



## Billbugs

Erin W. Hodgson  
Extension Entomology Specialist

### What You Should Know

- Billbugs are weevils or snout beetles that rarely fly.
- Billbugs eat turfgrass roots just below the thatch layer.
- Heavy billbug infestations can kill grass, with peak turfgrass injury occurring in mid to late summer.
- Early billbug detection is important for the prevention of widespread turfgrass damage.
- Keeping turfgrass properly irrigated and fertilized will minimize potential billbug damage.

**B**illbugs can be a serious turfgrass pest throughout the entire U.S., with at least eight species known to occur. In Utah, two species have been detected (Denver and bluegrass billbugs) and reported to cause turfgrass damage (Fig. 1). Although not a new pest to turfgrass, billbugs are often ignored or misdiagnosed, and root decline is confused with drought stress, fungal disease, or other insects. In most cases, damage is diagnosed as dollar spot disease or white grub feeding. Sod farms and golf courses seem to be especially affected by billbugs because turfgrass is well maintained. Newly-laid sod should be carefully monitored for the presence of billbugs.



Fig. 1. Billbug feeding will cause the crown to turn brown and die.<sup>1</sup>

### Plant Damage

Billbug larvae are the damaging life stage. The greatest injury to turfgrass usually appears from mid-June through late July, although billbugs can be feeding all summer. Initially, young larvae will hollow out stems and cause discoloration, but will move down to the crown and into the thatch layer as they mature. Turfgrass will look drought stressed with small brown patches appearing (Fig. 1). Eventually billbugs will consume the roots and destroy the entire root system. Blades of grass can easily be pulled away from the crown with billbug infestations (Fig. 2). Turfgrass root decline is often associated with white grubs or other insects, but billbugs deposit frass, or excrement, in the thatch layer (Fig. 3). Sawdust-like frass indicates billbugs even if you do not see larvae feeding.



Fig. 2. Turfgrass infested with billbugs looks brown and can easily be pulled away from the crown.<sup>1</sup>



Fig. 3. Billbugs leave behind brown, sawdust-like frass in the thatch layer.<sup>1</sup>

## Billbug or White Grub?

Although in different beetle families, billbugs sometimes can be confused with white grubs. There are a few common characters that distinguish the larvae. Billbugs are legless, have cream-colored bodies with a brown head, and have a slight curve to the body; larvae look like a grain of puffed rice (Fig. 4). By comparison, white grubs have three pairs of legs, have dirty grey-colored bodies with a brown head, and have a C-shaped curve to the body (Fig. 5). Full grown billbugs can reach up to ½" in length while white grubs can reach 1". While both types of larvae feed on turfgrass roots, white grubs are generally feeding well below the thatch layer.



Figs. 4 and 5. Examples of a common billbug (left) and white grub (right).<sup>1</sup>

## Billbug Life Cycle

Billbugs typically have one generation per year. Hunting and bluegrass billbugs overwinter in the adult stage and Denver billbugs can overwinter as adults or as full-grown larvae. When temperatures begin to warm in the spring, adults become active again and move from sheltered areas to turfgrass (Fig. 6). Mated females lay eggs in plant stems near the crown. Young larvae feed on grass blades near the crown, but will eventually move just below the thatch layer to feed on roots. Larvae feed until mid-July and pupate within the soil. Adults emerge in late July and are active in turfgrass for a few weeks before moving to sheltered areas for the winter.



Fig. 6. Adult billbugs can be seen walking from sheltered areas to turfgrass in the spring.<sup>1</sup>

## Billbug Description

Adult billbugs are weevils or sometimes referred to as "snout beetles" because their chewing mouthparts are located at the end of a snout along with elbowed antennae. Adults are slow-moving insects and will play dead if disturbed. Adult billbugs are black or grey, and like most beetles, have hardened forewings. Denver billbugs, *Sphenophorus cicatristriatus*, are also called Rocky Mountain billbugs. Adults are large and can reach up to ½" in length, and have impressions on the forewing that look like deer hoof prints (Fig. 7). Denver billbugs infest cool-season grasses in the Rocky Mountains and northern Great Plains. Hunting billbugs, *Sphenophorus venatus*, are one of the most widespread turfgrass pests in the U.S. Adults can reach up to ¼" in length and have distinct longitudinal grooves on the forewings (Fig. 8). Hunting billbugs infest warm-season grasses, like bermudagrass and zoysiagrass, and commonly attack sod farms. Bluegrass billbugs, *Sphenophorus parvulus*, are the most serious pest of bluegrass and perennial ryegrass in the northern U.S. and southern Canada. Adults are slightly smaller than hunting billbugs, and reach about 5/8" in length. Bluegrass billbugs are common wherever cool-season grasses are grown (Fig. 9).



Fig. 7. Denver billbug.<sup>2</sup>



Fig. 8. Hunting billbug.<sup>3</sup>

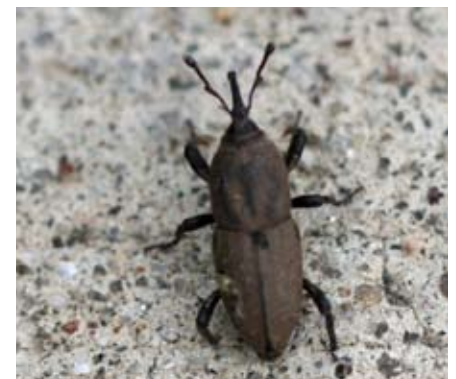


Fig. 9. Bluegrass billbug.<sup>2</sup>

## Scouting and Thresholds for Billbugs

As with all soil-dwelling insects, early billbug detection is difficult. Affected turfgrass areas should be scouted regularly in the summer by gently pulling blades from the crown. If the grass breaks off easily (Fig. 2) or hollow stems are visible, consider taking soil samples. Take at least four evenly spaced samples for the area. Cut a 6" x 6" square with a hand trowel to examine the upper 2" of the root zone (Fig. 10). After looking through the soil and thatch layer, replace the soil and return the turf. The treatment threshold for billbugs in turfgrass is an average of 1/ft<sup>2</sup> or 0.25 larvae for a 6" x 6" square with obvious visible crown damage.



Fig. 10. Taking soil cores will help determine the level of billbug infestation.<sup>1</sup>

## Cultural Control

Treating billbugs is expensive and unnecessary when under the treatment threshold. Scouting and other practical integrated pest management (IPM) strategies can reduce billbugs and potential turfgrass damage to tolerable levels in most cases. Implement the following cultural control methods to reduce billbug damage:

- Consider endophyte-infected perennial ryegrasses and fescues that are well adapted to Utah's climate.
- Overly maintained turfgrass can be an attractive place for adult females to lay eggs; keep plants healthy, but be careful not to exceed recommended fertilization and irrigation schedules.
- Scout for adults moving to turfgrass in the early spring and start monitoring for larvae in the summer by taking soil samples.

## Control Options

In certain situations where billbugs are consistently damaging over multiple years, a more aggressive control program can be initiated. Chemical control should be considered when cultural methods are not effective. Consider using systemic insecticides, like imidacloprid (Merit®) for billbug control because of its long residual on turfgrass roots.

Other products currently registered for billbug control in Utah include: beta-cyfluthrin, bifenthrin, clothianidin, and lorsban. Here are some guidelines for effective chemical control in turfgrass:

- If the thatch layer exceeds ½", use a light aeration to enhance soil penetration.
- Apply ½" of water 48 hours before chemical application to bring feeding larvae closer to the soil surface.
- Immediately apply ½ - ¾" of water after application to push the chemical down to the root zone.
- Mow the lawn to about 1½" to improve penetration.
- Repeat irrigation every four or five days to continue chemical movement in the soil.

Although there is little information on biological control of billbugs with entomopathogenic nematodes or fungus, these products provide an alternative to chemical control. Nematodes, such as *Steinernema carpocapsae* (Biosafe®, Biovector®, and Exhibit®) and fungus, such as *Beauveria bassiana* (Naturalis®) are available. Apply nematodes in the early morning or in the evening to avoid direct heat and sunlight. Irrigate before and after applications to encourage movement through the thatch layer. Nematodes should be applied at a rate of 25 million/1000 ft<sup>2</sup> of turfgrass. Several applications may be necessary for adequate billbug control.

<sup>1</sup> Images courtesy of Erin W. Hodgson, Utah State University Extension ([www.utahpests.usu.edu/insects](http://www.utahpests.usu.edu/insects)).

<sup>2</sup> Images courtesy of Whitney Cranshaw, Colorado State University Extension ([www.ipmimages.org](http://www.ipmimages.org)).

<sup>3</sup> Image courtesy of University of Georgia Archives, University of Georgia ([www.ipmimages.org](http://www.ipmimages.org)).

**Precautionary Statement:** All pesticides have benefits and risks, however following the label will maximize the benefits and reduce risks. Pay attention to the directions for use and follow precautionary statements. Pesticide labels are considered legal documents containing instructions and limitations. Inconsistent use of the product or disregarding the label is a violation of both federal and state laws. The pesticide applicator is legally responsible for proper use.

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