Billbugs can be a problem on athletic fields and golf course bunker surrounds.

Billbugs are a complex of weevils (Coleoptera: Curculionidae) or "snout beetles" that are capable of damaging turfgrass in North America. Billbugs can develop in turfgrasses found in all types of turfgrass systems such as home lawns, athletic fields, parks, and golf courses. Several species of billbugs can damage turf in North America. In Pennsylvania, the Hunting Billbug (Sphenophorus venatus vestitus) and the Bluegrass Billbug (Sphenophorus parvulus) are the most common billbugs encountered. Damage often appears similar to drought and is most severe on cool-season turfs with excessive thatch including Kentucky bluegrass, perennial ryegrass, tall and fine fescues. Hunting billbug is also capable of damaging warm-season grasses such as Bermudagrasses and Zoysiagrasses.

Billbug damage frequently goes unnoticed during periods of drought. Adults normally do not cause major damage to Kentucky bluegrass. The larval stage of this pest causes significant feeding damage. First- and second-instar larvae feed inside the stem, then tunnel through the stem, and drop to the thatch where they feed on crowns and roots. Damage frequently appears from late June through early August as spotty, straw-colored patches of Kentucky bluegrass that are scattered throughout the lawn. Heavy billbug larval damage may result in extensive browning and death of the turf. A good indicator that billbug larvae are nearby is the presence of moist, light-brown frass near the crown of the plant. Frass indicates that second-instar larvae have tunneled through stems and have dropped to the thatch to feed and complete the third larval instar.

Identification

Adults
Billbugs have a rather long snout and an elongated thorax. Commonly, adults can be observed adults walking on driveways and sidewalks as temperatures warm in the spring. Adults usually are gray to brown to almost black with pitted backs (i.e., pronotum). Often, dried soil may adhere to the elytra (harden hindwings) and change the overall color of adult billbugs. Species may be differentiated by the pattern to the pits on the pronotum. The pits on the Hunting billbug from a "V", whereas bluegrass billbugs have no distinct pattern.

Eggs
Adult females notch the stem of the grass plant and oviposit 3-5 kidney-shaped eggs (~ 0.59 inch) into the hollowed-out chamber per day.

Larvae
A white, legless larvae with a brown head capsule hatches from the egg in about 7 to 14 days. Billbugs complete three larval instars with the first and second instars feeding inside the grass stem. The second instar larva continues to grow, eventually breaking out of the stem. "Frass" is often present near the location where the larva exits the stem. The frass is white and has the texture of fine sawdust. The billbug larva drops to the thatch and starts feeding on roots and crowns. Billbug larvae are approximately 1/4 to 3/8 inch long. Larvae usually require 5 to 8 weeks to complete all three larval instars. Upon completion of feeding, pupation occurs in the soil. Pupae are about 1 to 2 inches long and change in color from creamy to reddish-brown.
General Life History

Bluegrass billbugs complete one generation each year. Adults usually overwinter in leaf litter and thatch, become active from late April through mid-May when temperatures exceed 65°F, and are frequently noticed walking across driveways and sidewalks. from late April through June, depending on geographical location. Oviposition may continue through July and early August. Teneral adults emerge (late August through September) in 7 to 10 days and continue feeding until they seek their overwintering site as late-summer and early fall temperatures drop. The latter sites include weed and leaf litter, litter around the foundation of buildings, or other protected areas.

Hunting billbugs are between ¼ to ⅛ inch long and are reddish-brown to black. The adult beetle has a characteristic long beak that is often associated with insects in the weevil family. Hunting billbugs go through complete metamorphosis, and can be identified by markings on the first segment of the thorax (pronotum) and the modified, hardened, first pair of wings (elytra).

Hunting billbugs most often overwinter in the adult stage but can also overwinter as large larvae. As soil temperatures increase in the spring, adults begin to feed, mate, and lay eggs. Once they become active in the spring, female adult billbugs begin to lay creamy white oblong shaped eggs that take 3 to 10 days to hatch. Larvae of the hunting billbug are white with a brown head capsule. They are legless and are ¼ to ⅜ inch long at the last instar. These larvae feed within the stems of the turfgrass plant, the crown, and the root zone for 3 to 5 weeks before pupating. After remaining in the pupal stage for 3 to 7 days, the adult billbugs emerge and the life cycle begins again until temperatures decrease in the fall.

Monitoring

Billbug adults can be monitored by relying on pitfall traps, which are small, plastic cups positioned inside holes in the turf. This sampling technique is not practical for a homeowner. Homeowners can carefully watch for adults in the spring as temperatures warm and billbugs start walking across sidewalks and driveways. Another method of sampling for billbug damage is commonly referred to as the "tug" test. Gently pull Kentucky bluegrass stems from a damaged area to determine if they break off and you notice a concentration of moist, straw-brown frass (Figure 3). Larvae can be sampled with the aid of a trowel or shovel to determine the absence or presence of mature billbug larvae and pupae in the soil. Growing degree day models indicate that degree days are calculated from a base temperature of 50°F by relying on a March 1 starting date. The models suggest that typically the first activity of billbug adults is usually recorded between 280 and 350 degree days, and that roughly 30 percent of first adult activity should occur between 560 and 624 degree days, and that the larvae began exiting from stems between 925 and 1,035 degree days. Severe visual damage usually occurs between 1,330 and 1,485 degree days.

Management

Nonchemical - Cultural

Endophyte-enhanced perennial ryegrass and tall fescue and tolerant Kentucky Bluegrass cultivars turfgrass are commercially available and easily integrated into a cultural management program. Endophytes can be bacteria or fungi, though endophyte turfgrass seed contain beneficial fungi that live between the cell walls of the plants. In most instances, fungal endophytes produce alkaloids, which give enhanced resistance to insects and disease like dollar spot and red thread. Follow all label directions regarding where you use endophyte-enhanced seed as endophytes may negatively impact the health of livestock (endophyte toxicosis).

In some instances, nitrogen fertilization and irrigation can mask billbug damage.

Nonchemical – Biological control

Insect-parasitic nematodes are available to curatively suppress various billbug species. Two major genera (Steinernema, Heterorhabditis) are commercially available for suppressing turfgrass insects. Heterorhabditis bacteriophora, a nematode with an active or "cruiser" juvenile stages is most effective when applied against the soil dwelling late instar stages. Insect-parasitic nematodes do not have a long shelf life. Likewise, be sure to follow all label directions regarding irrigating in this organism immediately following their application. If you rely on this nonchemical control method, then you need to remember that these nematodes are living, breathing organisms and should be handled with special care. Prior to applying this type of curative control measure be sure to check the expiration data on each package of insect-parasitic nematodes. Billbugs are also susceptible to the naturally occurring entomophagous fungus Beauveria bassiana. This fungus produces large amounts of cottonty, white mycelia, which affect the insect and can eventually result in death of the billbug. In some instances, billbug larvae and adults will be covered with white, cotton-like material. Unfortunately, this fungus rarely attacks enough billbugs to suppress populations below their economic threshold.

Chemical - Preventive control

In areas where billbugs have been problematic in the past, the use of conventional insecticides may be required to suppress adults in the spring to avoid larval damage. Spring applications of registered insecticides can be made based on monitoring adult activity with pitfall traps and using growing degree day model, or other methods. These applications are targeted to reduce adults prior to egg lay. Adults usually become active in the spring when temperatures exceed 60°F. Properly timing an application of a registered preventive billbug control formulation is very critical. Therefore, it is important to recognize that weather conditions and soil conditions can influence adult billbug emergence each year. Follow all specific label directions.
Chemical - Curative Strategy

In instances where billbug damage is recognized, a curative insecticide application may be required. In general, curative (rescue) applications are not as effective as a preventive since billbugs are usually more easily controlled in the spring when larvae hatch. However, effective curative treatments with contact insecticides may help prevent further turf loss.

Warning

The impact of several classes of insecticides on pollinating insects such as honey bees and native bees is a cause for concern. Because they are systemic chemicals absorbed into the plant, some of these products can be present in pollen and nectar, making them toxic to pollinators that feed on them.

Pesticides are poisonous. Read and follow directions and safety precautions on labels. Handle carefully and store in original labeled containers out of the reach of children, pets, and livestock. Dispose of empty containers right away, in a safe manner and place. Do not contaminate forage, streams, or ponds.

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Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

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Code: ART-7569