TURFGRASS TRENDS

INSECT CONTROL

To Treat or Not to Treat for Bugs?

By Eileen A. Buss

Turfgrass managers are stewards of the environment where they work. They make daily decisions that affect the physical and aesthetic quality of their turf. One such decision is whether or not insect pests are abundant enough to warrant controlling them.

Each turf manager has different responsibilities and limited time and money to deal with pest problems. Most superintendents are on site full-time, so they learn where their pest hot spots are and can watch those areas closely.

When it comes to pest management, identification of a symptom or pest is just the first step. Understanding why the symptom is there, and adjusting the way the turf is grown and managed is the real challenge for sustainable control. A "reactive" turf manager may treat symptoms of pest problems without determining the various factors that contributed to the outbreak. A responsive turf manager calls upon various resources (experience, training, site maps, test results) to figure out which factors worked together to cause the problem, and then tries to modify the system to reduce the likelihood of it occurring again. Insecticides are used selectively.

Turf managers can monitor the nighttime flight of most scarab beetles, mole crickets and pest moths using ultraviolet or mercury vapor lights.

Damage or tolerance thresholds are helpful tools that let superintendents gauge the amount of pest pressure, and then decide on a control strategy. Such thresholds enable the turf manager to make a series of decisions that ultimately answers the question: "Do I apply a pesticide or not?"

Researchers often suggest numbers, based on experimental data, of pest insects per square foot that can cause damage. But the end user's tolerance to damage and site-specific factors (grass species, soil type, irrigation, fertility, mowing height and plant stress) also come into play. The final decision about pesticide applications or other control measure is made by the turf manager based on his experience, tolerance for damage or risk, and budget.

Most turfgrasses can tolerate a certain amount of feeding damage before suffering reduced growth rates, significant root or leaf loss, or color or density changes. "Rule of thumb" threshold pest densities (Table 1) may be modified to fit the specific situation.

In general, four factors will influence how tolerance levels are established, including turf use, location, aesthetic value or replacement value, and playability and safety issues.

Turf use. Knowing how the turf will be used is basic to defining an "acceptable" level of pests. For example, is there a lot of foot or golf car traffic in an area? Will the turf be used all year, part of the year or just for show purposes?

Turf location. Where insect infestations are located will have a significant bearing

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on whether a treatment may be needed. For example, although turf on a golf course may be used all year, fairways and roughs likely won't be treated for problems as intensively as tees, greens or even areas around clubhouses.

Aesthetics and replacement value. The more valuable the turf in terms of cost of replacement, the lower the acceptable damage level. The cost to repair or resod a green is expensive when one considers not only the turf replacement and necessary labor costs, but also lost playing time (revenues), inconvenience to golfers, the turf manager's reputation or even his/her job security.

Playability and safety. Healthy turfgrass cushions us when we fall and is easy to walk on. But, tunnels or holes caused by insect pests or vertebrates digging for insects may reduce playability and increase the risk of injury. Also, the presence of wasps or fire ants increases the risk of stings or an allergic reaction in people sensitive to stinging insects.

Once the turf manager gets a feel for the tolerance or damage thresholds for key pests, then timing of control actions is the next big issue. How does one properly time applications to effectively control the most vulnerable life stage before damage becomes intolerable? Periodic monitoring of the key pests will provide valuable assistance at low cost.

For example, turfgrass managers in the southeastern United States know that most mole cricket nymphs hatch from eggs sometime between early May to mid-June each year. But if the peak hatch has already occurred, and nymphs are larger than expected, then some insecticides won't work as well. Doing soap flushes will indicate how many adults are still laying eggs or how many nymphs have hatched in an area, as well as their sizes.

There are advantages to properly timing pesticide applications. Not only will the products work better against the target pests, proper timing also reduces the risk to beneficial organisms, reduces liability issues and saves time and money by reducing the number of retreats.

There are several useful tools and tactics that turf managers can use to more accurately time pesticide applications and help determine if an application is even needed. Knowing how to accurately identify insects and understand their life cycles are keys to successful monitoring. Keep a good turfgrass pest management book with color photos available as a reference.

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Monitoring tools and tactics — indirect sampling

Black light traps — Turf managers can monitor the nighttime flight of most scarab beetles, mole crickets and pest moths using ultraviolet or mercury vapor lights. The adult insects fly to the light, drop into a container (usually through a funnel) and can't escape. These traps are often hung 10 feet or so away from buildings, hedges or other obstructions. Knowing when adults are flying, mating and laying eggs helps turf managers estimate when peak egg hatch will be to time control measures more accurately. Also, watch what flies to flood lights or lights on buildings.

Pheromone traps — Another way to catch adult male moths and beetles is a pheromone trap that contains either a mating pheromone or floral lure. The pheromone smells like a female, so a male flies to the pheromone, can't find a female and gets stuck in the trap. A floral lure may smell like preferred host plants or flowers. The pheromones are typically species-specific, so only a particular pest is targeted for each trap. This may work well for either mass trapping, mating disruption or simple monitoring.

Bait traps — Some insects may be attracted to the smell of rotting fruit, meat or dung. They fly to the source of the smell, fall into soapy water and die. This trap is useful in catching *Peltotrupes* beetles (a scarab), which make gopher-like mounds in deep sands in Florida.

Pitfall traps — These containers are placed flush with the ground, and walking or tunneling insects fall into them. Often, a soapy solution or antifreeze fills the bottom of the container to kill the insect. Pitfall traps can be made from household materials, like a small cup. Frequent emptying may be needed during periods of rain.

Monitoring tools and tactics — direct sampling

Soap flushes — An easy way to find some pests in the soil without damaging the turf is to do a soap flush. About 2 tablespoons of liquid dish soap is added to two gallons of water, and the solution is poured over a square yard of turf. Caterpillars, beetle adults, mole crickets, earwigs, worms and other creatures will surface within a few minutes.

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TABLE 1

Key turfgrass pests, their host plants, symptoms, and suggested damage thresholds.[a]

Arthropod pests	Preferred hosts	Damage symptoms	Suggested damage thresholds
Bermudagrass mite	Bermudagrass	Yellowed leaf tips, shortened internodes resulting in tufted growth.	Not determined
Billbugs ▪ Bluegrass, Denver, Hunting, Phoenician)	Cool-season grasses, bermudagrass, zoysiagrass	Larvae burrow down grass stems to the plant crown,killing stems and larger turf areas. Often misdiagnosed as drought, other insects or disease.	1 to 6 billbugs per sq. ft.
Caterpillars			
▪ Armyworm	Many grasses, small grains, legumes	Skeletonized or completely consumed foliage, with circular bare spots.	3 to 4 larvae per sq. ft.
▪ Cutworm	Many grasses and crops	Circular spots of clipped or dead grass near holes.	Not determined
▪ Fall armyworm	Bermudagrass, cool-season grasses, grains	Skeletonized or completely consumed foliage.	Not determined
▪ Sod webworm	Cool-season grasses, small grains	Small patches of chewed leaves or stems.	Not determined
▪ Tropical sod webworm	Most warm-season grasses	Notched leaves, ragged appearance.	5 to 8 larvae per sq. ft.
Chinch bugs ▪ (Hairy, Southern, Common)	Cool-season grasses, St. Augustinegrass	Foliage yellows, wilts and dies in small spots,then larger patches.	15 to 25 chinch bugs per sq. ft.
Mole crickets ▪ (*Scapteriscus* spp.)	Bermudagrass,bahiagrass, other warm-season grasses	Tunneling below the soil surface and root feeding result in bare patches of turf.	2 to 4 tunnels per sq. ft.
Spittlebugs	Centipedegrass, St. Augustinegrass	Purple-red striping in turf, wet and spongy to walk on.	Not determined
White grubs			
▪ Black turfgrass ataenius	Annual bluegrass Kentucky bluegrass, bentgrasses	Root feeding, resulting in wilting and gradual thinning of turf.	40 to 100 grubs per sq. ft.
▪ Green June beetles	Kentucky bluegrass, tall fescue, bermudagrass, thin-skinned fruits	Root feeding results in wilting and dying grass. Grubs make mounds.	5 to 7 grubs per sq. ft.
▪ Japanese beetle	Most grasses	Grubs feed on roots and root hairs, resulting in turf wilting and thinning. Adults skeletonize tree and shrub leaves.	10 to 20 grubs per sq. ft.
▪ Masked chafers	Pasturegrasses and turfgrasses	Larval root feeding weakens grass, resulting in wilting and dieback. Adults do not feed.	10 to 20 grubs per sq. ft.
▪ May and June beetles	Many grasses	Grubs feed on roots,resulting in wilting and dieback. Adults eat leaves of grasses, herbs, shrubs and trees.	3 to 6 grubs per sq. ft.
▪ Oriental beetle	Turfgrasses and sugarcane	Grubs feed on roots near the soil surface. Adults feed on several flowering plants.	6 to 8 grubs per sq. ft.

[a] Thresholds vary depending on the condition and use of the turf.

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Flotation — Floating is a kind of a flushing technique used to sample those insects that live in thatch, such as chinch bugs. There are two ways to do flotation. One way is to use a metal coffee can, cut both ends out, insert one end about 2 inches into the soil at the edge of damage and add warm water. Keep the water just at the tip of the grass blades and continually add water for a few minutes. Count the number of insects that float to the top. Or, using a hole cutter, remove a sample of turf and soil, place it into a bucket, and slowly add warm water to the top of the grass blades. Let the soil and turf core soak for several minutes, and then count the number of insects that emerge.

Soil sampling — For insects that live in the soil and do not respond to flushing or flotation, the main alternative is to dig into the soil with a spade or hole cutter and sift through the soil to find the insects. This is especially true for white grubs. Looking in the soil is important if the above-ground symptoms are difficult to diagnose.

Visual observations — The best monitoring technique is to be familiar with the signs and symptoms of insect injury. The more aware turf managers are of their environments, the better they will respond to pest problems.

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