

# TURFGRASS MATTERS

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## Waas Up?? In White Grub Control

by Dr. Kevin Mathias

A combination of federal regulatory rulings and economic decisions by insecticide manufacturers has dramatically changed the landscape of white grub insecticides and control strategies. At the beginning of the 1990's white grub control insecticides consisted mainly of organophosphate and carbamate based chemistries with only a few biorational products available (Table 1). As a group, the organophosphate and carbamate insecticides, have a relatively short residual activity and are highly efficacious when used in curative control programs. Optimum results are attained if the products are applied in mid to late August or into September as white grub damage is first noticed and when the grubs are young and relatively small.

As we enter the new millennium many of the curative control products have been replaced by a group of new insecticides. These insecticides, Merit and Mach 2, offer greater applicator safety, have less adverse effect on the environment, provide a longer window of application due to their extended soil residual activities, have mini-

*As we enter the new millennium many of the curative control products have been replaced by a group of new insecticides.*

mal impact on beneficial predators, and provide excellent control (+90%) of white grubs.

Merit and Mach 2 affect the early instar stages of white grubs and are much more effective in preventative than in curative control programs. A review of field evaluations for white grub control reported in Arthropod Management Tests from 1998 to 1999 demonstrated that applications of Mach 2 or Merit applied within the early June to early August time period provided excellent control (+90%), however, if these insecticide were applied from late August through September the average level of control dropped to 80%.

A recent survey conducted at the 2001 Maryland Turfgrass Conference illustrates how turfgrass managers have incorporated these new insecticides into their insect control programs (Figure 1). Merit was used by 60% of the respondents, followed by Dylox at 28%, and then Mach 2 at 19% for white grub control. Dylox, an organophosphate, was applied as a curative control for spot treatment to sites that had not been treated with Merit or Mach 2.

### Organophosphate / Carbamate Update

The ongoing review process mandated by the Food Quality and Protection Act of 1996 and under the direction of the Environmental Protection Agency (EPA) has continued to affect product choices for turfgrass insect control. Dursban's

(chlorpyrifos) new turfgrass labeling removes the application of this product to residential sites and restricts applications only to golf course and industrial sites. It also limits maximum application rates of 1 lb A.I./acre per season. Though never a stellar white grub control product due to its tendency to bind to organic matter, Dursban was quite effective at the 2 lb A.I./acre rate for adult control of the black turfgrass atenius beetle. When applied in early spring prior to egg laying, Dursban will control the adults thus preventing or reducing

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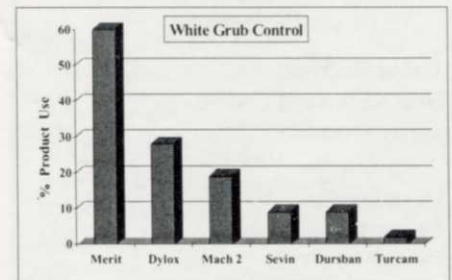


Figure 1. Survey results demonstrating the choice of white grub control used by turfgrass professionals in Maryland for the 2000 season. The survey was conducted at the 2001 Maryland Turfgrass Conference.

Table 1: White Grub Control Products

1990		
Organophosphates	Carbamates	Biorationals
Dylox Oftanol Mainstay Diazinon Dursban Triumph Mocap	Sevin Turcam	Milky Disease Nematodes
2001		
Dylox Diazinon*	Sevin	Merit Mach 2 Meridian**
		Milky Disease Nematodes Naturalis

\* Diazinon cannot be applied to golf course turf and sod farms  
\*\* Meridian is expected to get EPA registration in 2001

### Inside Matters

President's Message	2
Editor's Letter	3
Bullets from the Boardroom	3
Around the Mid-Atlantic	6
What Are You Going to Do?	9
Golf Notes	10
Student News	11
IAC Report	12
News & Notes	13
Chlorothalonil Update	14



## Grub Control, *continued from page 1*

egg laying and therefore future white grub damage. Various pyrethroid insecticides such as Talstar and DeltaGard are now replacing Dursban for this use.

Turcam (bendiocarb), a carbamate insecticide, manufactured by Aventis will no longer be produced for turfgrass insect control in 2001. This was a voluntary decision by the manufacturer based on economic considerations. However, current supplies of the product can be sold until the existing inventory is depleted. Diazinon is the most recent product to see future regulations affect its use in the market place. It will lose its labeling for all lawn and garden uses beginning in 2003 and in the mean time annual production levels will be reduced for the 2001-2002 seasons. With the impending cancellation of Diazinon only one insecticide, Dylox (trichlorfon), will provide effective curative control of white grubs.

### New Product Information

A new insecticide from Syngenta is planned for introduction in 2001. The product is Meridian (thiomethoxam) and white grub evaluation studies have shown excel-

lent efficacy when applied preventatively. Field evaluations of Meridian demonstrated excellent control (97%) when applied within the June to early August period (Table 2). However, if applied in a curative manner, late August through September, the level of control dropped to 80% for Japanese beetle, masked chafers, and oriental beetles. European chafer control showed an even greater drop when used as a preventative, 82% control, to 22% control when applied

in a curative manner (Table 2).

The proposed labeling for Meridian recommends an application window for white grubs 45 days before adult flight activity to 2nd instar development with optimal timing at peak egg hatch. Additional insects for which Meridian will be labeled for include billbug larvae and fire ant control and suppression of chinch bugs and mole crickets.

The mode of action for Meridian is similar to that of Merit. It interferes with the action of acetylcholine to attach to its receptor site within the synapse area of the nerve. The term, postsynaptic acetylcholine mimics, is used to describe their activity. It is important to note that if one wants to use the new insecticides and reduce the likelihood of resistance then one will need to have Mach 2 in a rotation with Merit or Meridian.

### Multiple Targeting

The possibility of controlling more than one turfgrass insect pest with these new insecticides is possible due to their long soil residual activities. For example an application of Mach 2 if timed properly could control sod webworm or cutworm larvae while

*continued on page 5*

Table 2: The mean level of control for Meridian 25WG applied at .2 lb. A/L/A for 10 field evaluations reported in *Arthropod Management Tests 2000*

White Grub Species	Mean %Control *Preventative	Mean %Control *Curative
Japanese beetle		
Masked chafers	97	80
Oriental beetle		
European chafer	82	22

\* Preventative control applications occurred between mid-June to mid-August period

\* Curative control applications occurred between late August to through September.

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**Grub Control**, *continued from page 5* also providing excellent white grub control. However for this to occur turfgrass manager's must be aware of the life histories of the major insect pests within their region.

At Maryland, black light trapping has been done at various golf courses since 1996. A number of turfgrass insect pests are collected and counted throughout the season and then posted on our home page (<http://iaa.umd.edu/umturf/umturf.html>). Adult scarab beetles such as masked chafers, the black turfgrass atenioid beetle, the oriental beetle, June beetles, and the asiatic garden beetle along with the Lepidopteran pests such as sod webworms and black cutworms are monitored from May through August. The light trap data can provide excellent insight into the proper timing to maximize control with the new preventative insecticides. Adult sod webworm and masked chafer cumulative counts have been tabulated over the past four years (Figure 2). If Mach 2 were to be used several windows of application can be evaluated. For example, if the major

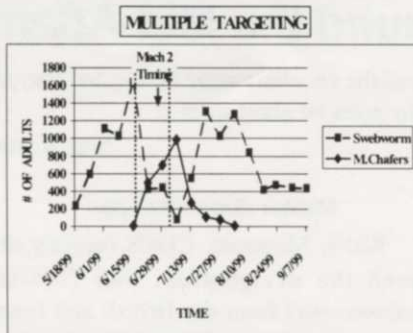


Figure 2: Optimum timing for targeting of Mach 2 for sod webworm and masked chafer control based on light trap results from 1996 - 2000 at Westwood C.C.

goal is to control white grubs then the timing of Mach 2 could occur between mid-June to early August. However, if one wanted to control the 1st generation of sod webworm larvae and masked chafer grubs then an application timed between mid to late June would control both of these turfgrass insect pests (Figure 2). Another possible multiple targeting example is the use of Merit to control billbug larvae and white grubs by timing an application in mid to late May.

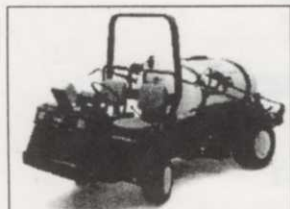
**Summary**

With the changing of the guard from the older broad spectrum insecticides to the newer more selective insecticides, turfgrass professionals will now see improved levels of control, greater applicator safety, and less interference of natural control. However, one major issue with the application of these new insecticides is their use in preventative control programs. If we rely too heavily on these products and apply them annually to large turfgrass sites without regards to the principles of integrated pest management then the likelihood of resistance and enhanced biodegradation of these products will occur. What we must do as turfgrass managers and researchers is to continue to improve our abilities to predict the likelihood of white grub damage. Greater emphasis on record keeping as to where and when white grub damage occurs, black light and pheromone trapping, and a better understanding of scarab (white grub) behavior are needed. Only then can we better identify high risk sites and apply judicious applications of these new insecticides.

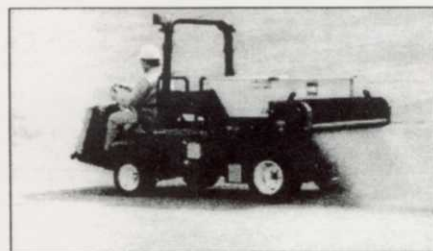
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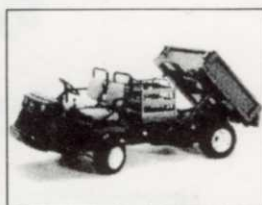
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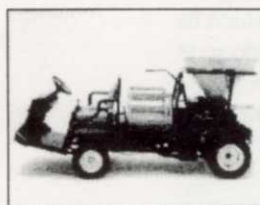
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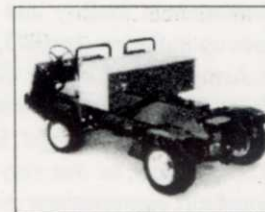
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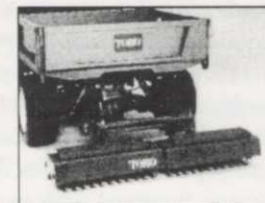
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