grass grown for seed.
	(Talstar GC) 0.2 % granular	4.6 lb (Broadcast Treatment)	For mound treatment, apply 1/2 cup of the granular insecticide per mound and then drench mound with 1-2 gallons of water so as to allow the insecticide to flow into ant tunnel. Talstar GC for use on lawns around residential, institutional, public, commercial and industrial buildings, parks, recreational areas, golf courses, sod farms, and athletic fields.
	(OnyxPro) 23.4%	0.16-0.32 fl oz (Broadcast Treatment)	Control will be optimized by combining broadcast applications with mound drenches. Mounds must be treated by applying 0.32 oz OnyxPro per mound in 1-2 gallons water by sprinkling the mound until it is wet and treat 3 feet out around the mound. <b>Imported Fire Ant Quarantine Treatment of grass sod for sale (sod farms).</b> Apply OnyxPro as a broadcast treatment. Use higher volumes up to 10 gallons of carrier per 1,000 sq ft to get uniform coverage when treating dense grass foliage. Make two applications of 0.32 fl oz per 1,000 sq ft seven days apart. This application will provide control within four weeks followed by 16 weeks of certification.

Pest	Insecticide and Formulation	Amount per 1,000 sq ft	Precautions and Remarks
<b>IMPORTED FIRE ANTS (cont'd.)</b>	Zeta-cypermethrin 0.05% plus bifenthrin 0.20% (Talstar XTRA G)		Control will be optimized by combining broadcast applications that will control foraging workers and newly mated fly-in queens with mound treatments that will eliminate existing colonies. If the soil is not moist, then it is important to irrigate before or soon after application. Broadcast treatments should apply no more than 0.50 lbs ai per acre (4.6 lbs/1,000 sq ft). Mounds should be treated by applying 1/2 cup of Talstar XTRA Granular per mound and then drenching the mound with 1 to 2 gallons of water. The mounds should be treated with sufficient force to break their apex and allow the insecticide solution to flow into the ant tunnels. Treat 3 feet out around the mound. For best results, apply in cool weather (65-80 F) or in early morning or late evening hours.
<b>LEAFHOPPERS and SPITTLEBUGS</b>	chlorpyrifos 2 EC (Dursban Pro) 50 WSP	1.5 fl oz 2 lb/acre	Thatch control is important in preventing and controlling spittlebugs. Proper dethatching and fertilization practices can disrupt the humid conditions essential for spittlebugs. Treat infested areas. Not for residential use.
	deltamethrin 0.1 G (DeltaGard G)	2 to 3 lb	Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.
	zeta-cypermethrin 2.70% bifenthrin 7.87% imidacloprid 13.83% (Triple Crown T&O)	0.23-0.46 10-20 fl oz / acre	
<b>MILLIPEDES</b>	carbaryl 4 SL (Sevin Brand SL)	1 1/2 to 3 fl oz	
	zeta-cypermethrin 2.70% bifenthrin 7.87% imidacloprid 13.83% (Triple Crown T&O)	0.23-0.46 10-20 fl oz / acre	
<b>MOLE CRICKETS</b>	deltamethrin 0.1 G (DeltaGard G)	2 to 3 lb	Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.
	bifenthrin 7.9 F (Talstar Lawn & Tree) 7.9 F (Talstar GC)	0.5-1.0 fl oz 0.25-0.5 fl oz	Application should be made as late in the day as possible and should be watered in with up to 0.5 inches of water immediately after treatment. If the soil is not moist, then it is important to irrigate before application to bring the mole crickets closer to the soil surface.
	dinotefuron 20SG (Zylam)	1 oz or 2.7 lb/acre	Make application prior to or during the peak egg hatch period. When adults or large nymphs are present and actively tunneling, tank mix with a curative insecticide.



Pest	Insecticide and Formulation	Amount per 1,000 sq ft	Precautions and Remarks
<b>MOLE CRICKETS (cont'd.)</b>	acephate (Orthene Turf, Tree & Ornamental Spray) 75 SP	1 to 1 1/2 oz	Water soil prior to application. Do not water in. For golf courses and sod farm turfgrasses. Not for homeowner lawn use except for imported fire ant mound treatments.
	cyfluthrin (Tempo 20 WP) 20 WP	(1 packet) 50 gm per 7,500 sq ft	Tempo 20 WP not for use on sod farms or golf courses.
	(Tempo 20 WP GC) 20 WP	(1 packet) 55 gm per 7,800 sq ft	Tempo 20 WP GC for use on residential and commercial sites including golf courses.
	fipronil (Chipco TopChoice) 0.0143%G	87 lb/acre	The primary purpose of TopChoice is to control imported fire ants. Mole crickets at this rate will be controlled for approximately four months. For best results, treated turf should be watered or irrigated after application.
	beta-cyfluthrin (Tempo SC Ultra) 1 SC	6 ml	Not for use on sod farms or golf courses.
	zeta-cypermethrin 2.70% bifenthrin 7.87% imidacloprid 13.83% (Triple Crown T&O)	0.46-0.80 20-35 fl oz / acre	
<b>SOWBUGS, PILLBUGS</b>	carbaryl (Sevin Brand SL) 4 SL	1 1/2 to 3 fl oz	
	deltamethrin (DeltaGard G) 0.1 G	2 to 3 lb	Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.
	zeta-cypermethrin 2.70% bifenthrin 7.87% imidacloprid 13.83% (Triple Crown T&O)	0.23-0.46 10-20 fl oz / acre	
<b>SLUGS and SNAILS</b>	metaldehyde (2%) and carbaryl (5% Sevin) granules (Bug-geta Plus)	0.5 lb	If ground is dry, water area to be treated thoroughly.
<b>SOD WEBWORMS</b> (Refer to UT Extension fact sheet SP 290-L)	carbaryl (Sevin Brand SL) 4 SL	4.4 to 6 fl oz	Treat in late afternoon. Repeat as needed. Apply adequate water for good coverage. Do not cut grass for one to three days after application.
	chlorpyrifos (Dursban Pro) 2 EC (Dursban 50W) 50 WSP	1.5 fl oz 2 lb/acre	Watering or mowing of the treated area should be delayed for 12 to 24 hours after treatment. Not for residential use.
	dinotefuron (Zylam) 20SG	1 oz or 2.7 lb/acre	

Pest	Insecticide and Formulation		Amount per 1,000 sq ft	Precautions and Remarks
<b>SOD WEBWORMS (cont'd.)</b> (Refer to UT Extension fact sheet SP 290-L)	trichlorfon (Dylox 80) (Dylox 6.2G)	80 SP 6.2 G	2.5 to 3.75 oz 2 lb	Dylox 80 and 6.2G not for use on turf being grown for sale.
	deltamethrin (DeltaGard G)	0.1 G	2 to 3 lb	Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.
	methomyl (Lannate)	90 SP	2/5 oz	For use on sod farms only. After application, sprinkle irrigate for 15 minutes.
	<i>Bacillus thuringiensis</i> (Dipel 2X)	WP	0.37 to 0.73 oz	
	spinosyn A and spinosyn D (Conserve SC)	1 SC	0.25 fl oz	Conserve SC is labeled for use on all turfgrasses.
	cyfluthrin (Tempo 20 WP)	20 WP	50 gm (1 packet) per 7,500 to 10,000 sq ft	Delay watering or mowing for 24 hours for optimum control. Tempo 20 WP not for use on sod farms and golf courses.
	(Tempo 20 WP GC)	20 WP	55 gm (1 packet) per 11,000 sq ft	Tempo 20 WP GC for use on residential and commercial sites including golf courses.
	beta-cyfluthrin (Tempo SC Ultra)	1 SC	4-6 ml	Not for use on sod farms or golf courses.
	<i>Steinernema</i> sp. Entomopathogenic nematodes		see label	Application should be made when small larvae or damage is first detected.
	azadirachtin (Turplex BioInsecticide)	3% EC	0.25 to 0.5 fl oz	Use 1-5 gallons of water per 1,000 square feet. Irrigate well before applying.
	lambda-cyhalothrin (Scimitar WP) (Scimitar CS) (Scimitar GC)	10 WP 9.7 CS 9.7 CS	3 to 6 grams 3.4 to 7 ml 3.4 to 7 ml	Scimitar GC can be used on golf courses.
	permethrin (Astro)	3.2 EC	0.4 to 0.8 fl oz	For use on lawns (residential lawns and sod farms).

Pest	Insecticide and Formulation	Amount per 1,000 sq ft	Precautions and Remarks
<b>SOD WEBWORMS (cont'd.)</b> (Refer to UT Extension fact sheet SP 290-L)	halofenozide (MACH 2) 1.5 G 2 L	1.55 lb 1.5 fl oz	MACH 2 Granular is labeled for use on all turfgrass sites while MACH 2 Liquid is registered for use on commercial sites including golf courses, sod farms, commercial lawns and cemeteries. A single repeat application can be made if needed.
	bifenthrin (Talstar Lawn & Tree) 7.9 F (Talstar GC) 7.9 F	0.18-0.25 fl oz 0.25 fl oz	Delay watering or mowing for 24 hours after application.
	clothianidin (Arena 50 WDG)	6.4-12.8 oz/acre	Do not apply more than 12.8 oz of Arena 50 WDG per acre per season.
	chlorantraniliprole (Acelepryn) 1.67 SC 0.2%G	0.046-0.092 fl oz 2-4 fl oz/acre 1.15 - 2.3 lb 50 - 100 lb/acre	Delay watering or mowing for 24 hours after application of Acelepryn 1.67 SC. If a mowing height of greater than 1 inch is used, the higher rate may be required during periods of high pest pressure for either of the formulations.
	zeta-cypermethrin 2.70% bifenthrin 7.87% imidacloprid 13.83% (Triple Crown T&O)	0.23-0.34 10-15 fl oz / acre	

#### Formulation Abbreviations Used

WSP	-	Water soluble packets	E or EC	-	Emulsifiable concentrate
WP	-	Wettable powder	SL	-	Suspended liquid
SP	-	Soluble powder	F	-	Flowable
			G	-	Granules

## Sampling and Aesthetic Thresholds for Turfgrass Insect Pests

White grubs — Treat from July to mid-August when the aesthetic threshold determined by sampling has been reached. Sample several square foot sections of turfgrass by using a shovel or spade to cut out a square foot section and lift the turf back to expose the roots and count white grubs.

### Threshold Targets for White Grubs

Assuming Adequate Growing Conditions and No Digging Animals

Annual White grubs \*5-10 grubs/square foot\*

(Japanese Beetle, Oriental Beetle, European Chafer, Asiatic Garden Beetle) Southern and Northern masked Chafers

(Annual White Grubs) \*15-20 grubs/square foot\*

Black Turfgrass Ataenius \*30-50 grubs/square foot\* May/June Beetles \*3-8 grubs/square foot\*

Green June beetle \*6-8 grubs/square foot\* Adapted from D.J. Shetlar (1995) and D.A. Potter (1982)

Sod webworms — These caterpillars feed on the blades of grass. The light colored caterpillars with dark spots make silk tunnels in the grass. Check for sod webworms and cutworms by preparing a soap solution of 2 teaspoons of liquid dishwashing detergent in a gallon of water. Pour this solution over a 2 foot by 2 foot area (4 ft<sup>2</sup>). Treat when four to six or more sod webworms per 4 ft<sup>2</sup> are found.

Cutworms — These dark, dingy colored caterpillars feed at night and hide in the ground in the daylight. They clip off the blades of grass at the crown. Treat when one or more cutworms per 4 ft<sup>2</sup> are found.

Armyworm and fall armyworm — These caterpillars reach high population levels and can totally defoliate fields or yards. They can also be detected by using a soap solution flush. Sample periodically through the spring and summer and treat when any populations of these caterpillars are detected.

## References

Potter, D.A. 1982. Influence of feeding by grubs of the southern masked chafer on quality and yield of Kentucky bluegrass. J. Econ. Entomol. 75: 21-24.

Shetlar, D.J. 1995. Lawns and Turf/North. pp. 316-317. In R. Foster, E. Knake, R.H. McCarty, & J.J. Mortvedt [eds.], 1995 Insect Control Guide. Meister Publishing Co., Willoughby, Ohio.

AG.TENNESSEE.EDU

Real. Life. Solutions.™

PB 1342(Rev) 7/18 18-0267

Programs in agriculture and natural resources, 4-H youth development, family and consumer sciences, and resource development.  
University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating.  
UT Extension provides equal opportunities in programs and employment.