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Commercial Turfgrass Insect Control



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Table of Contents

<i>Commercial Turfgrass Insect Control Calendar</i>	3
<i>Ants</i>	4
<i>Yellowjackets, Burrowing Bees and Wasps</i>	4
<i>Billbugs</i>	4
<i>Chinch Bugs</i>	5
<i>Cutworms and Armyworms</i>	6
<i>Earthworms</i>	7
<i>Fall Armyworms</i>	7
<i>Grasshoppers</i>	7
<i>White Grubs</i>	8
<i>Green June Beetle Grubs (only)</i>	8
<i>Imported Fire Ants</i>	8
<i>Leafhoppers and Spittlebugs</i>	11
<i>Millipedes</i>	11
<i>Mole Crickets</i>	11
<i>Sowbugs and Pillbugs</i>	12
<i>Slugs and Snails</i>	12
<i>Sod Webworms</i>	12
<i>Sampling and Economic Thresholds for Turfgrass Insect Pests</i>	14

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 Beetles	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

Pest	Insecticide & Formulation		Amount per 1000 sq ft	Precautions and Remarks	
ANTS (Also see imported fire ants)	<i>chlorpyrifos</i> (Dursban Pro)	2 E	1.5 fl oz	<i>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.</i>	
	(Dursban 50W)	50 WSP	2 lb./acre		
	<i>carbaryl</i> (Sevin Brand SL)	4 SL	1½ to 3 fl oz		
	<i>lambda-cyhalothrin</i> (Scimitar CS, Scimitar GC)	9.7 CS			<i>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.</i>
	<i>deltamethrin</i> (DeltaGard G)	0.1 G	2 to 3 lb		<i>Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.</i>
	<i>cyfluthrin</i> (Tempo 20 WP)	20 WP	(1 packet) 50 gm per 7,500 to 10,000 sq ft		<i>Tempo 20 WP not for use on sod farms or golf courses.</i>
	(Tempo 20 WP GC)	20 WP	55 gm (1 packet) per 11,000 sq ft		<i>Tempo 20 WP GC for use on residential and commercial sites including golf courses.</i>
	<i>beta-cyfluthrin</i> (Tempo SC Ultra)	1 SC	4-6 ml		<i>Not for use on sod farms or golf courses.</i>
	<i>bifenthrin</i> (Talstar Lawn & Tree)	7.9 F	0.5-1 fl oz		
	(Talstar GC)	7.9 F	1 fl oz		
	<i>fipronil</i> (Chipco Topchoice)	0.0143% G	2 lb or 87 lb/acre	<i>For best results, treated turf should be watered or irrigated after application.</i>	
YELLOW JACKETS (Also other burrowing bees & wasps)	<i>carbaryl</i> (Carbaryl 80 S)	80 WP	4 oz	<i>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.</i>	
	(Sevin Brand SL)	4 SL	3 fl oz per gallon of water		
BILLBUGS	<i>bifenthrin</i> (Talstar Lawn & Tree)	7.9 F	0.25-0.5 fl oz	<i>For control of adult billbugs when they are first observed during April – early May.</i>	
	(Talstar GC)	7.9 F	0.25-0.5 fl oz		

Pest	Insecticide & Formulation		Amount per 1000 sq ft	Precautions and Remarks
<i>BILLBUGS</i> (cont'd)	<i>clothianidin</i> (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.
	<i>chlorantraniliprole</i> (Acelepryn)	1.67 SC	0.184 - 0.46 fl oz 8 - 20 fl oz/acre	Apply when overwintered adult billbugs are first observed in April. This application will also provide white grub control.
		0.2% G	1.15 - 2.3 lb 50 - 100 lb/acre	
	<i>imidacloprid</i> (Merit 75WP) (Merit 0.5 G)	75 WP	6.4 to 8.6 oz/acre	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.
		0.5 G	1.4 to 1.8 lb	
	<i>deltamethrin</i> (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.
<i>halofenozide</i> (MACH 2)	1.5 G	2.3 lb	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.	
	2 L	2.2 fl oz		
	(GrubEx)	1.5 G	See label for spreader settings.	
<i>CHINCH BUGS</i>	<i>cyfluthrin</i> (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.
		20 WP	55 gm (1 packet) per 7,800 sq ft	Tempo 20 WP GC for use on residential sites, including golf courses.
	<i>beta-cyfluthrin</i> (Tempo SC Ultra)	1 SC	6 ml	Not for use on sod farms or golf courses.
	<i>chlorpyrifos</i> (Dursban Pro) (Dursban 50W)	2 EC	1.5 fl oz	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.
		50 WSP	2 lb/acre	
		<i>clothianidin</i> (Arena 50 WDG)	50 WDG	12.8 oz/acre

Pest	Insecticide & Formulation	Amount per 1000 sq ft	Precautions and Remarks	
CUTWORMS, ARMYWORMS	<i>carbaryl</i> (Sevin Brand SL)	4 SL	1.5 to 3 fl oz	<i>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.</i>
	<i>acephate</i> (Orthene Turf, Tree & Ornamental Spray)	75 SP	0.5 to 2.4 oz	<i>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.</i>
	<i>chlorpyrifos</i> (Dursban Pro) (Dursban 50W)	2 EC 50 WSP	1.5 fl oz 2 lb/acre	<i>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.</i>
	<i>trichlorfon</i> (Dylox 80)	80 SP	2.5 to 3.75 oz	
	<i>bifenthrin</i> (Talstar Lawn & Tree) (Talstar GC)	7.9 F 7.9 F	0.18-0.25 fl oz 0.25 fl oz	<i>Delay watering or mowing for 24 hours after application.</i>
	<i>cyfluthrin</i> (Tempo 20 WP)	20 WP	(1 packet) 50 gm per 7,500 to 10,000 sq ft	<i>Delay watering or mowing for 24 hours for optimum control. Tempo 20 WP not for use on sod farms or golf courses.</i>
	(Tempo 20 WP GC)	20 WP	55 gm (1 packet) per 7,800 to 11,000 sq ft	<i>Tempo 20 WP GC for use on residential and commercial sites, including golf courses.</i>
	<i>beta-cyfluthrin</i> (Tempo SC Ultra)	1 SC	4-6 ml	<i>Not for use on sod farms or golf courses.</i>
	<i>spinosyn A and spinosyn D</i> (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	<i>Conserve SC is labeled for use on all turfgrasses.</i>
	<i>azadirachtin</i> (Turplex BioInsecticide)	3% EC	0.25 to 0.5 fl oz	<i>Use 1-5 gallons of water per 1000 square feet. Irrigate well before applying.</i>
	<i>Steinernema sp.</i> Parasitic nematodes		see label	<i>Application should be made when small larvae or damage is first detected.</i>
	<i>lambda-cyhalothrin</i> (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	<i>Scimitar GC can be used on golf courses.</i>

Pest	Insecticide & Formulation		Amount per 1000 sq ft	Precautions and Remarks
CUTWORMS, ARMYWORMS (cont'd)	halofenozide (MACH 2)	1.5G	1.55 lb	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.
		2 L	1.5 fl oz	
	(GrubEx)	1.5G	see label for spreader settings	
	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	0.046-0.092 fl oz 2-4 fl oz/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.
		0.2%G	1.15 - 2.3 lb 50 - 100 lb/acre	
EARTHWORMS				Usually not a problem. No labeled controls available.
FALL ARMYWORMS	chlorpyrifos (Dursban Pro)	2 EC	1.5 fl oz	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.
	(Dursban 50W)	50 WSP	2 lb/acre	
	chlorantraniliprole (Acelepryn)	1.67 SC	0.046-0.092 fl oz 2-4 fl oz/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.
		0.2%G	1.15 - 2.3 lb 50 - 100 lb/acre	
GRASSHOPPERS (refer to UT Extension factsheet SP290X)	chlorpyrifos (Dursban Pro)	2 EC	1.5 fl oz	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.
	(Dursban 50W)	50 WSP	2 lb/acre	
	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.

Pest	Insecticide & Formulation		Amount per 1000 sq ft	Precautions and Remarks
<i>WHITE GRUBS</i> (May beetle, masked chafers, green June beetle, Japanese beetle and others)	<i>trichlorfon</i> (Dylox 80)	80 SP	3.75 oz	<i>Dylox not for use on sod farms. Thoroughly irrigate following application.</i>
	(Dylox 6.2G)	6.2 G	3 lb	
	<i>imidacloprid</i> (Merit 75 WP)	75 WP	6.4 oz/acre	<i>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.</i>
	(Merit 0.5 G)	0.5 G	1.4 lb	
	<i>clothianidin</i> (Arena 50 WDG)	50 WDG	6.4-12.8 oz/acre	<i>Do not apply more than 12.8 oz of Arena 50 WDG per acre per season.</i>
	<i>halofenozide</i> (MACH 2)	1.5 G 2 L	2.3 lb 2.2 fl oz	<i>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.</i>
	(GrubEx)	1.5 G	See label for spreader settings.	
	<i>thiamethoxam</i> (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	<i>Apply up to 45 days before the historical peak of adult flight to 2nd instar grub of the species being targeted. For optimum control, treat from peak flight to peak egg hatch.</i>
	<i>chlorantraniliprole</i> (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	<i>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.</i>
<i>GREEN JUNE BEETLE GRUBS</i> (only)	<i>carbaryl</i> (Sevin Brand SL)	4 SL	1 1/2 to 3 fl oz	<i>Water in, but do not flood.</i>
<i>IMPORTED FIRE ANTS</i>	<i>hydramethylnon</i> (Amdro Granular Insecticide, Siege Fire Ant Bait)	0.73% bait		<i>Uniformly broadcast 1-1.5 lb of bait per acre with ground equipment on pastures, rangegrass, lawns, turf, sod, noncropland and ornamental nursery stock. Or, uniformly distribute five 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.</i>

Pest	Insecticide & Formulation	Amount per 1000 sq ft	Precautions and Remarks
IMPORTED FIRE ANTS (cont'd)	<i>abamectin</i> (PT370 Ascend Fire Ant Stopper Bait)	0.011% bait	<i>Broadcast: Uniformly apply 1 lb of bait per acre to turf, lawns and noncrop areas. Individual mound: Use 5 to 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.</i>
	(Varsity Fire Ant Bait) 0.011% bait	0.4 oz 1 lb/acre	
	<i>fenoxycarb</i> (Award Brand of Logic Fire Ant Bait)	1% bait	<i>Do not apply on pasture or rangeland to be grazed. Broadcast 1-1.5 lb per acre or apply one to three 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.</i>
	<i>pyriproxyfen</i> (Distance Fire Ant Bait)	0.5% bait	<i>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 to 4 feet around the mound. For Spectracide Fire Ant Bait, use 2 to 4 tablespoons of bait per mound. Evenly sprinkle bait in a 1-foot circle around the center of each mound.</i>
	(Spectracide Fire Ant Bait)	0.35-0.5 oz or 1-1.5 lb/acre or 1-4 Tbsp/mound 0.05% bait 1 lb/4,400 sq ft	
	<i>s-methoprene</i> (Extinguish)		<i>For use on turfgrass and landscapes, golf courses, roadsides, school grounds, sports fields, pastures, rangeland, sod farms and other listed sites.</i>
	<i>fipronil</i> (Chipco Ceasefire)	0.00015% bait	<i>For use on home lawns, golf courses and commercial and recreational turf and sod farms. May make a total of 4 applications per year if necessary.</i>
	(Chipco Topchoice) 0.0143% G	1.5-15 lb/acre or 5 Tbsp/mound 2 lb or 87 lb/acre	

Pest	Insecticide & Formulation		Amount per 1000 sq ft	Precautions and Remarks
IMPORTED FIRE ANTS (cont'd)	indoxacarb (Advion)	0.045 G	0.5 oz.	<i>For use on home lawns, golf courses, athletic fields and recreational turf, parks, cemeteries and other listed sites.</i>
	chlorpyrifos (Dursban Pro) 2 EC (Dursban 50W) 50 WSP			<i>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 to 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.</i>
	lambda-cyhalothrin (Scimitar CS, Scimitar GC)	9.7 CS		<i>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.</i>
	acephate (Orthene Turf, Tree & Ornamental Spray)	75 SP		<i>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.</i>
		75 SP		<i>Evenly distribute 1-2 tsp without water over the mound.</i>
	deltamethrin (DeltaGard G)	0.1 G	2 to 3 lb	<i>Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.</i>

Pest	Insecticide & Formulation		Amount per 1000 sq ft	Precautions and Remarks
<i>IMPORTED FIRE ANTS (cont'd)</i>	<i>bifenthrin (Talstar One)</i>		1.0 oz (Broadcast Treatment)	<i>For mound treatment, dilute 1 teaspoon per gallon of water and apply 1 to 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.</i>
	<i>Talstar GC 0.2 % granular</i>		4.6 lb (Broadcast Treatment)	<i>For mound treatment, apply ½ cup of the granular insecticide per mound and then drench mound with 1 to 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.</i>
<i>LEAFHOPPERS and SPITTLEBUGS</i>	<i>chlorpyrifos (Dursban Pro) (Dursban 50W)</i>	2 EC 50 WSP	1.5 fl oz 2 lb/acre	<i>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.</i>
	<i>deltamethrin (DeltaGard G)</i>	0.1 G	2 to 3 lb	<i>Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.</i>
<i>MILLIPEDES</i>	<i>carbaryl (Sevin Brand SL)</i>	4 SL	1½ to 3 fl oz	
<i>MOLE CRICKETS</i>	<i>deltamethrin (DeltaGard G)</i>	0.1 G	2 to 3 lb	<i>Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.</i>
	<i>bifenthrin (Talstar Lawn & Tree)</i>	7.9 F	0.5-1.0 fl oz	<i>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.</i>
	<i>(Talstar GC)</i>	7.9 F	0.25-0.5 fl oz	

Pest	Insecticide & Formulation		Amount per 1000 sq ft	Precautions and Remarks
<i>MOLE CRICKETS</i> (cont'd)	<i>acephate</i> (<i>Orthene Turf, Tree & Ornamental Spray</i>)	75 SP	1 to 1.5 oz	<i>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.</i>
	<i>cyfluthrin</i> (<i>Tempo 20 WP</i>)	20 WP	(1 packet) 50 gm per 7,500 sq ft	<i>Tempo 20 WP not for use on sod farms or golf courses.</i>
	(<i>Tempo 20 WP GC</i>)	20 WP	55 gm (1 packet) per 7,800 sq ft	<i>Tempo 20 WP GC for use on residential and commercial sites including golf courses.</i>
	<i>fipronil</i> (<i>Chipco TopChoice</i>) 0.0143%G		87 lb/acre	<i>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.</i>
	<i>beta-cyfluthrin</i> (<i>Tempo SC Ultra</i>)	1 SC	6 ml	<i>Not for use on sod farms or golf courses.</i>
<i>SOWBUGS, PILLBUGS</i>	<i>carbaryl</i> (<i>Sevin Brand SL</i>)	4 SL	1.5 to 3 fl oz	
	<i>deltamethrin</i> (<i>DeltaGard G</i>)	0.1 G	2 to 3 lb	<i>Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.</i>
<i>SLUGS and SNAILS</i>	<i>metaldehyde (2%) and carbaryl (5% Sevin) granules</i> (<i>Bug-geta Plus</i>)		0.5 lb	<i>If ground is dry, water area to be treated thoroughly.</i>
<i>SOD WEBWORMS</i> (Refer to UT Extension factsheet SP290L)	<i>carbaryl</i> (<i>Sevin Brand SL</i>)	4 SL	4.4 to 6 fl oz	<i>Treat in late afternoon. Repeat as needed. Apply adequate water for good coverage. Do not cut grass for one to three days after application.</i>
	<i>chlorpyrifos</i> (<i>Dursban Pro</i>)	2 EC	1.5 fl oz	<i>Watering or mowing of the treated area should be delayed for 12 to 24 hours after treatment. Not for residential use.</i>
	(<i>Dursban 50W</i>)	50 WSP	2 lb/acre	
	<i>trichlorfon</i> (<i>Dylox 80</i>)	80 SP	2.5 to 3.75 oz	<i>Dylox 80 and 6.2G not for use on turf being grown for sale.</i>
	(<i>Dylox 6.2G</i>)	6.2 G	2 lb	

Pest	Insecticide & Formulation		Amount per 1000 sq ft	Precautions and Remarks
<i>SOD WEBWORMS</i> (cont'd)	<i>deltamethrin</i> (DeltaGard G)	0.1 G	2 to 3 lb	<i>Irrigate with an adequate quantity of water to thoroughly moisten grass and thatch and dissolve the insecticide granules.</i>
	<i>methomyl</i> (Lannate)	90 SP	2/5 to 4/5 oz	<i>For use on sod farms only. After application, sprinkle irrigate for 15 minutes.</i>
	<i>Bacillus thuringiensis</i> (Dipel 2X)	WP	0.37 to 0.73 oz	
	<i>spinosyn A and spinosyn D</i> (Conserve SC)	1 SC	0.25 fl oz	<i>Conserve SC is labeled for use on all turfgrasses.</i>
	<i>cyfluthrin</i> (Tempo 20 WP)	20 WP	50 gm (1 packet) per 7,500 to 10,000 sq ft	<i>Delay watering or mowing for 24 hours for optimum control. Tempo 20 WP not for use on sod farms and golf courses.</i>
	<i>(Tempo 20 WP GC)</i>	20 WP	55 gm (1 packet) per 11,000 sq ft	<i>Tempo 20 WP GC for use on residential and commercial sites including golf courses.</i>
	<i>beta-cyfluthrin</i> (Tempo SC Ultra)	1 SC	4-6 ml	<i>Not for use on sod farms or golf courses.</i>
	<i>Steinernema sp.</i> <i>Parasitic nematodes</i>		see label	<i>Application should be made when small larvae or damage is first detected.</i>
	<i>azadirachtin</i> (Turplex BiolInsecticide)	3% EC	0.25 to 0.5 fl oz	<i>Use 1-5 gallons of water per 1000 square feet. Irrigate well before applying.</i>
	<i>lambda-cyhalothrin</i> (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	<i>Scimitar GC can be used on golf courses.</i>
	<i>permethrin</i> (Astro)	3.2 EC	0.4 to 0.8 fl oz	<i>For use on lawns (residential lawns and sod farms).</i>
	<i>halofenozide</i> (MACH 2)	1.5 G 2 L	1.55 lb 1.5 fl oz	<i>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.</i>
	<i>(GrubEx)</i>	1.5 G	see label for spreader settings	
	<i>bifenthrin</i> (Talstar Lawn & Tree) (Talstar GC)	7.9 F 7.9 F	0.18-0.25 fl oz 0.25 fl oz	<i>Delay watering or mowing for 24 hours after application.</i>

Pest	Insecticide & Formulation		Amount per 1000 sq ft	Precautions and Remarks
SOD WEBWORMS (cont'd)	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	0.046-0.092 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.

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 Economic Thresholds for Turfgrass Insect Pests

White grubs – Treat in mid-August when the economic threshold has been reached. Sample several square foot sections of turf by using a shovel or spade to cut out a square-foot section and lift the turf back to count grubs.

Threshold Targets for White Grubs –

Assuming Adequate Growing Conditions & No Digging Animals

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

(Japanese Beetle, Oriental Beetle, European Chafer, Asiatic Garden Beetle)

Masked Chafer (Annual White Grub) * 15-20 grubs/square foot *

Black Turfgrass Ataenius * 30-50 grubs/square foot *

May/June Beetles * 3-8 grubs/square foot *

Green June beetle grubs * 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 ft by 2 ft area (4 ft²). Treat when 4-6 or more sod webworms per 4 ft² 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 ft² are found.

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.

Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label. Persons who do not obey the law will be subject to penalties.

Disclaimer Statement

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication.

Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product. The author(s), the University of Tennessee Institute of Agriculture and University of Tennessee Extension assume no liability resulting from the use of these recommendations.

