FEATURE ARTICLE

Diagnosing and Controlling Billbugs

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Billbugs are among the most misdiagnosed pests of lawns and golf courses. Their damage is often confused with symptoms of drought stress damage from other insects or diseases, especially dollar spot. The **bluegrass billbug** (*Sphenophorus parvulus*) attacks cool-season grasses, especially Kentucky bluegrass and non-endophytic perennial ryegrass, in the northern half of the United States and southern Canada. The hunting billbug (*S. venatus vestitus*) is a pest of warm-season grasses, especially zoysiagrasses and improved hybrid bermudagrasses in the transition zone and southern states. Diagnosis and control of the two species are generally similar.

General Description. Billbugs belong to the weevil family, a group of slow-moving beetles having a long beak-like snout with chewing mouthparts at the tip. Adults are hard-bodied, 5/16 to 7/16 inch (8–11 mm) long, and slate gray to charcoal black, although they may appear brownish due to dried mud adhering to the body. The snout, head, and thorax are about as long as the wing covers, and the elbowed antennae are attached near the base of the snout. They usually "play dead" when picked up or disturbed. **Billbug larvae resemble small white grubs, but without legs. Mature ones are about 3/8-inch (9.4-mm) long and cream-colored, with a brown head. The body is hump-backed, somewhat fatter through the tail end, but tapering at the tip.**

Life Cycle and Habits. Bluegrass billbugs overwinter as adults in thatch, soil cavities, bark mulch, leaf litter, or other sheltered locations. Adults become active in April and May, and may be seen crawling over sidewalks or driveways. Females deposit eggs in small cavities chewed in grass stems or stolons. **Young larvae begin feeding within grass stems, which become hollowed out and packed with powdery frass. Older larvae tunnel down to feed on the crown and then move to the soil to feed externally on the crown and roots, leaving an accumulation of fine, whitish sawdust-like frass near the feeding site.** This is the point when visible damage is noticed. Larvae are present from June into August. New adults appear in August and September and may again be observed on pavement as they seek overwintering sites in October. There is one generation per year.

Hunting billbugs hibernate as adults in the transition zone, but farther south the adults may be active nearly year-round. Most eggs are laid in the spring when bermudagrasses and zoysiagrass are well out of winter dormancy. Eggs are inserted into leaf sheaths or grass stems, and the larvae then feed in the same manner as bluegrass billbugs. Larvae may be present from May into October.

Damage and Diagnosis. In cool-season grasses, watch for scattered patches of dead or dying grass, resembling dollar spot disease, beginning in late June and continuing into August. The injury may be as subtle as chronic thinning of the turf. Damage on golf courses tends to occur in sunny, dryer areas around greens and green banks, tee banks, bunkers, and in areas around the clubhouse. In lawns, it may be mistaken for drought stress or sod webworm injury. **Hunting billbugs commonly cause 6 to 12 inch (15 to 30 cm) patches of brown, dying grass** resembling burn from dog urine. When roughed up with your hand, the stolons may break apart, the pieces appearing to have been chewed off at the ends.

The "tug test" is the best way to diagnose billbug injury. Grasp the affected stems and gently pull upward. If the grass breaks off easily at the crown and the stems are hollowed out with bits of sawdust-like frass around their broken ends, then billbugs are responsible. Use a knife to examine the crown and roots for fine sawdust-like material, a white legless larvae with a brown head.

Control. Endophytic perennial ryegrasses are relatively resistant. Recent research by Richmond, Niemczyk, and Shetlar (2000, *J. Economic Entomology,* 93:1662–1668) showed that **overseeding stands to produce as little as 30% endophytic grass discourages bluegrass billbug infestations.** Agronomic practices that enhance turf vigor will help the stand to outgrow billbug damage.

For sites with a history of billbug problems, applying imidacloprid (Merit®) or halofenozide (MACH 2®) from mid-May to early June provides preventive control, with residues generally lasting long enough to also control major grub species (e.g., masked chafers, Japanese beetle grubs) hatching out later in the summer. Both Merit® and MACH 2® have systemic activity that kills larvae inside the stems, as well as in the soil. **Alternatively, applying a labeled pyrethroid, e.g., bifenthrin (Talstar®), cyfluthrin (Tempo®), deltamethrin (DeltaGard®), or lambda-cyhalothrin (Scimitar®) between mid-April and mid-May intercepts the overwintered females before they can lay eggs in the stems.**

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Use a liquid application and apply only a light post-treatment watering, 1/8 inch (3.2 mm) or less, to keep the residues in the upper thatch where adult billbugs reside. Deploying the latter strategy after mid-May, however, may result in turf damage because females will already have laid some eggs.

Control becomes more difficult after mid-June, when larvae have moved into the soil to feed on the crown and roots. Insecticides labeled for grubs and billbugs, e.g., halofenzide, imidacloprid, bendiocarb (Turcam®), carbaryl (Seven®), or diazinon (but not for golf courses and sod farms), followed by sufficient watering to move the residues to the root zone, provide some control at that time. Such treatments may be too late to prevent turf damage, however, because the billbug larvae may already have damaged the plant crowns.

Thatch and Mat Must Be Minimized

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(*Colletotrichum graminicola*) survive in and build-up their populations in the presence of thatch. Wet thatch also provides the moist conditions needed by algae and moss to proliferate. Furthermore, thatchy or puffy stands are predisposed to scalping.

Today's high standards for quality golf turf require that thatch and mat layers be aggressively minimized. **These organic layers are managed through a combination of aerifications, topdressing, and proper fertility and irrigation practices.** Putting greens should be cored with wide diameter tines and heavily topdressed in the spring and again in late summer prior to the time annual bluegrass (*Poa annua*) seeds germinate. During the golfing season, putting greens with significant thatch or mat layers should be quadratined and lightly topdressed on a 3- to 4-week interval. During wet periods, greens may be spiked frequently to promote water drainage and air exchange with the soil. Water injection aeration is also beneficial in promoting soil aeration and root growth.

During the summer the turf should be irrigated deeply and infrequently. Research conducted at Texas A&M University by Dr. Richard White and coworkers has shown that deep and infrequent irrigation results in less thatch build-up and a reduction in algae and disease problems. Too many golf course superintendents are irrigating nightly for a set period of time. This practice keeps thatch and mat layers saturated, thereby promoting algae, moss, black layer, scald, large divots, scalping, and generally less than optimum playing conditions. It is very important to keep the turf as dry as possible during the summer. **Deep and infrequent irrigation will improve the environmental stress tolerance of turf, help to discourage pests, minimize problems associated with large divots and deep ball marks, and enable creeping bentgrass (*Agrostis stolonifera*) to compete more effectively with annual bluegrass.**

Fertilizer management is also important in minimizing thatch. Most of the annual nitrogen used on cool-season grasses should be applied during the autumn months. **During the summer, light applications of nitrogen (0.1–0.2 lb N/1,000 ft^2; 5–6 kg N ha^{-1}), known as spoon-feeding or foliar feeding, should be applied every 2 to 3 weeks.** Spoon-feeding promotes vigor, particularly in creeping bentgrass, thus enabling the turf to more effectively compete with annual bluegrass and to more rapidly recover from divots, ball marks, and mechanical damage. Spoon-feeding with water soluble N-sources, such as urea and ammonium sulfate, is preferred. Use of the aforementioned N-sources has been shown to provide as much as 30 to 60% suppression of dollar spot and brown patch (*Rhizoctonia solani*). Natural organic fertilizers are good N-sources and they are safe. Natural organic N-sources, however, are not generally superior to low rate applications of water soluble N-sources in promoting summertime vigor. **Research conducted at the University of Maryland does not provide strong evidence that natural organic N-sources are better at promoting thatch degradation, promoting soil microbial activity, or reducing diseases, when compared to synthetic slow-release fertilizers or urea.** Indeed, some composted sewage sludges that contain large wood chips and some dehydrated manures can promote thatch and dollar spot.