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.

<table>
<thead>
<tr>
<th>Insecticidal treatment</th>
<th>Chemical class</th>
<th>Lbs. ai/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azadirachtin</td>
<td>biological</td>
<td>0.02-0.43</td>
</tr>
<tr>
<td>Bacillus thuringiensis kurstaki</td>
<td>biological</td>
<td>0.67-1.67 qt/acre</td>
</tr>
<tr>
<td>Beauveria bassiana JW-1</td>
<td>biological</td>
<td>see label</td>
</tr>
<tr>
<td>Beta-cyfluthrin</td>
<td>pyrethroid</td>
<td>0.046-0.07</td>
</tr>
<tr>
<td>Bifenthrine</td>
<td>pyrethroid</td>
<td>0.05</td>
</tr>
<tr>
<td>Carbaryl</td>
<td>carbamate</td>
<td>2.0-4.0</td>
</tr>
<tr>
<td>Chlorpyrifos</td>
<td>organophosphate</td>
<td>1.0</td>
</tr>
<tr>
<td>Cyfluthrin</td>
<td>pyrethroid</td>
<td>0.1-0.2</td>
</tr>
<tr>
<td>Deltamethrin</td>
<td>pyrethroid</td>
<td>0.08-0.13</td>
</tr>
<tr>
<td>Diazinon</td>
<td>organophosphate</td>
<td>2.7-5.5</td>
</tr>
<tr>
<td>Halofenozide</td>
<td>growth regulator</td>
<td>1.0</td>
</tr>
<tr>
<td>Heterorhabditis bacteriophora</td>
<td>biological</td>
<td>see label</td>
</tr>
<tr>
<td>Lambda-cyhalothrin</td>
<td>pyrethroid</td>
<td>0.027-0.055</td>
</tr>
<tr>
<td>Permethrin</td>
<td>pyrethroid</td>
<td>0.44-0.87</td>
</tr>
<tr>
<td>Spinosad</td>
<td>spinosyn</td>
<td>0.07 (small larvae), 0.4 (large larvae)</td>
</tr>
<tr>
<td>Steinernema carpocapsae</td>
<td>biological</td>
<td>(1.0 bill./acre)</td>
</tr>
</tbody>
</table>

**BLUEGRASS BILLBUG LARVAE**

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

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<td>biological</td>
<td>see label</td>
</tr>
<tr>
<td>Carbaryl</td>
<td>carbamate</td>
<td>2.0-4.0</td>
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<tr>
<td>Diazinon</td>
<td>organophosphate</td>
<td>2.7-5.5</td>
</tr>
<tr>
<td>Halofenozide</td>
<td>growth regulator</td>
<td>1.0</td>
</tr>
<tr>
<td>Heterorhabditis bacteriophora</td>
<td>biological</td>
<td>see label</td>
</tr>
<tr>
<td>Imidacloprid</td>
<td>chloronicotinyl</td>
<td>0.3-0.4</td>
</tr>
<tr>
<td>Steinernema carpocapsae</td>
<td>biological</td>
<td>see label</td>
</tr>
</tbody>
</table>

**CHINCH BUGS**

Acephate organophosphate 2.4-5.0

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<tr>
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<tr>
<td>Beauveria bassiana JW-1</td>
<td>biological</td>
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</tr>
<tr>
<td>Carbaryl</td>
<td>carbamate</td>
<td>2.0-4.0</td>
</tr>
<tr>
<td>Chlorpyrifos</td>
<td>organophosphate</td>
<td>1.0</td>
</tr>
<tr>
<td>Cyfluthrin</td>
<td>pyrethroid</td>
<td>0.1-0.2</td>
</tr>
<tr>
<td>Deltamethrin</td>
<td>pyrethroid</td>
<td>0.08-0.13</td>
</tr>
<tr>
<td>Diazinon</td>
<td>organophosphate</td>
<td>2.7-5.5</td>
</tr>
<tr>
<td>Imidacloprid</td>
<td>chloronicotinyl</td>
<td>0.40 (suppression only)</td>
</tr>
<tr>
<td>Lambda-cyhalothrin</td>
<td>pyrethroid</td>
<td>0.027-0.055</td>
</tr>
<tr>
<td>Permethrin</td>
<td>pyrethroid</td>
<td>0.44-0.87</td>
</tr>
<tr>
<td>Steinernema carpocapsae</td>
<td>biological</td>
<td>see label</td>
</tr>
</tbody>
</table>
### CLOVER MITE

<table>
<thead>
<tr>
<th>Insecticidal treatment</th>
<th>Chemical class</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Bifenthrin&lt;sup&gt;a&lt;/sup&gt;</td>
<td>pyrethroid</td>
<td>0.05</td>
</tr>
<tr>
<td>Chlorpyrifos&lt;sup&gt;b&lt;/sup&gt;</td>
<td>organophosphate</td>
<td>1.0</td>
</tr>
<tr>
<td>Deltamethrin&lt;sup&gt;g&lt;/sup&gt;</td>
<td>pyrethroid</td>
<td>0.08-0.13</td>
</tr>
<tr>
<td>Diazinon&lt;sup&gt;a&lt;/sup&gt;</td>
<td>organophosphate</td>
<td>2.7-5.5</td>
</tr>
<tr>
<td>Dicofol</td>
<td>organochlorine</td>
<td>0.46-0.92</td>
</tr>
<tr>
<td>Lambda-cyhalothrin&lt;sup&gt;e&lt;/sup&gt;</td>
<td>pyrethroid</td>
<td>0.027-0.055</td>
</tr>
</tbody>
</table>

### GREENBUG

**Aphids**

- Acephate organophosphate 1.0
- Chlorpyrifos<sup>b</sup> 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<sup>c</sup> pyrethroid 0.046-0.07
- Bifenthrin<sup>e</sup> pyrethroid 0.05
- Carbaryl carbamate 2.0-4.0
- Chlorpyrifos<sup>b</sup> organophosphate 1.0
- Cyfluthrin<sup>f</sup> pyrethroid 0.1-0.2
- Deltamethrin<sup>g</sup> pyrethroid 0.08-0.13
- Diazinon<sup>a</sup> organophosphate 2.7-5.5
- Fipronil phenyl pyrazole 0.0125-0.025 (golf course and commercial grounds only)
- Imidacloprid chloronicotinyl 0.4
- Lambda-cyhalothrin<sup>e</sup> pyrethroid 0.027-0.055
- Permethrine pyrethroid 0.4-0.87
- Steinernema riobravis biological see label
- Steinernema scapterisci biological see label

### GENERAL CRANE FLY LARVAE

- Bifenthrin<sup>e</sup> pyrethroid 0.05-0.1

### CUTWORMS

- Acephate organophosphate 2.4-5.0
- Azadirachtin biological see label
- Beta-cyfluthrin<sup>c</sup> pyrethroid 0.046-0.07
- Bifenthrin<sup>e</sup> pyrethroid 0.05
- Carbaryl carbamate 2.0-4.0
- Chlorpyrifos<sup>b</sup> organophosphate 1.0
- Cyfluthrin<sup>e</sup> pyrethroid 0.1-0.2
- Deltamethrin<sup>g</sup> pyrethroid 0.08-0.13
- Diazinon<sup>a</sup> organophosphate 2.7-5.5
- Halofenozide growth regulator 1.0
- Heterorhabditis bacteriophora biological see label
- Imidacloprid chloronicotinyl 0.3-0.4 (suppression only)
- Lambda-cyhalothrin<sup>e</sup> 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<sup>e</sup> pyrethroid 0.05
- Carbaryl carbamate 2.0-4.0
- Chlorpyrifos<sup>b</sup> organophosphate 1.0
- Halofenozide growth regulator 1.0
- Lambda-cyhalothrin<sup>e</sup> pyrethroid 0.027-0.055
- Spinosad spinosad 0.07 (small larvae), 0.4 (large larvae)

### 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<sup>c</sup> pyrethroid 0.046-0.07
- Bifenthrin<sup>e</sup> pyrethroid 0.05
- Carbaryl carbamate 2.0-4.0
- Chlorpyrifos<sup>b</sup> organophosphate 1.0
- Cyfluthrin<sup>e</sup> pyrethroid 0.1-0.2
- Deltamethrin<sup>g</sup> pyrethroid 0.08-0.13
- Diazinon<sup>a</sup> organophosphate 2.7-5.5
- Fluvalinate pyrethroid 0.05-0.16
- Halofenozide growth regulator 1.0
- Heterorhabditis bacteriophora biological see label
- Lambda-cyhalothrin<sup>e</sup> pyrethroid 0.027-0.055
- Permethrine pyrethroid 0.4-0.87
- Spinosad spinosad 0.24 (small larvae), 0.4 (large larvae)
- Steinernema carpocapsae biological see label
- Trichlorfon organophosphate 5.4-8.0
Insect Control / LM’s Quick Reference Guide

TURF PEST INSECTS AND CHEMICAL CONTROLS (CONTINUED)

**WHITE GRUBS**

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

- *Bacillus popilliae*
  - Biological: See label
- *Beauveria bassiana JW-1*
  - Biological: See label
- Bifenthrin
  - Pyrethroid: 0.05-0.1 (adults only)
- Chlorpyrifos
  - Organophosphate: 2.0-4.0
- Cyfluthrin
  - Pyrethroid: 0.08-0.13 (JP adults only)
- Deltamethrin
  - Pyrethroid: 0.08-0.13
- Dazinon
  - Organophosphate: 4.0-5.5
- Halofenozide
  - Growth regulator: 1.5-2.0
- *Heterorhabditis bacteriophora*
  - Biological: See label
- Imidacloprid
  - Chloronicotinyl: 0.3-0.4
- Lambda-cyhalothrin
  - Pyrethroid: 0.055 (suppression)
- Permethrin
  - Pyrethroid: 0.44-0.87
- Steinernema glaseri
  - Biological: See label
- Trichlorfon
  - 8.0

**BLACK TURFGRASS ATEANUIS**

- Acephate
  - Organophosphate: 3.0-4.0
- *Beauveria bassiana JW-1*
  - Biological: See label
- Beta-cyfluthrin
  - Pyrethroid: 0.07 (adults)
- Bifenthrin
  - Pyrethroid: 0.05-0.1 (adults)
- Chlorpyrifos
  - Organophosphate: 2.0-4.0
- Halofenozide
  - Growth regulator: 1.5
- Imidacloprid
  - Chloronicotinyl: 0.3-0.4
- Lambda-cyhalothrin
  - 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

**MAY/JUNE BEETLES, PHYLOPHAGA SPP**

- Carbaryl
  - Carbamate: 8.0
- Halofenozide
  - Growth regulator: 1.5
- Imidacloprid
  - Chloronicotinyl: 0.3
- Trichlorfon
  - Organophosphate: 8.0

*Not registered for use on golf courses or sod farms.*

- *For home lawns only.*
- *Actual formulation*
- *Different trade names exist for golf course, sod farms and other turf areas*

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

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**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 chafer**

*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.
**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.turfgrassnews.com

**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.