

# Biology and Management of Bermudagrass Stem Maggot

► The bermudagrass stem maggot has become a pest for cattlemen and hay producers across the Southeast. Learn control measures and strategies for mitigating damage.

If your bermudagrass hayfield has a frosted appearance (figure 1) in the middle of summer, it may have been damaged by this new, invasive pest. The damage is caused by the feeding of the immature stage of a fly, which is called a larva or a maggot. Only the top parts of the shoots are damaged (figure 2), while the lower leaves on the shoot remain green (figure 3).

## About the Insect

In the United States, bermudagrass stem maggot (*Atherigona reversura*) is only a problem on bermudagrass and stargrass (*Cynodon spp.*). The insect has a few more grass hosts in other parts of the world, however, and it is native to south Asia, extending from Japan westward to Pakistan and Oman. Somehow it made its way to the continental United States, where it was first found in 2010 in Pierce, Jeff Davis, and Tift counties in Georgia. By the end of 2012, it was found throughout most of the Southeast. The insect has also been accidentally introduced into Hawaii. While it is not unusual for new species to show up in North America, unfortunately in this case, there is very little information about this insect, its life cycle, the damage it causes, or measures to control it. This publication summarizes



Figure 1. Damaged bermudagrass fields have a frosted appearance.

what scientists at the University of Georgia have learned about the pest in the past few years.

The adult fly is small and yellow with dark eyes (figure 4). The fly lays its eggs on the bermudagrass stem near a node. The larvae are also yellowish, grow to be about 1/8 inch long (figure 5), and may be hard to find because they usually have left the stem by the time the plant shows symptoms of damage. Multiple generations hatch each summer. The fly has a life cycle that usually lasts about 3 weeks, but it can be as short as 12 days.



Figure 2. Only the top parts of the bermudagrass shoots are damaged, causing the frosted appearance.



Figure 3. The bottom parts of the affected bermudagrass shoots remain green (photo by Charles Ray, Department of Entomology and Plant Pathology, Auburn, University).



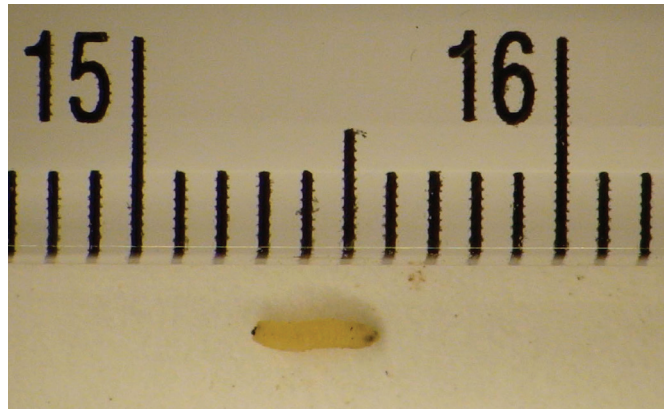
**Figure 4.** The adult stage of this pest is a small fly.

## Mechanism of Damage and Economic Impact

Upon hatching from the egg, the maggot, or larva, works its way toward the last plant node, where the leaf blade emerges from the stem. As the maggot develops, it burrows in the shoot and feeds (figures 6 and 7). The leaves (usually the top two or three) above the feeding site wither and die, resulting in potential yield loss. The death of these upper leaves while the lower leaves remain green causes the frosted appearance. The shoot stops elongating as a result of the insect's feeding. In response to the damage, the plant may grow another shoot from a lower node of the damaged shoot (figure 8). The tip of the new shoot can also be attacked by later generations of the bermudagrass stem maggot.



**Figure 6.** The larva feeds inside the bermudagrass stem.



**Figure 5.** The larva (maggot) is about 1/8 inch (3 mm) long.

The amount of damage caused by the bermudagrass stem maggot seems to depend on the growing conditions of the bermudagrass. In instances where good soil and moisture conditions allow a normal, rapid growth rate, the loss of the upper one to three leaves seems to have a minimal impact on yield. However, economic yield loss may occur in growth periods that are limited by poor soil and moisture conditions. In those situations, it is believed that the slower growth rate due to the poorer conditions allows egg-laying and larval development to occur relatively early in the grass growth cycle.

In many parts of the Southeast, infestations have increased to levels that cause some loss of yield, although the actual amount of loss varies considerably depending on the cultivar and market. Even though the fly damages only the top leaves of the plant, the unsightly appearance may cause some buyers, especially those in the horse market, to reject the hay. With heavy infestations, regrowth after a cutting can be slowed considerably. Damage is worse in finer-stemmed cultivars such as Alicia, Coastal, Russell, and common



**Figure 7.** A closeup of a damaged shoot before the tip of the shoot has died (photo by Lisa Baxter, Department of Entomology, University of Georgia)



Bermuda. Damage almost never reaches economically important levels in coarser varieties such as Tifton-85, though these varieties are still attacked. Grazed pastures are not normally affected by the fly, because as livestock graze they eat the fly eggs and maggots along with the grass. Therefore, the population of the fly does not build up in a pasture unless the livestock grazing pressure is light. The fly attacked all of the turf-type Bermuda cultivars tested at the University of Georgia. However, with frequent mowing there isn't time for the fly to complete its life cycle before the next mowing.

## Management Strategies

One option for mitigating the damage caused by bermudagrass stem maggot is through harvest management. If damage is found within 1 week of the normal harvest stage, proceed to harvest the crop as soon as weather conditions allow. Once the damage becomes apparent, the crop is unlikely to add a significant amount of yield. If damage is observed within 1 to 3 weeks after the previous harvest, it is also likely that the crop will not add a significant amount of yield. The damaged crop should be cut and (if the yields are substantial enough to warrant) baled and removed from the field as soon as weather conditions allow. Leaving the damaged crop in the field will only compete with any attempts by the plant to regrow and decrease the opportunity that the next cutting will have to accumulate mass.

Control of bermudagrass stem maggot can also be achieved through the foliar application of relatively inexpensive insecticides. Current recommendations are to treat after a cutting if damage levels are high. Best results have come from treating twice—once a few days after baling the previous crop as the grass begins to resprout and again 5 to 7 days later. The lowest labeled rate of any pyrethroid\* insecticide that is approved for hayfield application has been effective. No differences have been noted among the brands or active ingredients. There is no residual activity with these insecticides beyond a few days after application. The infestation levels that cause concern usually build later in the season. Therefore, a single round of treatments may protect the grass through the rest of the growing season. Considerable reduction in damage can be seen after a single application as the grass regrows, and for late season, that may be a more cost-effective option.



**Figure 8.** Bermudagrass shoots showing tip damage. Note the new shoot emerging from a lower node of the shoot on the right.

\* Pyrethroid insecticides are those with active ingredients that end in “thrin,” including beta-cyfluthrin, cyfluthrin, lambda-cyhalothrin, and zeta-cypermethrin. Many brand names are available as these materials are off patent and offered by many marketers.



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