

GET REAL GRASSHOPPER

Versatility



AERA-vator™
Aeration



BedShaper



PowerVac™ Collection System,
Sunshade Canopy and Dethatcher



Dozer Blade

Enjoy year-round
profitability with the

"Power of One"

With one Grasshopper, you'll enjoy the highest quality cut possible and replace a truckload of single-purpose equipment. A single FrontMount™ power unit can offer multiple opportunities for income, with a complete range of aeration, spraying, landscaping, leaf and debris cleanup and snow removal implements. Switching decks and attachments is easy, thanks to our patented QuikConverter™ Implement System, so you can handle multiple tasks with little downtime or effort. Putting a Grasshopper to work for year-round profits has been key to the success of many businesses for nearly 35 years.



Buffalo
Turbine Blower



Shielded Sprayer



ROPS



Snowthrower



Remote Vac™



PowerVac™
Collection System

Still
GRASSHOPPER
YOUR NEXT MOWER ... and more

To locate a dealer near you, visit our Web site at:
www.grasshoppermower.com/LM

The Grasshopper Company • P.O. Box 637 • Moundridge, KS 67107 U.S.A. • Phone: (620) 345-8621 • FAX: (620) 345-2301

Author Index

January

Porter, Sue; Griggs, Judson; Hall, Ron; Harler, Curt; Rao, Balakrishna; Stahl, Jason; Witterschein, George

February

Brakeman, Lynne; King, Steven; Hall, Ron; Harler, Curt; Rao, Balakrishna; Stahl, Jason; Staib, Bob; Vinchesi, Brian

March

Hall, Ron; Harler, Curt; Mathers, Hannah; Powell, A.J.; Rao, Balakrishna; Stahl, Jason; Volz, Wayne; Wilkinson, Hank; Witterschein, George; Zwaska, Paul

April

Greenwald, Steve; Hall, Ron; Hanrahan, Rich; Harler, Curt; Poulsen, Vicky; Rao, Balakrishna; Stahl, Jason; Witterschein, George

May

Atkinson, William; Greenwald, Steve; Grunder, Marty; Hall, Ron; Harler, Curt; Rao, Balakrishna; Stahl, Jason; Wilkinson, Hank; Zwaska, Paul

June

Fitzpatrick, Mike; Guyette, James; Hall, Ron; Harler, Curt; LaScales, Gary; Mongeon, Roger; Rao, Balakrishna

July

Bio, Robin, M.; Brede, Doug; Fletcher, Patricia and David; Gooch, Jamie; Grahl, Cindy; Hall, Ron; Harler, Curt; LaFlamme, Ed; Stahl, Jason; Witterschein, George

August

Andrews, Bob; Clayton, Debbie; Gooch, Jamie; Hall, Ron; Harler, Curt; Stahl, Jason; Witterschein, George

September

Burchfield, Gary; Hall, Ron; Harler, Curt; LaFlamme, Ed; Myers, Donald, F.; Rao, Balakrishna; Rugg, Jeff; Stahl, Jason; Weiss, Daniel; West, Jeff; Wilson, Bruce; Woodford, Katherine;

October

Fireman, Jerry; Hall, Ron; Hanson, Arik; Harler, Curt; LaFlamme, Ed; Myers, Donald; Stahl, Jason; Wilson, Bruce; Witterschein, George

November

Agudelo-Silva, Fernando and Linda Novy; Guido, Judy; Grahl, Cindy; Hall, Ron; Harler, Curt; Hofer, Thomas; McGrady, Jeff; Stahl, Jason

Article Index

Arbor care

Treat trees right, June, page 42; Fight tree killers, August, page 52

Associations

PLCAA president explores lawn care in Asia, January, p. 15; Student career days, February, page 14; NLA Hall of Famer, April, page 28; Optimism prevails at ALCA Student Career Days, May, page 21; ALCA maintenance event, June, page 14; PLCAA adds football star Theismann to conference lineup, May, page 22; Fender honored for TPI's 'Water Right' book, July, page 21; Champion Tree Project plants 9-11 memorial at Pentagon, October, page 20; Leadership jams, PGMS unites, EXPO moves to October, November, page 18

Athletic Turf

The dirt on infield skins, January, page 52; Soccer in the desert, January, page 58; Soils to build reputations, March, page 46; Strategies to combat traffic, March, page 56; Yankee's field gets a facelift, March, page 60; Infields for truest play, May, page 60; Pacesetter Park, June, page 46; Woodfield Country Club, September, page 44; Getting back to nature, November, page 62

Awards

Award-winning landscape management: Post Riverside, January, page 32; Chicago medians, February, page 28; Busch Gardens, March, page 44; Roche of Colorado, April, page 76; Druid Ridge Cemetery, May, page 50; Pacesetter Park, June, page 46; Mohonk Mountain House, July, page 62; Abbott Labs, August, page 42; Woodfield Country Club, September, page 44; Chicago Park District, October, page 42

Business management

Open your books for profit, January, p. 22; Help! Manager in a slump, February, page 10; Mow for more \$\$, March, page 30; Establish your rates, March, page 92; Don't let lowballers bite into your profits, April, page 32; Payday for the owner, April, page 108; Play your game, May, Page 26; Lowballers? Forget about 'em, May, page 12; What is your time worth? May, page 84; Increase sales or cut costs, June, page 10; Customers are people first, June, page 12; Business plan basics, June, page 30; Franchising's revival, June, page 34; A budget to build your brand, June, page 80; Don't let drought dry you up, July, page 12; Get to really know clients, July, page 14; Business planning is strong medicine, July, page 47; First, define your game, July, page 116; Go with the cash flow, August, page 10; When you budget, you win, August, page 12; Three paths to profit, August, page 24; A need for speed, August, page 68; Bidding wars heating up, September, page 8; Need help? Head to GIE, October, page 9; You can never learn enough, October, page 10; Wrap the season up right, October, page 14; Relationships that pay, October, page 22; Commit to it, kept it simple, October, page 70; Don't overreact to change, November, page 12; Get off to a fast start in '03, November, page 28

Design/build

Building a 'grand' view, February, page 48; Install patios and decks profitably, July, page 88; Quick designs that sell, October, page 38; Hitting the wall, October, page 52

Employees

Open your books for profit, January, p. 22; Creating good leaders, February, page 18; Communicate with your Hispanic employees, March, page 10; Hire to grow, April, page 87; You can never learn enough, September, page 10; Keep your labor legal, September, page 34

Environment

Lighting it up, April, page 38; Win with water, June, page 22; Treat trees right, June, page 42; 10 tough industry issues, July, page 38; Don't let drought dry you up, July, page 12; Canada responds with IPM push, November, page 9; Be ready for erosion rules, November, page 46; Sustainable landscaping's success, November, page 54

Fertilizer

Fertigation for the residential market, February, page 24; Easy with the N, February, page 56; MN limits phosphorus fertilizer, May, page 18; Scotts asks for science in FQPA, May, page 20

Irrigation

Fertigation for the residential market, February, page 24; Irrigation's changing face, February, page 30; Audit now, save later, April, page 50; Win with water, June, page 22; Tune your tubing, July, page 79; Sprinkler winterization basics, September, page 40; Irrigation components, October, page 44

Lawn care

Perfecting a park, April, page 43; Goodbye Crabby, June, page 60; Look locally when planting turfgrass, July, page 96; Lawn care in nowhere, August, page 36; Organiccare brings new look to lawn care franchising, September, page 11; Control winter weeds, September, page 48; Seed availability, October, page 60; To lime or not to lime, November, page 70

Operations

Get your life back, January, page 67; The account that got away, February, page 52; Mow for more \$\$, March, page 30; Mow and prosper, February, page 72; Avoid sod job screw-ups, March, page 36; Success from big ugly jobs, August, page 25; One-stop growth plan, August, page 28; Slow but steady, August, page 31; Lawn care in nowhere, August, page 36; Make disease management pay, August, page 47; Ground zero green again, September, page 64; Eliminate lost time, September, page 82; Wrap up the season right, October, page 14; To lime or not to lime, November, page 70

Ornamentals

Make disease management pay, August, page 47

Pest control

New insecticide options, April, page 90; Fungicide resistance, May, page 52; Say good-bye to pond pests, July, page 103; Make disease management pay, August, page 47; Control winter weeds, September, page 48

Profiles

Play your game, May, Page 26; Win with water, June, page 22; Success from big ugly jobs, Au-

gust, page 25; One-stop growth plan, August, page 28; Slow but steady, August, page 31; Lawn care in nowhere, August, page 36; Ground zero green again, September, page 64; Relationships that pay off, October, page 23; Going for the Gold, October, page 28; People of the Year, 2002, November, page 34

Products and equipment

Mower guide (Buy right in 2002, It's all about the Zs, Mowers), January, p. 34-46; Get a grip (landscape trimmers), January, page 60; Sprayers and spreaders, February, page 36; Skid steers and their attachments, March page 62; Truck guide: Keep on truckin', April, page 53; Hot wheels, April, page 58; Mobile and agile, April, page 74; Aerate to the core, April, page 82; Tough little brutes (compacts), May, page 32; Tough enough (compacts), May, page 42; Mulch it up, May, page 68; Why these units are special (specialty trucks), June, page 54; Cleaning tools, June, page 48; Walls and pavers getting trendy, July, page 92; Landscape lighting, August, page 44; Irrigation components, September, page 44; Lowdown on loaders, September, page 52; Seed availability, September, page 60; Items for irrigation, October, page 44; Get hitched o a new trailer, November, page 64

Residential

Fertigation for the residential market, February, page 24

Sales and marketing

Sales and marketing 2002, January, page 26; Selling add-on services, March, page 16; Help! Don't let lowballers bite into your profits, April, page 32; Homework overcomes objections, April, page 88; lowballers? Forget about 'em, May, page 12; Give them reasons to buy, May, page 16; Increase sales or cut costs, June, page 10; Customers are people first, June, page 12; Franchising's revival, June, page 34; A budget to build your brand, June, page 80; Bidding wars heating up, October, page 8; Changing colors for a friendlier image, November, page 72; Aim for 90% contract renewal rate, November, page 86

Snow removal

Ready, set . . . snow!, September, page 46; Going for the Gold, October, page 28

Software and technology

Saved by software, February, page 54; Your computer is a vital tool, April, page 10; Software scene, October, page 32; Quick designs that sell, October, page 38

Turfgrass

Fertigation for the residential market, February, page 24; Look locally when planting turfgrass, July, page 96; Upheavals mark seed trade, August, page 9; Make disease management pay, August, page 47; Control winter weeds, September, page 48; Seed availability, October, page 60

Water features

Be a pro at pond maintenance, September, page 56; 1-2-3 pond installation, November, page 40

Weed Control

Get tough with ornamental weeds, March, page 72; Control winter weeds, October, page 48

LM100

The Top 50, July, page 26; 10 niche service ideas, July, page 23, 10 quality small companies, July, page 34; 10 great medium-sized companies, July, page 38; 10 top industry issues, July, page 38; 10 top grounds pros, July, 40

State of the Industry

When the going gets tough, September, page 16; Eight trends, September, page 18; Tight times, September, page 30.

News Index

Acquisitions, mergers and expansion

Manager buys Post Landscape Group, January, p. 15; Woods Equipment Co. gets debt restructuring agreement, January page 16; Gowan acquires Rubigan, February, page 14; Scotts LawnService acquires The Lawn Company, April, page 16; Bayer buys Aventis, July, page 20; Deere closes two production plants, August, page 16; Davey acquires National Shade, August, page 23;

Companies

RBI changes name, February, page 15; LandTek Group improves NYC soccer field, February, page 17; Howdy, pardner, let's do business, June, page 20; HighGrove Partners prepares for tour, July, page 16; Organicare brings new look to lawn care franchising, September, page 11; ValleyCrest eyes expansion, October, page 16

Economy

Pre-season selling strong, March, page 14; Cautious optimism, September, page 7; MN landscape industry tops \$2.1 billion, October, page 18; Let housing starts start you up, November, page 16

Environment and weather

Industry braces for drought, March, page 15; Another El Nino, April, page 14; Fender honored for TPI's 'Water Right' book, July, page 21; New study: healthy lawns prevent runoff, October, page 19; VA suffers water ban, October, page 20

Legislation & regulation

National 'Do Not Call' list proposed, February, page 15; Feuding neighbors spark blower fuss, March, page 18; Legislators give NC turf big \$\$, April, page 29; Washington bans use of clopyralid on lawns, April, page 30; MN limits phosphorus fertilizer, May, page 18; Scotts asks for science in FQPA, May, page 20; Canada's industry under siege, June, page 7 & 15; IA turf pros develop phosphorus policy, June, page 16; Symbiot defends atrazine, July, page 16; Clopyralid lost to home lawns, August, page 15; EPA says most organophosphorus safe, August, page 15

People

Tree worker receives national safety award, June, page 19; Fender honored for TPI's 'Water Right' book, July, page 21; A hero speaks, September, page 12; Champion tree project at Pentagon, October, page 20

Suppliers

New LESCO prez off to a fast start, January, p. 14; Bobcat donates over \$200,000 to 9-11 victims, February, page 16; Simplot ready for action, April, page 16; New CEO plots LESCO's future, May, page 19; Homeowners buying pro mowers, June, page 16; Symbiot attracts regional players, July, page 19; Scotts remains on the grow, September, page 10; Home Depot takes on LESCO, October, page 17

Technology

Surfin' Turf, Nursery Network; February, page 17; Surfin' Turf, LandscapeLink, March, page 18; Truck parade, August, page 16

Training

Chipco Academy offers training on Chipco line, January, page 16

Turfgrass

New herbicides debut, April, page 15

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 ac-

ording 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
<i>Bacillus thuringiensis kurstaki</i>	biological	0.67-1.67 qt/acre
<i>Beauveria bassiana</i> 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
<i>Heterorhabditis bacteriophora</i>	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)
<i>Steinernema carpocapsae</i>	biological	(1.0 bill./acre)

BERMUDAGRASS MITE

Found in southern states

<i>Beauveria bassiana</i> JW-1	biological	see label
Bifenthrin ^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 or observe on warm, sunny days. Adults lay eggs in turf stems as soon as they become active.

<i>Beauveria bassiana</i> 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
<i>Heterorhabditis bacteriophora</i>	biological	see label
Lambda-cyhalothrin ^e	pyrethroid	0.027-0.055
<i>Steinernema carpocapsae</i>	biological	see label

BLUEGRASS BILLBUG LARVAE

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

<i>Beauveria bassiana</i> JW-1	biological	see label
Carbaryl	carbamate	2.0-4.0
Diazinon ^a	organophosphate	2.7-5.5
Halofenozide	growth regulator	1.0
<i>Heterorhabditis bacteriophora</i>	biological	see label
Imidacloprid	chloronicotinyl	0.3-0.4
<i>Steinernema carpocapsae</i>	biological	see label

CHINCH BUGS

Acephate	organophosphate	2.4-5.0
<i>Beauveria bassiana</i> 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
<i>Heterorhabditis bacteriophora</i>	biological	see label
Imidacloprid	chloronicotinyl	0.40 (suppression only)
Lambda-cyhalothrin ^e	pyrethroid	0.027-0.055
Permethrin ^e	pyrethroid	0.44-0.87
<i>Steinernema carpocapsae</i>	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
<i>Heterorhabditis bacteriophora</i>	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)
<i>Steinernema carpocapsae</i>	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)

<i>Steinernema carpocapsae</i>	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
<i>Beauveria bassiana</i> 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	phenyl pyrazole	0.0125-0.025 <i>(golf course and commercial grounds only)</i>
Imidocloprid	chloronicotinyl	0.4
Lambda-cyhalothrin ^e	pyrethroid	0.027-0.055
Permethrine	pyrethroid	0.44-0.87
<i>Steinernema riobravus</i>	biological	see label
<i>Steinernema scapterisci</i>	biological	see label

■ SOD WEBWORMS

Acephate	organophosphate	2.4-5.0
Azadirachtin	biological	0.02-0.43
<i>Bacillus thuringiensis kurstaki</i>	biological	see label
<i>Beauveria bassiana</i> 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
<i>Heterorhabditis bacteriophora</i>	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)
<i>Steinernema carpocapsae</i>	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

<i>Bacillus popilliae</i> Japanese beetle only	biological	see label
<i>Beauveria bassiana</i> 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	growth regulator	1.5-2.0
<i>Heterorhabditis bacteriophora</i>	biological	see label
Imidacloprid	chloronicotinyl	0.3-0.4
Lambda-cyhalothrin ^e	pyrethroid	0.055 (suppression)
Permethrin ^c	pyrethroid	0.44-0.87
<i>Steinernema glaseri</i>	biological	see label
Trichlorfon		8.0

■ **MAY/JUNE BEETLES, PHYLLOPHAGA SPP**

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

■ **BLACK TURFGRASS ATAENIUS**

Acephate	organophosphate	3.0-4.0
<i>Beauveria bassiana</i> 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**

<i>Beauveria bassiana</i> 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 VITNUM, 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 ac-

tion 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

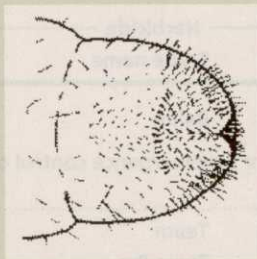
Identifier: Transverse anal slit and two fairly compact parallel rows of spines. These grubs have short legs that aren't used for locomotion.

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

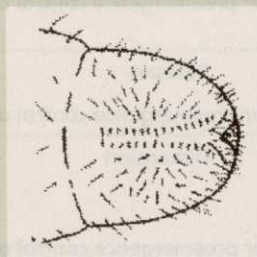
Action threshold: Because the grubs feed more in the thatch and not as much on the roots, thresholds are usually higher than for the direct root-feeding species like the Japanese beetle.

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

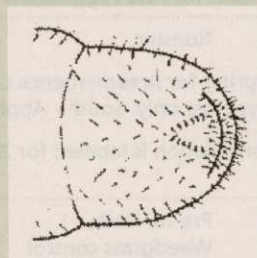
The raster patterns for common turfgrass grubs:



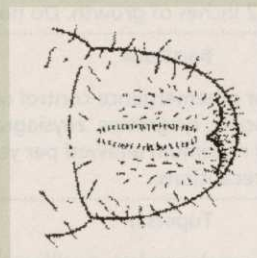
Asiatic garden beetles: Action thresholds are higher than for Japanese beetles (at 10 to 20 grubs per square foot) because they're significantly smaller.



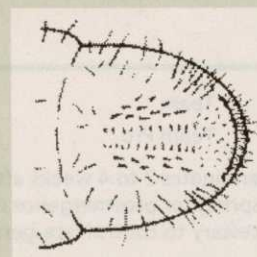
Europe chafers: Action thresholds usually are slightly lower than those for Japanese beetles, at five to 10 grubs per square foot.



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			AI/A
	Common name	Trade name	Formulation	
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.				
*proflumicet	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			AI/A
	Common name	Trade name	Formulation	
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.
Goosegrass (continued)	*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.				
Goosegrass (continued)	*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.				
Crabgrass, goosegrass, foxtail, barnyardgrass, other summer annual grasses	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.			

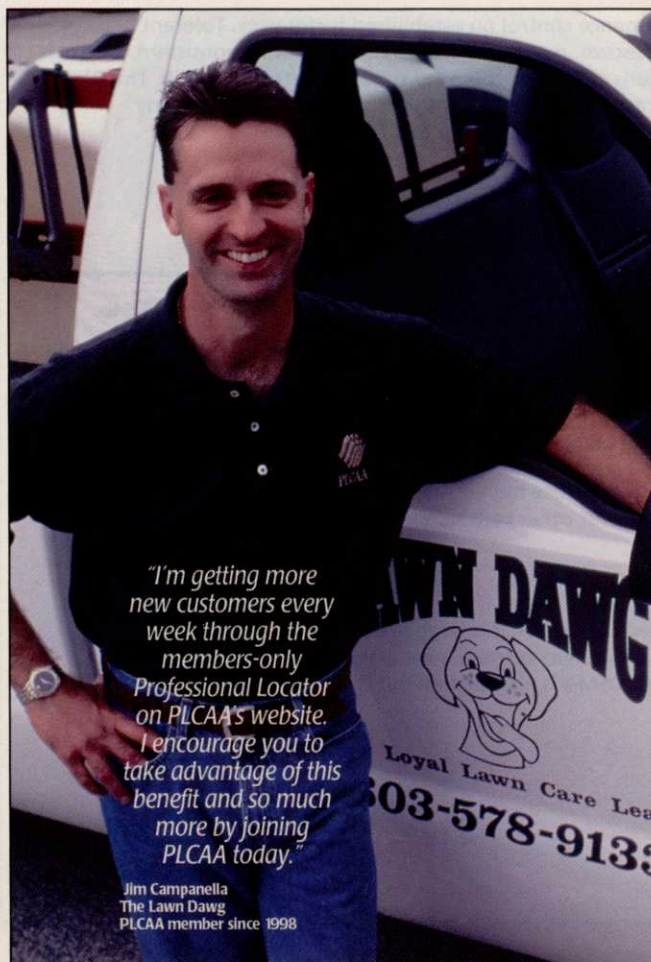
*Restricted-use pesticide; may be purchased and used only by certified applicators.

CHEMICAL CONTROL OF TURFGRASS WEEDS (CONTINUED)

■ **ANNUAL GRASSY WEEDS: POSTMERGENCE CONTROL (CONTINUED)**

Weed	Herbicide			AI/A
	Common name	Trade name	Formulation	
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



"I'm getting more new customers every week through the members-only Professional Locator on PLCAA's website. I encourage you to take advantage of this benefit and so much more by joining PLCAA today."

Jim Campanella
The Lawn Dawg
PLCAA member since 1998

"PLCAA helped me grow my business from \$194,000 to \$3.9 million in just 4 years!"

Here are just a few of the ways PLCAA can benefit you too...

- ◆ FREE business and regulatory advice
- ◆ FREE human resource information
- ◆ FREE company listing on PLCAA's website
- ◆ Group insurance and retirement plan packages

TELL ME MORE!



- YES! Send me information on PLCAA benefits and introductory membership specials today!
- YES! Send me a FREE industry publication.

Company _____
 Name _____ Title _____
 Address _____
 City _____ State _____ Zip _____
 Phone (____) _____ Fax (____) _____
 Email _____ Website _____
 What year did your business start? _____ Number of trucks you own? _____
 Number of employees: Peak? _____ Non-Peak? _____

Limited Time Membership Offer ...
 (800) 458-3466 ... www.plcaa.org