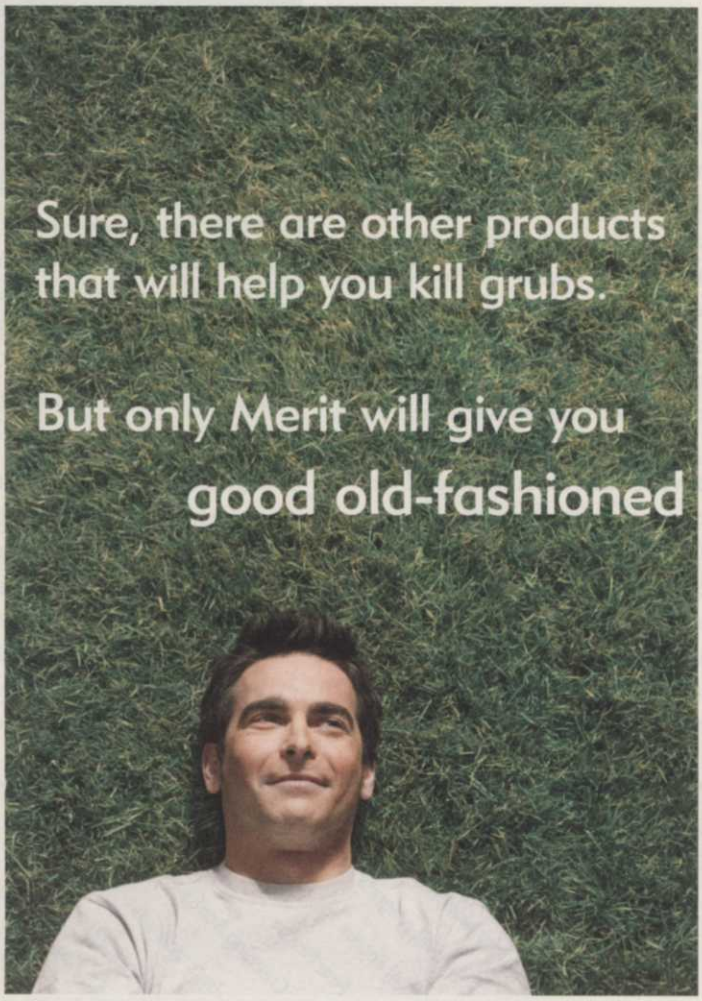

It's nice to know that help is never far away. Especially when it comes to controlling grubs. After all, your job isn't about taking risks, it's about keeping turf essentially grub-free and healthy. And that's why you should stick with Merit.® It's the #1 preferred insecticide in the country. It controls virtually every grub species, averaging 97%* efficacy, and it's the most proven grub control product on the market. And if that's not enough, it's Backed by Bayer,™ which gives you the support and resources you need to get the job done. If you ever have questions or problems, we're here to help. It's Science. It's support. It's peace of mind.

up to 97% efficacy 100% support

MERIT®

* Average based on university science and field trials.

continued from page 60

tivated by either rainwater or irrigation after application. Figure 1 shows a map of expected dates after which crabgrass would germinate and there would be no more killing frosts. Pre-emergence herbicides must be applied before this date. Typically, they are applied two to three weeks earlier, when an indicator plant, such as forsythia in the northern United States (see figure 2) or dogwoods in South are in bloom.

Some of the products released during the 1990's had claims that they could be applied the prior fall. However, subsequent university research showed that, because of pesticide degradation dynamics (more on this later), best control is achieved by waiting until forsythia bloom or soil temperatures reach around 50°F.

Choices, choices, choices

Pre-emergence herbicides vary greatly in their duration of effectiveness. Table 1 lists the products currently on the market. Products that contain either pendimethalin, prodiamine or dithiopyr usually give the longest control. The other materials on the chart also have advantages. Formulations that contain benefin or bensulide, for example, tend to be less expensive. The trade off is shorter duration of residual activity and slightly less effective control. Consult the label for specific usage recommendations.

There tends to not be a significant difference in crabgrass control whether the same active ingredient is applied as a liquid or as a granular formulation. Both require light irrigation for activation. One note of caution, however — pre-emergence herbicide formulated on an excessively large granule can be a problem because this may result in sporadic distribution of the herbicide around the particles. The granule does not need to be "greens grade" but it should not be excessively large either.

FIGURE 2. In the northern United States, the best time to apply a pre-emergence herbicide for the control of crabgrass is when *Forsythia x intermedia* is in bloom (shown). The blooming of either dogwoods or azaleas is often used to indicate proper timing in the South.

continued on page 64

TABLE 1. Turf tolerances to preemergence herbicides. Consult the pesticide label for specific usage recommendations.

† Dormant bermudagrass only. * ‡ Fairway and tees height bentgrass only. *
§ Seaside, Highland, Astoria, and C-7 creeping bentgrass only. *
¶ Use restrictions on putting greens vary among formulations. *
* *Consult label for specifics.*

Products	Kentucky bluegrass	Perennial ryegrass	Tall Fescue	Fine Fescue	Creeping Bentgrass	Bermudagrass	Zoysiagrass	St. Augustinegrass	Centipedegrass
Bensulide (Betasan, Bensumec, Lescosan) - Controls P.annua, others	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ethofumasate (Prograss) - Controls P.annua, other weeds	✓	✓	✓		‡	†		✓	
Benefin (Balan, LESCO Benefin 2.5G)	✓	✓	✓	✓		✓	✓	✓	✓
Oryzalin (Surflan, XL – combination with benefin)			✓			✓	✓	✓	✓
Pendimethalin (Pendulum, LESCO Pre-M, PROTURF)	✓	✓	✓	✓		✓	✓	✓	✓
Prodiamine (Barricade)	✓	✓	✓	✓	‡	✓	✓	✓	✓
Trifluralin (Team) - Combination product with Benefin	✓	✓	✓	✓	‡	✓	✓	✓	✓
Dipeptides (Corn Gluten Meal)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Siduron (Tupersan) - Safe to turfgrass seedlings. Consult label	✓	✓	✓	✓	§				
Oxadiazon (Chipco Ronstar) - Controls goosegrass and other weeds	✓	✓	✓			✓	✓	✓	
Dithiopyr (Dimension) - Pre + Post-emergence	✓	✓	✓	✓	¶	✓	✓	✓	✓
Isoxaben (Gallery) - Broadleaf weed control	✓	✓	✓	✓	‡	✓	✓	✓	✓
Atrazine						✓	✓	✓	✓
Simazine (Princep)						✓	✓	✓	✓
Metribuzin (Snecor)						✓			
Metolachlor (Pennant)						✓	✓	✓	✓
Napropamide (Devrinol)						✓	✓	✓	✓

POUNCE ON YOUR COMPETITION.

With the improved ProCat from BOB-CAT®

PROCAT

BOB-CAT's high-output, premium performance **ProCat** zero-turn riding mowers are better than ever. The ProCat has exclusive new features that get the job done faster and easier with improved durability for the long haul. From a quick-lift foot pedal that raises the deck over obstacles to wider wheels and a reinforced front deck, the ProCat provides a more productive, more comfortable mow with an unmatched quality-of-cut. Get a jump on your competition and try a BOB-CAT® ProCat today.

All-New Features:

1. **New Quick-Lift Pedal:** Allows the operator to quickly raise the deck over obstacles while keeping both hands on the controls.*
2. **Larger 12-Gallon Fuel Tank:** Run longer with an additional 2.5 gallons of fuel. New tank also includes a cup holder.*
3. **Wider Caster Wheels on 61" Deck:** Allows for better floatation and lower compaction while providing increased durability.*
4. **Improved Blow-Out Baffles:** Provides better discharge and collection capabilities.**
5. **Fully Adjustable Suspension Seat with Adjustable Arm Rests:** Provides more comfort in all mowing applications.
6. **New, Sealed, Maintenance-Free Battery:** For ease of use and safety.

**All ProCat models except ES Series.*
***Not on all models.*

The look of pure power.

BOB-CAT®

For more great products and to find your local authorized BOB-CAT® dealer, call **1-866-469-1242** or visit **www.bobcatturf.com** • PO Box 469 • Johnson Creek, WI 53038-0469

Key Code: BC070011

Circle 138

continued from page 62

Rates and frequency

To be effective, a pre-emergence herbicide barrier must last for about four months in the northern United States and up to seven months in the South. After application, these herbicides are subject to numerous processes that act to degrade the product. To discuss all of the processes that govern how long a pesticide will persist after application is beyond the scope of this article. However, one of the most important factors that governs the effectiveness of pre-emergence herbicides is microbial degradation, which is summarized briefly in Figure 3.

The amount of time it takes for 50% of a product to degrade in the soil is referred to as its half life. If, for example, a product's half life is 50 days, then 50 days after application about 50% of the product will remain and 100 days after application about 25% of the product will remain. Once the level of product in the soil falls below a certain minimum concentration then crabgrass will be able to germinate through the herbicide barrier (See Figure 3). As long as you are within the label limits, you can increase the duration of effective control by increasing the initial application rate. In other words, if your pesticide has a half life of 50 days and you wish to get an additional 50 days of control, you would double the application rate.

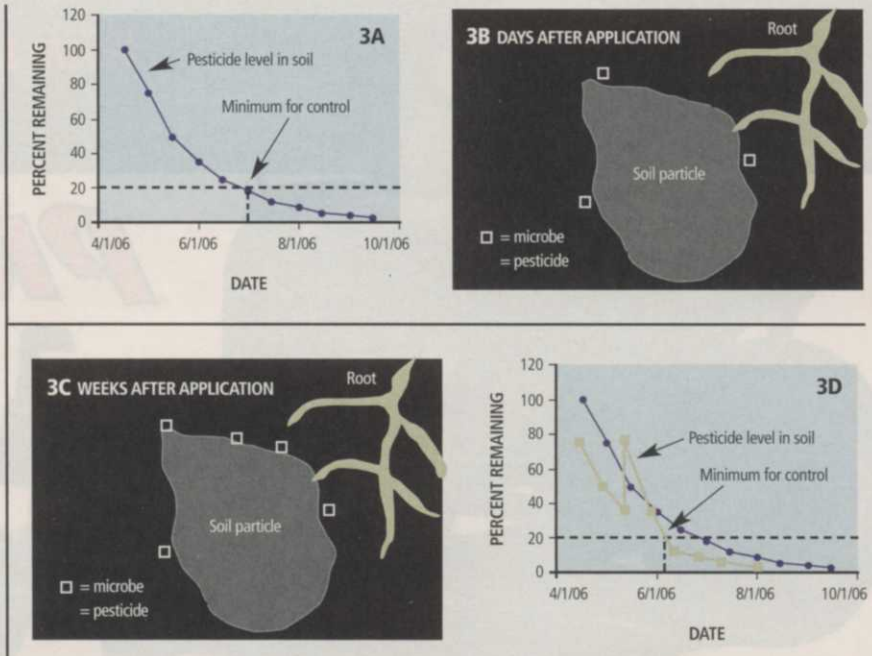

FIGURE 3. After a pre-emergence herbicide is applied, it dissipates, primarily due to microbial degradation. **Figure 3A** shows a model of hypothetical degradation following an application made April 15. Once the pesticide is degraded to below a certain minimum (in this example 20% of application just prior to July 1), crabgrass will begin to break through. **Figure 3B** shows a diagram of a soil particle with a hypothetical distribution of pesticide and soil microbes that degrade the pesticide. The microbial population then may increase, such as what is modeled in **Figure 3C**. **Figure 3D** shows a hypothetical example of a split application where a 75% rate is applied two times about six weeks apart. The first application degrades normally. However, the second application of the herbicide may degrade more rapidly due to the increased microorganisms. The result could be an actual decrease in the duration of effectiveness of the product (as modeled by the red line in Figure 3D). You should consult the pesticide label and your state's extension literature for specific recommendations if you are going to make split applications.

Split or not to split?

In a split application you apply a portion of the pesticide initially followed by a subsequent application around six to 15 weeks later. This practice is widely followed in the South due to the extended season. However, research conducted in the 1990s suggests that with some products this can actually decrease control. The reason for this is that the initial application results in an increase in the soil microbial populations that degrade the pesticide. This increase in microbial activity then can result in subsequent applications of the pesticide being degraded more rapidly (See Figure 3). Many studies have showed that, at best, splitting the application of certain herbicides is not more effective than the single application and in some cases, can result in significantly less control of crabgrass. However, this is not the case with all pre-emergence herbicides.

Generally speaking, in the northern United States you should make one application and increase the duration of control by increasing the application rate. If you are in the South and you're going to make split applications, wait 60 to 90 days (or according to label directions) before making the second application. Also, consult your state's extension literature, because some products benefit from sequential applications and some do not.

Since the introduction of quinclorac in 2000 the industry has had a tool to reli-

continued on page 66

FERRIS...

What will you do on *your* day off?

"Ever since I started mowing with my Ferris IS® 3100Z, my weekend starts on Friday."

Richard Hale • R.L. Hale Landscaping • Suffield, CT

Relax - enjoy it! You *can* because a Ferris mower will increase your productivity and take the pain out of mowing. Our patented suspension systems have been proven to help prevent fatigue when compared to non-suspension machines. Ferris owners have been able to increase their productivity by as much as 20%! If you mow for a living, that could be an extra $1,000 in your pocket every two weeks, from each Ferris machine in your fleet!

And since our patented suspension systems allow the cutter deck to follow the contours of the landscape, you'll have a beautiful manicured finish every time.

Contact your local Ferris dealer for a demo today and experience the difference suspension makes!

FERRIS®

Go The Extra Yard™

www.FerrisIndustries.com/mgt • 1(800)933-6175

Circle 139

continued from page 64

ably control crabgrass post-emergence during mid and late season. However, pre-emergence herbicides continue to be our best option, especially in areas with moderate or heavy infestations of crabgrass. And, with the recent cancellation of the arsenical herbicides MSMA and DSMA, the use of pre-emergence herbicides becomes more important for the control of weeds such as dallisgrass and goosegrass. Pre-emergence herbicides can be very effective for controlling crabgrass, other annual grasses, and even some annual broadleaf weeds. Taking into consideration the proper product choice, application timing, and the effects of application rate and frequency will assist you in maximizing the potential control afforded by these products. LM

— The author is Associate Professor Horticulture and Crop Science at The Ohio State University and a frequent contributor to LM. Contact him at **gardner.254@osu.edu**.

What happens if **MSMA** bites the dust?

BY BERT MCCARTY

On August 9, 2006, the US Environmental Protection Agency (EPA) issued a ruling disallowing reregistration of the organic arsenical herbicide family. Important members of this family include MSMA, DSMA, and CMA (Table 1). The organic arsenical herbicides have been used in turf since the 1950s and are the backbone products for post-emergence grass weed control, especially in warm-season turfgrasses. These herbicides provide good broad-spectrum post-emergence weed control including crabgrass, goosegrass, sandspur, annual nutsedges and annual broadleaf weeds. With repeat applications, they eventually control perennial weeds such as dallisgrass, yellow nutsedge, bull (or thin) paspalum, johnsongrass, bromesedge, carpetgrass, crowfootgrass, St. Augustinegrass, centipedegrass, kyllinga species and various perennial broadleaf weeds.

Control of certain weeds without MSMA will become more challenging and probably more expensive. This is especially true for perennial weeds such as dallisgrass (shown), which currently has no comparable control substitute.

These herbicide formulations are termed "organic arsenical" as carbon is attached to the basic molecule as a methyl (CH_3) group. The EPA contends that through the process termed demethylation, the organic forms of arsenic from pesticides are degraded into the more toxic inorganic (or without the methyl group) form.

When the EPA cancels a product, a 60-day public response period is allowed for interested parties to voice their opinions or concerns about the pending action. For the organic arsenicals, due to overwhelming response, the EPA extended this deadline from October 2006 to January 19, 2007. Once the public response period expires, the EPA will consider these and issue a final ruling approximately 30 days later. The following Web site can be accessed to track the latest ruling or progress of this issue: *http://www.epa.gov/fedrgstr/EPA-PEST/2006/August/Day-09/p12905.htm*

Weed control without MSMA

What does this probable cancellation mean to lawn care operators who depend on the organic arsenicals? Unfortunately, post-emergence weed control is about to get more expensive and selective. For example, post-emergence dallisgrass control typically requires three to five MSMA applications (Figure 1). Three applications of MSMA cost $18 to $24 per acre and provide approximately 90% - 95% dallisgrass control. The next most effective material provides only about 65% suppression with two applications at a material cost of $293 per acre.

For post-emergence crabgrass control in bermudagrass and zoysiagrass, quinclorac (trade name Drive) will become the main product of choice. Fenoxaprop-ethyl (trade name Acclaim Extra) will still be available in cool-season grasses along with quinclorac. Drive is an extremely fast acting and effective herbicide, if good soil moisture is present (in other words, the weed is actively growing) and works best on immature plants. Also, in warm-season grasses, pre-emergence herbicides will

continued on page 77


HE WHO DOES
THE MOST WINS.
One Tough Animal™
Bobcat®

Land Clearing

Why bulldoze down everything in sight with large equipment? Only Bobcat provides the machines and attachments to choose which trees and landscape features stay and which ones go—giving your customers the option of keeping mature landscape features and saving you money on new trees, fill and other materials.

To see Bobcat equipment in action, send for your FREE interactive CD-ROM.

Just return the attached card or visit our website:

www.bobcat.com/landscape

Bobcat®

See the full line of Bobcat equipment in action – on a FREE CD-ROM!

See more on our website

www.bobcat.com/landscape

Bobcat

Hardscaping

Rock ornaments, concrete patios and ponds are often installed in hard-to-reach places. Eliminate agonizing hand labor and get jobs done faster by using Bobcat attachments.

- Backhoe
- Dumping Hopper
- Vibratory Roller
- Clamp
- Rotating Grapple
- Concrete Pump
- Concrete Mixer

Customers say...

Without our T300 we'd lose a lot of work days to rainy weather. Plus, it doesn't leave ruts in the ground. And we don't have to worry about flat tires. I'd been waiting for a Bobcat® track loader with the high lift capacity of this machine.

Brian Benford
Evergreen Forest Products
Wilmington, North Carolina

By eliminating repair work, the [all-wheel steer loader] saves us at least an hour a day. We work on some pretty nice yards and the last thing you want to do is spend time and money repairing turf. Also, we can turn on asphalt driveways on hot summer days without leaving marks.

Jerry Hodgson
Jerry's Tree Service
Chetek, Wisconsin