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Pest control information and recommendations for turfgrass

These recommendations have been compiled from several sources that were updated this past year, including cooperative extension publications from Cornell, The Ohio State and North Carolina State Universities. Our thanks to the Green Industry programs at these fine universities. Even so, they are still recommendations and may not apply to your area because of state and local regulations. While they indicate active ingredients that have been proven to be effective against particular pests —when used according to label directions and under proper conditions — make sure there are no restrictions on their use in your market. When in doubt, check with Cooperative Extension or with the turfgrass and ornamental experts at your state land grant university.

Always read and follow label directions. When in doubt about a label's intent or the proper or most effective way to use a particular product, contact the manufacturer (use the toll-free number on the label) or visit the manufacturer's Web site.

TURF PEST INSECTS AND CHEMICAL CONTROLS

ARMYWORMS

Treat at first sign of damage. Use a soap flush to disclose populations.

Insecticidal treatment	Chemical class	Lbs. ai/acre
Azadirachtin	biological	0.02-0.43
Bacillusthuringiensis kurstaki	biological	0.67-1.67 qt/acre
Beauveria bassiana JW-1	biological	see label
Beta-cyfluthrin[c]	pyrethroid	0.046-0.07
Bifenthrin[e]	pyrethroid	0.05
Carbaryl	carbamate	2.0-4.0
Chlorpyrifos[b]	organophosphate	1.0
Cyfluthrin[e]	pyrethroid	0.1-0.2
Deltamethrin[e]	pyrethroid	0.08-0.13
Diazinon[a]	organophosphate	2.7-5.5
Halofenozide	growth regulator	1.0
Heterorhabiditis bacteriophora	biological	(0.6-1.0 bill./acre)
Lambda-cyhalothrin[e]	pyrethroid	0.027-0.055
Permethrin[c]	pyrethroid	0.44-0.87
Spinosad	spinosyn	0.07 (small larvae), 0.4 (large larvae)
Steinernema carpocapsae	biological	(1.0 bill./acre)

BERMUDAGRASS MITE

Found in southern states

Beauveria bassiana JW-1	biological	see label
Bifenthren[e]	pyrethroid	0.05-0.1
Deltamethrin[e]	pyrethroid	0.08-0.13
Diazinon[a]	organophosphate	2.7-4.0

BLUEGRASS BILLBUG ADULTS

Control adults when first noticed migrating in spring. Use pitfall traps to monitor adults of observe on warm, sunny days. Adults lay eggs in turf stems as soon as they become active.

Beauveria bassiana JW-1	biological	see label
Beta-cyfluthrin[c]	pyrethroid	0.046-0.07
Bifenthrin[e]	pyrethroid	0.05
Chlorpyrifos[b]	organophosphate	1.0
Cyfluthrin[e]	pyrethroid	0.1-0.2
Deltamethrin[e]	pyrethroid	0.08-0.13
Diazinon[a]	organophosphate	2.7-5.5
Heterorhabiditis bacteriophora	biological	see label
Lambda-cyhalothrin[e]	pyrethroid	0.027-0.055
Steinernema carpocapsae	biological	see label

BLUEGRASS BILLBUG LARVAE

Control larvae in late spring. Thatch reduction and good irrigation improve efficacy of products.

Beauveria bassiana JW-1	biological	see label
Carbaryl	carbamate	2.0-4.0
Diazinon[a]	organophosphate	2.7-5.5
Halofenozide	growth regulator	1.0
Heterorhabiditis bacteriophora	biological	see label
Imidaclorid	chloronicotinyl	0.3-0.4
Steinernema carpocapsae	biological	see label

CHINCH BUGS

Acephate	organophosphate	2.4-5.0
Beauveria bassiana JW-1	biological	see label
Beta-cyfluthrin[c]	pyrethroid	0.046-0.07
Bifenthrin[e]	pyrethroid	0.05
Carbaryl	carbamate	2.0-4.0
Chlorpyrifos[b]	organophosphate	1.0
Cyfluthrin[e]	pyrethroid	0.1-0.2
Deltamethrin[e]	pyrethroid	0.08-0.13
Diazinon[a]	organophosphate	2.7-5.5
Heterorhabiditis bacteriophora	biological	see label
Imidacloprid	chloronicotinyl	0.40 (suppression only)
Lambda-cyhalothrin[e]	pyrethroid	0.027-0.055
Permethrin[e]	pyrethroid	0.44-0.87
Steinernema carpocapsae	biological	see label

CLOVER MITE

Insecticidal treatment	Chemical class	Lbs. ai/acre
Bifenthrin[e]	pyrethroid	0.05
Chlorpyrifos[b]	organophosphate	1.0
Deltamethrin[e]	pyrethroid	0.08-0.13
Diazinon[a]	organophosphate	2.7-5.5
Dicofol	organochlorine	0.46-0.92
Lambda-cyhalothrin[e]	pyrethroid	0.027-0.055

EUROPEAN CRANE FLY LARVAE

Carbaryl	carbamate	8.0
Chlorpyrifos[b]	organophosphate	1.0
Diazinon	organophosphate	2.7

GENERAL CRANE FLY LARVAE

Bifenthrin[e]	pyrethroid	0.05-0.1

CUTWORMS

Acephate	organophosphate	2.4-5.0
Azadirachtin	biological	see label
Beta-cyfluthrin[c]	pyrethroid	0.046-0.07
Bifenthrin[e]	pyrethroid	0.05
Carbaryl	carbamate	2.0-4.0
Chlorpyrifos[b]	organophosphate	1.0
Cyfluthrin[e]	pyrethroid	0.1-0.2
Deltamethrin[e]	pyrethroid	0.08-0.13
Diazinon[a]	organophosphate	2.7-5.5
Halofenozide	growth regulator	1.0
Heterorhabiditis bacteriophora	biological	see label
Imidacloprid	chloronicotinyl	0.3-0.4 (suppression only)
Lambda-cyhalothrin[e]	pyrethroid	0.027-0.055
Spinosad	spinosad	0.24 (small larvae), 0.4 (large larvae)
Steinernema carpocapsae	biological	see label
Trichlorfon	organophosphate	5.4-8.0

FALL ARMYWORM

Acephate	organophosphate	1.0-2.4
Azadirachtin	biological	0.02-0.43
Bifenthrin[e]	pyrethroid	0.05
Carbaryl	carbamate	2.0-4.0
Chlorpyrifos[b]	organophosphate	1.0
Halofenozide	growth regulator	1.0
Lambda-cyhalothrin[e]	pyrethroid	0.027-0.055
Spinosad	spinosad	0.07 (small larvae), 0.4 (large larvae)
Steinernema carpocapsae	biological	see label

GREENBUG

Aphids

Acephate	organophosphate	1.0
Chlorpyrifos[b]	organophosphate	1.0

MOLE CRICKETS

Imported mole crickets are pests of southern turf.

Acephate	organophosphate	2.0-4.0
Beauveria bassiana JW-1	biological	see label
Beta-cyfluthrin[c]	pyrethroid	0.046-0.07
Bifenthrin[e]	pyrethroid	0.05
Carbaryl	carbamate	2.0-4.0
Chlorpyrifos[b]	organophosphate	1.0
Cyfluthrin[e]	pyrethroid	0.1-0.2
Deltamethrin[e]	pyrethroid	0.08-0.13
Diazinon[a]	organophosphate	2.7-5.5
Fipronil *(golf course and commercial grounds only)*	phenyl pyrazole	0.0125-0.025
Imidocloprid	chloronicotinyl	0.4
Lambda-cyhalothrin[e]	pyrethroid	0.027-0.055
Permethrine	pyrethroid	0.44-0.87
Steinernema riobravis	biological	see label
Steinernema scapterisci	biological	see label

SOD WEBWORMS

Acephate	organophosphate	2.4-5.0
Azadirachtin	biological	0.02-0.43
Bacillus thuringiensis kurstaki	biological	see label
Beauveria bassiana JW-1	biological	see label
Beta-cyfluthrin[e]	pyrethroid	0.046-0.07
Bifenthrin[e]	pyrethroid	0.05
Carbaryl	carbamate	2.0-4.0
Chlorpyrifos[b]	organophosphate	1.0
Cyfluthrin[e]	pyrethroid	0.1-0.2
Deltamethrin[e]	pyrethroid	0.08-0.13
Diazinon[a]	organophosphate	2.7-5.5
Fluvalinate	pyrethroid	0.05-0.16
Halofenozide	growth regulator	1.0
Heterorhabiditis bacteriophora	biological	see label
Lambda-cyhalothrin[e]	pyrethroid	0.027-0.055
Permethrin[c]	pyrethroid	0.44-0.87
Spinosad	spinosad	0.24 (small larvae), 0.4 (large larvae)
Steinernema carpocapsae	biological	see label
Trichlorfon	organophosphate	5.4-8.0

TURF PEST INSECTS AND CHEMICAL CONTROLS *(CONTINUED)*

WHITE GRUBS

Japanese beetle, masked chafers, European chafers, Asiatic garden beetle, oriental beetle

Bacillus popilliae Japanese beetle only	biological	see label
Beauveria bassiana JW-1	biological	see label
Bifenthrin[e]	pyrethroid	0.1 (adults only)
Carbaryl	carbamate	8.0
Chlorpyrifos[b]	organophosphate	2.0-4.0
Cyfluthrin[e]	pyrethroid	0.2 (JP adults only)
Deltamethrin[e]	pyrethroid	0.08-0.13 (JP adults only)
Diazinon[a]	organophosphate	4.0-5.5
Halofenozide	grown regulator	1.5-2.0
Heterorhabiditis bacteriophora	biological	see label
Imidaclorid	chloronicotinyl	0.3-0.4
Lambda-cyhalothrin[e]	pyrethroid	0.055 (suppression)
Permethrin[c]	pyrethroid	0.44-0.87
Steinernema glaseri	biological	see label
Trichlorfon		8.0

MAY/JUNE BEETLES, PHYLLOPHAGA SPP

Carbaryl	carbamate	8.0
Halofenozide	growth regulator	1.5
Imidaclorid	chloronicotinyl	0.3
Trichlorfon	organophosphate	8.0

BLACK TURFGRASS ATAENIUS

Acephate	organophosphate	3.0-4.0
Beauveria bassiana JW-1	biological	see label
Beta-cyfluthrin[c]	pyrethroid	0.07 (adults)
Bifenthrin[e]	pyrethroid	0.05-0.1 (adults)
Chlorpyrifos[b]	organophosphate	2.0-4.0
Halofenozide	growth regulator	1.5
Imidacloprid	chloronicotinyl	0.3-0.4
Lambda-cyhalothrin[e]	pyrethroid	0.055 (adults)
Spinosad	spinosad	0.4 (adults)
Trichlorfon	organophosphate	8.0

GREEN JUNE BEETLE

Beauveria bassiana JW-1	biological	see label
Carbaryl	carbamate	2.0-4.0
Halofenozide	growth regulator	1.5
Trichlorfon	organophosphate	8.0

[a] Not registered for use on golf courses or sod farms.

[b] Not to be used on residential turf.

[c] For home lawns only.

[d] Actual formulation

[e] Different trade names exist for golf course, sod farms and other turf areas

SOURCE: "2002 MANAGEMENT OF TURFGRASS PESTS," OHIO STATE UNIVERSITY EXTENSION

Grub identification tips

BY PAT VITTUM, PH.D.

Two factors in determining how to control grubs in your turf are: 1. identifying which grubs are attacking your turfgrass, and 2. figuring out how many there are.

To identify grub species, inspect the shape of the anal slit and the pattern of hairs on its posterior. Use a hand lens; it makes the job a lot easier. Next, figure out what the threshold is that grubs must cross before they seriously damage the turf.

The following are some identifying characteristics of each grub species and action thresholds for each. Use this information strictly as a guide. It serves as a way to compare damage potential between species.

Japanese beetles

Identifier: Transverse anal slit and a v-shaped row of spines just in front of the slit, pointing toward the head.

Range: Found east of the Mississippi River and north of central Georgia. They're also beginning to show up in parts of Minnesota and some of the Central Plains.

Action threshold: Six to 15 grubs per sq. ft. in moderately maintained turfgrass.

European chafers

Identifier: Branched anal slit and two almost parallel rows of spines that look like an opening zipper.

Range: Eastern third of Massachusetts, Rhode Island and along the Erie Canal in New York, southern New Hampshire and southern Maine. Other areas of infestation include the shores of the Great Lakes and parts of southern Michigan.

Action threshold: five to 10 grubs per sq. ft.

Oriental beetles

Identifier: A transverse anal slit (like the Japanese beetle) and two almost parallel rows of spines

Range: Coastal New England (including most of Rhode Island and Connecticut), Long Island, eastern New Jersey and parts of Pennsylvania, with populations also reported along the Connecticut River and perhaps into southern Vermont and New Hampshire. Other locations will probably be confirmed through pheromone trapping.

Action threshold: Six to 15 grubs per sq. ft.

Asiatic garden beetles

Identifier: Branched anal slit with a distinct semicircle of spines just in front of the slit.

Range: Throughout the Northeast and Midwest.

Action threshold: 10 to 20 grubs per sq. ft.

Northern and southern masked chafers

Identifier: Transverse anal slit. Spines are scattered with no obvious pattern.

Range: Throughout the Northeast and Midwest but are more common in the Midwest and Plains states.

Action threshold: Eight to 20 grubs per sq. ft.

Green June beetles

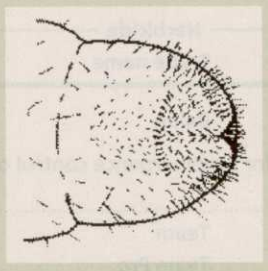
Identifier: Transverse anal slit and two fairly compact parallel rows of spines. These grubs have short legs that aren't used for locomotion.

Range: Eastern U.S., from southeastern New York to Florida and westward to Texas and Kansas.

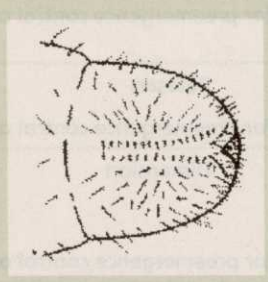
Action threshold: Because the grubs feed more in the thatch and not as much on the roots, thresholds are usually higher than for the direct root-feeding species like the Japanese beetle.

— From the November 2002 issue of Turfgrass Trends. Visit **www.turfgrasstrends.com**

The raster patterns for common turfgrass grubs:

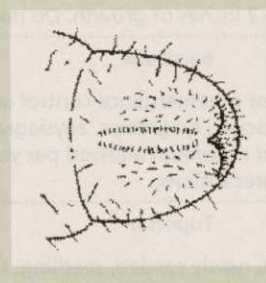


Asiatic garden beetles: Action thresholds are higher than for Japanese beetles (at 10 to 20 grubs per square foot) because they're significantly smaller.

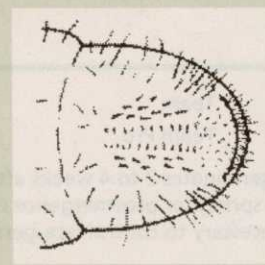


Europe chafers: Action thresholds usually are slightly lower than those for Japanese beetles, at five to 10 grubs per square foot.

Japanese beetles: Action thresholds typically range from six to 15 grubs per square foot in moderately maintained turfgrass.



Green June beetles: Action thresholds are usually a bit higher than for the direct root-feeding species, like the Japanese beetle.



Oriental beetles: Action thresholds typically range from six to 15 grubs per square foot in moderately maintained turfgrass.

CHEMICAL CONTROL OF TURFGRASS WEEDS

ANNUAL GRASSY WEEDS: PREEMERGENCE CONTROL

Weed	Herbicide: Common name	Trade name	Formulation	AI/A
Crabgrass, barnyardgrass, foxtails, panicum	benefin	Balan	25G	2 lb.
	Apply in early spring for preemergence control on mature turfgrass only. May injure bentgrass.			
	benefin + trifluralin	Team	2G	2 lb.
	benefin + trifluralin	Team Pro	0.86G	1.5-3.0 lb.
	Apply in early spring for preemergence control on mature turfgrass only.			
	bensulide	Betasan	4E	7.5-1.0 lb.
	Apply in early spring for preemergence control on mature turfgrass only.			
	*dithiopyr	Dimension	1EC, granular w/fertilizer (several formulations)	0.25-0.5 lb.
	Apply in early spring for preemergence control on established turfgrasses. Tolerant turfgrasses include bluegrasses, fescues, ryegrasses, zoysiagrass, and creeping bentgrass. Length of control is rate dependent. See label for rate suggestions and precautions.			
	oxadiazon 2G	Ronstar	2G, 50WP	2-4 lb.
	North - Apply in early spring for preemergence control on mature Kentucky bluegrass, tall fescue, and perennial ryegrass only. South - Apply 2-3 weeks before greenup.			
	NOTE: Ronstar 50WP formulation is labeled for Zoysia turf but has injured other cool-season turfgrasses.			
	pendimethalin	Pre-M, Halts, Weedgrass control	65DG	1.5-2.0 lb.
	Apply in early spring for preemergence control on mature turfgrass. May also be used on seedling turf with 1 to 2 inches of growth. Do not use on closely cut bentgrass.			
	*prodiamine	Barricade	65WG	0.65-0.75 lb.
	Apply in early spring for preemergence control on established turfgrasses. Tolerant turfgrasses include bluegrasses, fescues, ryegrasses, zoysiagrass and creeping bentgrass. Maximum dose for any application and maximum allowed per year vary with turf type. See label for detailed rate suggestions and precautions.			
	siduron	Tupersan	4.6%, 50WP	6-12 lb.
	Apply in early spring to newly seeded, seedling, or mature turfgrass for preemergence control. Also effective on young crabgrass seedlings. Use reduced rate, 6 lb./A, on newly seeded turfgrass.			
Goosegrass	benefin + trifluralin	Team	2G	3 lb.
	benefin + trifluralin	Team Pro	0.86G	3 lb.
	Goosegrass generally germinates 2 to 4 weeks after crabgrass. Treat later than for crabgrass. Apply in spring for preemergence control on mature turfgrass only. Split applications may be necessary to control late-germinating goosegrass.			

**Restricted-use pesticide; may be purchased and used only by certified applicators.*

ANNUAL GRASSY WEEDS: PREEMERGENCE CONTROL *(CONTINUED)*

Weed	Herbicide: Common name	Trade name	Formulation	AI/A
Goosegrass *(continued)*	oxadiazon 2G	Ronstar	2G, 50WP	4 lb.
	Apply in spring for preemergence control on mature Kentucky bluegrass, tall fescue, and perennial ryegrass only. *NOTE*: Ronstar 50WP formulation is labeled for zoysia turf but has injured other cool-season turfgrasses.			
	Bensulide + oxadiazon	Scott's Goosegrass/ Crabgrass Control	4E+50WP	6.5+1.5 lb.
	*Dithiopyr	Dimension	1EC	0.5 lb.
	Apply in spring for preemergence control on established turfgrasses. Tolerant turfgrasses include bluegrasses, fescues, ryegrasses, zoysiagrass, and creepingbentgrass.			
	Pendimethalin	Pre-M, Halts, Weedgrass Control	60DG 60WP	2 lb. 2 lb.
	Apply in spring for preemergence control on mature turfgrass only. Do not use on closely cut bentgrass. Second application may be necessary to control late-germinating goosegrass.			
	*Prodiamine	Barricade	65WDG	0.75 lb.
	Apply in early spring for preemergence control on established turfgrasses. Tolerant turfgrasses include bluegrasses, fescues, ryegrasses and zoysiagrass. More consistent control is obtained by sequential applications of 0.75 lb. followed six weeks later by 0.25 lb. This higher rate required to control goosegrass is not safe on bentgrass. Maximum dose for any application and maximum allowed per year vary with turf type.			

ANNUAL GRASSY WEEDS: POSTEMERGENCE CONTROL

Crabgrass, goosegrass, foxtail, barnyardgrass, other summer annual grasses	*dithiopyr	Dimension	1EC	0.38-0.5 lb.
	Postemergent control of young seedling (pretillering) crabgrass but not goosegrass. Addition of 0.25% (by volume) of a nonionic surfactant may improve control. To control tillered crabgrass, dithiopyr may be mixed with Acclaim or MSMA.			
	Fenoxaprop	Acclaim Extra	0.57EC	1/8-3/8 lb.
	Apply to actively growing grassy weeds. Use higher rates for larger weeds. Do not tank mix with broadleaf herbicides. See label for other restrictions. Addition of a surfactant is not generally recommended.			
	Methanearsonates	MSMA	6.0L, 6.6L, 55WG	2 lb.
	Apply after crabgrass has emerged but before it is large enough to be competitive with desirable turfgrass. Repeat application may be necessary. Does not control goosegrass effectively. May discolor turfgrass. DSMA is also labeled but is used at higher rates.			

**Restricted-use pesticide; may be purchased and used only by certified applicators.*

CHEMICAL CONTROL OF TURFGRASS WEEDS *(CONTINUED)*

ANNUAL GRASSY WEEDS: POSTMERGENCE CONTROL *(CONTINUED)*

Weed	Herbicide: Common name	Trade name	Formulation	AI/A
Annual bluegrass in perennial ryegrass	ethofumesate	Prograss	1.5EC	1-2 lb./A (2/3-1 1/3 gal./A)
	North - Apply in late August or early September to control seedling annual bluegrass. Apply follow-up treatment 30 to 60 days later. Do not exceed 4 lb. AI/A per year. On seedling ryegrass, apply only after ryegrass seedlings are 1 inch tall. South - First app. 30-45 days after overseeding with perennial ryegrass. Second 21-28 days later.			
Annual bluegrass in creeping bentgrass	paclobutrizol	Scott's TGR	0.36G	1/3-3/4 lb./A
	For suppression of annual bluegrass and gradual conversion to bentgrass. Use lower rate on sandy soils. Apply in late summer or early fall (no later than October 1 in north) and again in the spring after 100% green-up. Applications when turfgrass vigor is low may result in undesirable levels of discoloration and growth reduction.			

SOURCE: CORNELL COOPERATIVE EXTENSION'S 2001 PEST MANAGEMENT GUIDELINES FOR COMMERCIAL TURFGRASS / NORTH CAROLINA COOPERATIVE EXTENSION SERVICE