



BILLBUGS IN HOME LAWNS

Sphenophorus parvulus Gyllenhal

Several billbug species occur on turf, but the bluegrass billbug is the most common in our state. Home lawn areas in Pennsylvania are often subject to severe and extensive injury) by the larval stages of bluegrass billbug. Billbugs have become a major pest of Kentucky bluegrass maintained on residential lawns; they also attack perennial ryegrass, tall fescue, and fine fescue. Related species, including hunting billbug, Denver billbug (limited to the Rocky Mountains and northern Great Plains), and Phoenician billbug (limited to southern California and Arizona) have caused major damage to turfgrasses.

DESCRIPTION

This destructive weevil has a rather long snout and an elongated thorax, which has resulted in the common name “billbug.” The 3/8-inch adults can be difficult to locate in turf, but they have a peculiar habit of walking on driveways and sidewalks in the spring as temperatures warm. Newly emerged adults are dark brown (Fig. 1a) before darkening. Adults usually are gray to brown to almost black with pitted backs (i.e., pronotum), though dried soil may change the overall color of adult billbugs. Mature third-instar billbug larvae are approximately 1/4 to 3/8 inch long, have a brown head capsule, and are white with no legs present (Fig. 1b).

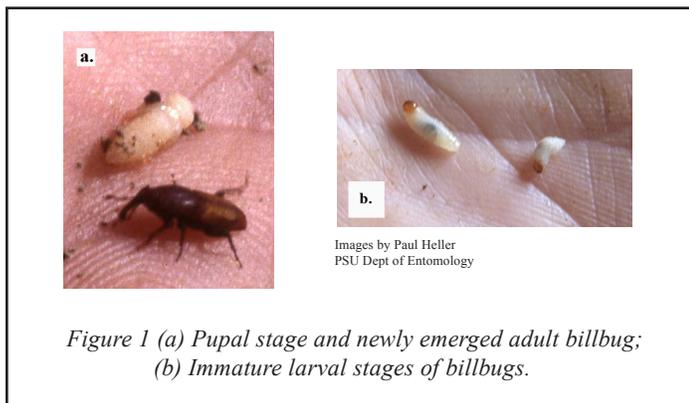


Figure 1 (a) Pupal stage and newly emerged adult billbug; (b) Immature larval stages of billbugs.

GENERAL LIFE HISTORY

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. Adult females lay white, long, kidney-shaped eggs (e.g., 0.59 inch long) in a hollowed-out chamber in the grass stem from late April through June, depending on geographical location. In some cases oviposition may continue through July and early August. 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 (Fig. 2). The frass is white and has the texture of fine sawdust. The billbug larva drops to the thatch



Figure 2. Billbug frass at base of damaged stem.

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. 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.

DAMAGE

Bluegrass 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. University of Maryland entomologists suggests that the economic threshold for billbug is 6 to 8 per square foot.

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 (Fig. 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. Dr. David Shetlar (The Ohio State University) has developed a growing degree day model for bluegrass billbug. Shetlar’s model indicates that degree days are calculated from a base temperature of 50°F by relying on a March 1 starting date. He notes that first activity of billbug adults was recorded between 280 and 350 degree days, 30 percent first adult activity should occur between 560 and 624 degree days, larvae began exiting from stems between 925 and 1,035 degree days, and that severe visual damage usually occurred between 1,330 and 1,485 degree days.

CONTROL

Nonchemical - Cultural

You can use resistant and/or tolerant Kentucky bluegrass cultivars. A control alternative is using endophyte-enhanced turfgrass seed as part of your management program. (Endophytes are usually beneficial fungi that live between the cell walls of grass plants.) In most instances, fungal endophytes produce alkaloids, which give enhanced resistance to insects and disease. Currently, endophytes occur in tall fescue, fine fescue, and perennial ryegrass seed. Billbugs can be repelled by use of endophyte-enhanced turfgrass cultivars. In some instances, fertilization and irrigation can assist in masking billbug damage. However, if you are developing a sustainable turfgrass management system, fertilizer input may not be favored. Follow all label directions regarding where you use endophyte-enhanced seed since you do not want to negatively impact the health of livestock, which often is referred to as endophyte toxicosis.

Nonchemical Curative - Biological

Insect-parasitic nematodes are available to curatively suppress various billbug species. Two major species available for suppressing

billbugs: *Steinernema* spp. and *Heterorhabditis* spp. 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 non-chemical 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* (Blas.). This fungus produces large amounts of cottony, 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 sufficient numbers of billbugs to suppress populations below their economic threshold.

Chemical - Curative Home Lawn Billbug Strategy

Some individuals also make a summer rescue application, which is usually not as effective as a preventive application. This may be attributed to the fact that billbugs are usually more easily controlled in the spring before larvae hatch and mine the stems. If you wait and rely on a curative treatment, then damage may already be present.

Chemical - Preventive Home Lawn Billbug Strategy

Use of conventional insecticides remains the most effective method of suppressing adults in the spring. Spring applications of registered insecticides can be made based on monitoring adult activity with pitfall traps and using D. Shetlar’s growing degree day model, adult trapping data, 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. You would have to adjust your treatment schedule based on what is occurring in your specific geographical region. Properly timing an application of a registered preventive billbug control formulation is very critical. It is important to recognize that weather conditions and soil conditions can influence adult billbug emergence each year. *Follow all specific label directions.*

WARNING

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.

Paul Heller
Professor
Dept. of Entomology
April 2007

Turf - 7

©The Pennsylvania State University 2007

This publication is available in alternative media on request.

Where trade names are used, no discrimination is intended and no endorsement by The Pennsylvania State University or Pennsylvania Department of Agriculture is implied.

Entomological Notes are intended to serve as a quick reference guide and should not be used as a substitute for product label information. Although every attempt is made to produce

Entomological Notes that are complete, timely, and accurate, the pesticide user bears the responsibility of consulting the pesticide label and adhering to those directions.

Issued in furtherance of Cooperative Extension Works, Acts of Congress May 8 and June 30, 1914, in cooperation with the U. S. Department of Agriculture and the Pennsylvania Legislature. D. Jackson, Director of Cooperative Extension, The Pennsylvania State University.

The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, or veteran status. Discrimination or harassment against faculty, staff, or students will not be tolerated at The Pennsylvania State University. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Director, The Pennsylvania State University, 328 Bouke Building, University Park, PA 16802-5901, Tel 814-865-4700/V, 814-863-1150/TTY.