

## Year-End Report Card on New Turf Insecticides

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Despite years of research and field testing that precede registration of insecticides, the strengths and limitations of new products often aren't fully revealed until they're put to use by turfgrass professionals. Here are some of the patterns that emerged from 1998:

Halofenozide (MACH 2<sup>®</sup>), the newest soil insecticide, was registered for use in most states in 1998. MACH 2<sup>®</sup> belongs to a new class of synthetic insecticides called Molt Accelerating Compounds (MACs) which disrupt the hormonal system that controls growth and molting in target insects. It has very low vertebrate toxicity and is one of the least toxic materials you can use for grub control. **Professionals have obtained excellent preventive control of Japanese beetle and masked chafer (*Cyclocephala*) grubs, as well as black turfgrass ataenius, with MACH 2<sup>®</sup> applied any time from mid-May to early August.** MACH 2<sup>®</sup> also kills billbug larvae, and the liquid (2SC) formulation has performed well against sod webworms and cutworms.

Despite advertised claims that it is effective for curative control, we know now that **MACH 2<sup>®</sup> works too slowly against large grubs to put a stop to digging by skunks, raccoons, birds, or other vertebrate predators.** Although large (3<sup>rd</sup> instar) grubs stop feeding soon after ingesting MACH 2<sup>®</sup>, it may take 3 weeks or longer before they die and decompose to the point that they no longer attract digging varmints. Remember, MACH 2<sup>®</sup> works by disrupting molting, so it works best if applied early—before or soon after egg hatch—to target small grubs that are actively growing. **Once grubs are large**

**enough to cause noticeable damage, you're better off with a fast-acting, short-residual product such as Dylox<sup>®</sup> (trichlorfon).** Also, recent research has shown that **MACH 2<sup>®</sup> is less active against European chafer and Asiatic garden beetle grubs than against other grub species.** So, it pays to know what kind of grubs you're dealing with, especially with this product.

**Merit<sup>®</sup> (imidacloprid) continues to give excellent preventive grub control when applied any time from May until egg hatch (early August).** Some golf course superintendents reported failure of Merit<sup>®</sup> for grub control this last season. Usually, these problems were traced to **too-early an application (March or April)** motivated by the intent to multiple-target the first generation of black turfgrass ataenius grubs, which hatches in mid- to late May. These early spring applications do not kill the large, overwintered grubs of Japanese beetle, masked chafers, European chafer, or other annual species, and the product "runs out of gas" by August when the new brood of these grubs arrives. The same problem can also occur with MACH 2<sup>®</sup>. **In most areas, the optimal window for preventive control of annual grub species with either product is from early June to mid-July.** If your intent is to control both black turfgrass ataenius and annual grubs with the same treatment, wait until mid-May before making the application.

Both Merit<sup>®</sup> and MACH 2<sup>®</sup> are more forgiving than other grub insecticides if not immediately watered in. However, both products, especially the sprayable formulations, are susceptible to photodegradation upon prolonged exposure to sunlight, and neither can kill grubs unless the

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### Winter Ice...

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to occur during high traffic periods. A solution to this problem is the use of protective wooden-floor entrance ways at these locations.

#### References

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2. Beard, J.B. 1964. Effects of ice, snow, and water covers on Kentucky bluegrass, annual bluegrass, and creeping bentgrass. *Crop Sci.* 4:638-640.
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4. Beard, J.B. 1965. Bentgrass (*Agrostis* spp.) varietal tolerance to ice cover injury. *Agron. J.* 57:513.
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## ...Chlorotic Putting Greens

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response to heat stress and high humidity, but usually there is no turf thinning. Thinning and turf loss, however, may be the result of a pathogen. When in doubt, samples should be sent to a diagnostic lab. Excessive irrigation, soil compaction, poor internal drainage, supraoptimal temperature stress, and shade also cause yellowing during the summer. The yellowing is due to altered physiological processes—such as lowered photosynthesis and increased respiration—leading to senescence, low soil oxygen levels, impaired transpiration, or possibly an inability of roots to effectively take up nutrients. In the aforementioned situations, it is important to promote soil drying and cooling by restricting irrigation and syringing judiciously, avoiding mechanical injury, and improving air circulation with fans or by selective tree and bush removal.

In most situations, the chlorosis that develops in response to abrupt temperature or relative humidity changes or extremes dissipates within a few weeks or months. Nutritionally related chlorosis can debilitate plants, especially annual bluegrass and creeping bentgrass on greens. **Should thinning of the turf become evident, an application of 0.1 to 0.2 lb N per 1,000 ft<sup>2</sup> (0.5 to 1.0 kg N per ha) from a quick-release nitrogen source or a micronutrient product may alleviate the condition.** Because Fe and Mg are involved in chlorophyll production and elicit a shoot green up response, they are frequently recommended. **Iron sulfate (1 to 2 oz per 1,000 ft<sup>2</sup>, 30**

**to 60 g per 93 m<sup>2</sup>) or chelated Fe materials are suggested. Epsom salts or MgSO<sub>4</sub> (2.0 oz per 1,000 ft<sup>2</sup>; 60 g per 93 m<sup>2</sup>) are good sources of Mg.** Also, the next time large increments of nitrogen (i.e., >0.5 lb N per 1,000 ft<sup>2</sup>; 25 kg N per ha) are to be applied use a complete fertilizer, i.e., N + P + K. The application of other micronutrients and biostimulants may also be beneficial. If the yellowing is clonal, i.e., genetic, a significant greenup in response to N, Fe, Mg, or other micronutrient applications is unlikely. Covering chlorotic greens during unusually cold spring or autumn nights may be somewhat beneficial. Promoting soil drying and evaporation, as previously noted, is recommended in the summer.

There are other causes of a generalized chlorosis, including the following: (a) integrating applications of plant growth regulators and biostimulants containing gibberellic acid; (b) certain pesticides applied during warm to hot weather can scorch on yellow turf; (c) use of extremely high seeding rates, which result in huge numbers of plants occupying a small space; (d) excessively wet or poorly drained soils that become temporarily anaerobic; (e) prolonged periods of overcast or rainy weather; (f) iron chlorosis due to alkaline soils; (g) plant parasitic nematodes; (h) *Pythium*-induced root dysfunction; and perhaps (i) viruses and other diseases. In the case of these latter situations, the chlorosis could develop at almost any time of the year. 

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residues are leached down to the root zone. That's why they should be watered-in soon after application.

Conserve<sup>®</sup> (spinosad) is a new insecticide derived from fermentation by-products of a naturally occurring microbe. It has an LD<sub>50</sub> of >3,000, which places it in the "virtually nontoxic" category for vertebrates. **Conserve<sup>®</sup> is providing very good to excellent control of cutworms, armyworms, and sod webworms.**

**DeltaGard GC<sup>TM</sup> (deltamethrin) is a new, fast-acting pyrethroid that gives excellent control of turf caterpillars (cutworms, sod webworms, armyworms), as well as many other surface-active insects.** As with other pyrethroids, such as Scimitar<sup>®</sup> (lambda-cyhalothrin), Talstar<sup>®</sup> (bifenthrin) and Tempo<sup>®</sup> (cyfluthrin), DeltaGard is a Restricted Use Pesticide due to its toxicity to fish and aquatic organisms.

Naturalis-T<sup>®</sup> is a new product containing the insect-specific fungus *Beauveria bassiana*. When the fungus comes into contact with the target pest, ostensibly it sticks to its outer surface, penetrates the body wall of the insect, and causes death by rapid loss of water and nutrients. Natural epidemics of *Beauveria bassiana* sometimes suppress populations of chinch bugs and certain other insects under moist conditions. The commercial product has performed poorly in my cutworm and grub trials. So far, I've not seen convincing evidence that Naturalis-T<sup>®</sup> provides reliable, consistent control of turfgrass pests.

*Note:* Additional information on insecticides is included in the author's new book *Destructive Turfgrass Insects: Biology, Diagnosis, and Control*, which is available from Ann Arbor Press (121 South Main Street, P.O. Box 310, Chelsea, MI 48118; tel 1-800-858-5299; fax 734-475-5299). 