

Multiple Targeting: Value Added or Value Subtracted?

Daniel A. Potter

Multiple targeting involves applying an insecticide with intent to control two or more pest species by the same treatment. Sometimes this approach targets two major pests, as when golf superintendents apply a long-residual soil insecticide such as Merit® or MACH 2® in late April or May to control first-generation black turfgrass atenius (BTA) grubs that appear in late May or June, as well as annual grub species, such as masked chafers or Japanese beetles, that hatch from eggs in late July or August. Multiple targeting also can provide “added value” by reducing the need for additional applications to control secondary targets. Thus, a lawn care applicator who applies MACH 2® in June for preventive control of white grubs would likely also suppress whatever sod webworms might be present at the time of application or over the active residual life of the insecticide. **But, multiple-targeting can sometimes backfire if you try to stretch an insecticide’s residual limits so far that the optimum treatment window for the main target is missed.**

Registration of imidacloprid (Bayer’s Merit®) and halofenozide (RohMid’s MACH 2®) during the 1990s opened a new era of preventive insect control. Multiple targeting with these products gained favor on golf courses in the cool-season and transition zones where the BTA is a sporadic, but sometimes severe pest. The seasonal life cycle of BTA differs from that of other grub species in that there are two generations per year throughout most of the species’ range. The adult beetles overwinter under plant debris or in thatch or soil. They emerge in the spring and fly to fairways or putting greens where eggs are laid. Superintendents who normally expect to see grub damage in late summer may be caught off guard to find very high densities of the relatively small BTA grubs damaging the roots in June. A second brood of BTA grubs normally shows up in August, about when the grubs of masked chafers, Japanese beetles, and other annual species are just getting started. **Either Merit® or MACH 2®, applied in mid- to late May, will control first-generation BTA grubs and generally have enough residual persistence to control annual grubs that appear later in summer.**

Owing partly to competitive advertising, as well as uncertainty about the products’ residual limits, some sources promoted application of Merit® or MACH 2® as early as mid-April to provide “season-long” control of annual grubs as well as a spectrum of other turf pests. **Although treatments made before May 15 often do provide satisfactory control, I have heard reports of treat-**

ment failures where such early applications apparently “ran out of gas” before eggs of Japanese beetles, masked chafers, or other annual grubs had hatched. According to Bayer’s technical literature, the half-life of Merit® when applied to turf is 61 to 107 days. MACH 2® and Meridian®, the new soil insecticide from Novartis (registration expected in 2001), have half-lives in that same ballpark. In the cool-season turfgrass zones where eggs of annual grubs will typically hatch from late July to mid-August, residues from an April or early May application will have degraded in the soil for at least 90 days before the vulnerable, first-instar grubs are present. Thus, if you are concerned mainly with annual grubs, it makes no biological sense to apply your preventive insecticide several months before egg hatch. The optimum treatment window for such grubs is any time during the month to six weeks before egg hatch. This window generally falls from early June to mid-July in the transition zone, and about two weeks later in more northern states. For golf courses where BTA is a concern, late May application is a reasonable compromise to preventively control both its larvae and the annual grub species.

Given the turf industry’s growing dependence on preventive insecticides, stewardship of these products is important. Placing residues in the soil several months before the optimum date for primary targets exposes them to chemical and microbial degradation for longer than is necessary. **Accelerated microbial degradation, wherein soil microbes become adapted to pesticides such that they degrade the residues much faster than is normal, also is a concern.** A decade ago, accelerated microbial degradation resulted in treatment failures on sites that had been repeatedly treated with isofenphos (Oftanol®), a relatively long-residual organophosphate. Although accelerated breakdown is not known to occur with either Merit® or MACH 2®, there is much that we do not know about this phenomenon. Another potential concern is long-range pest resistance. Although resistance is more likely to occur with pests having multiple generations per year than those with having a 1-year life cycle, note that preventive applications in April or May expose *two* generations (overwintered grubs and the newly-hatched larvae) to the residues. **Resistance to modern preventive insecticides has not been documented for turf pests, but resistance to imidacloprid already has occurred in certain pests of greenhouse and field crops.** Note, too, that Merit® and Meridian® are both neonicotinyls, and thus are chemically

Continued on page 7

Cultivar Conversion on Creeping Bentgrass Greens

With the recent introduction of the Penn A and G series cultivars of creeping bentgrass (*Agrostis stolonifera*) that can sustain high shoot densities at extraordinarily close mowing heights, a frequently asked question has been the potential to interseed into an existing cultivar stand such as Penncross with the objective of converting to the new cultivar. A number of efforts have been made in this regard over the past few years with mixed results. I have not been able to answer this question specifically in terms of a clear yes or no relative to successful experiences.

However, for the first time I can relate experiences with comparative interseeding. My observations have been in Japan in a relatively cool climatic area near the foot of Mt. Fuji, west of Tokyo. Two golf courses in this area have conducted an interseeding program for three years with the goal of converting Penncross to Penn A-2. Both golf courses employed similar interseeding practices conducted in the late-summer period of early September. The procedure involved:

- **Close mowing** of 1/8 inch (3.2 mm) for a period of several weeks prior to interseeding.
- **Vertical cutting** in two to three directions with excess organic material removed.
- **Coring** with high-density 0.3 inch (8 mm) diameter tines to a 0.8 inch (20 mm) depth on a 1.1 inch (27.5 mm) spacing. The cores were removed.
- **Seeding, topdressing and brushing**, using 2 lb per 1,000 ft² (10 g/m²) with coated seed.

An application of phosphorus also was made to the seedbed prior to seeding. Subsequently, daily to twice daily irrigation was applied as needed to avoid surface water stress to the germinating seedlings. This interseeding process was re-

peated in the second year. It should be noted that both golf courses have a double-green system, which allowed a two-week post-interseeding period where play was not allowed on the interseeded set of 18 greens.

I have made visitations to both sites for three consecutive years during the autumn period. Dramatic differences were observed in the autumn of the year 2000. One golf course has achieved a dramatic conversion to Penn A-2, which is visually evident in terms of a narrower leaf width, higher shoot density, and more erect growth habit. In contrast, the other golf course remains dominated by Penncross creeping bentgrass. **There has been one key difference between the two golf courses. On the course where the conversion was successful, they sustained a cutting height in the 1/8 to 3/32 inch (3.2 to 3.0 mm) range for the three-year period. Whereas the golf course where success has been far less dramatic and Penncross appears to remain dominant, the cutting height was maintained at a 4 mm height, except for lowering during a two-week period for several key tournaments each year.** It should be noted that in the second year on the course that was successful there was a temporary thinning of the Penncross turf cover on the greens. Whether this could have been avoided or not is unclear, but may not necessarily need to have occurred.

This comparative set of golf courses demonstrates there is at least one key cultural element that aids in successful conversion to the higher density, extraordinarily close mowing tolerant cultivars, that being a very close mowing height which stresses the Penncross. There most probably are other cultural practices that may also contribute, but to what degree and whether they have an additive effect remains to be determined.

Multiple Targeting...

Continued from page 5

similar. As always, it is good practice not to overdo it with any one class of pesticide.

Therefore, I disagree with some authorities who broadly promote early spring preventive treatments under the auspices of multiple targeting. One publication, for example, states that if grubs are the primary target, early May is the optimal time to apply Merit[®] on northern golf courses because such timing also gives season-long control of secondary pests such as billbug larvae, first-generation cutworm larvae, greenbug aphids, and frit fly. In my experience, those secondary pests don't often occur at high enough levels in fairways to justify applying a grub treatment that early. The same source recommends late April through May as the optimal time to apply Merit[®] for grub control on northern lawns because secondary pests, such as billbug larvae, greenbug aphid, and chinch bugs, will also be suppressed. Again, in my view, those pests don't occur often enough, or at high enough levels, to

warrant treating 1–2 months earlier than the optimum window for the primary target. Should surface-feeding pests, such as sod webworms and cutworms, approach intolerable levels, they are relatively easy to control by spot-treating with a fast-acting, short residual insecticide.

When multiple-targeting BTA and annual grub species with preventive soil insecticides, use the highest labeled rate and treat shortly before egg hatch of BTA. This treatment timing, generally mid- to late-May, increases the likelihood that sufficient residue will persist into July and August. For grub management on lawns or sports fields, or on golf courses without a history of BTA, there is little justification to apply Merit[®] or MACH 2[®] any earlier than early to mid-June. Stewardship of these products warrants that we use them selectively, during optimum windows, rather than as a routine, season-long cure-all for secondary pests that only occasionally occur at damaging levels.