Rhodesgrass Mealybug: BIOLOGY AND MANAGEMENT

UNIVERSITY OF GEORGIA EXTENSION

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The rhodesgrass mealybug (RMG), *Antonina graminis,* is an invasive insect native to Asia. First found in the U.S. in Texas in 1942, RMG has since spread to all states on the Gulf of Mexico as well as Georgia, South Carolina, New Mexico, Arizona, and California. RMG can infest more than 100 grass species (family Gramineae) including all warm-season grasses commonly used for pastures and turf in Georgia. Grass species affected include bermudagrass, St. Augustinegrass, rhodesgrass and Johnsongrass, buffalograss, tall fescue, centipedegrass, bahiagrass, and zoysiagrass. High numbers of RMG have been detected on 'TifEagle' and 'Tifway' bermudagrass (Figure 1).

Damage

The RMG feeds at the grass nodes covered within leaf sheaths. Initially, the feeding damage appears in turfgrass as yellowing and stunted growth, similar to symptoms of drought stress (Figure 2). When closely examined, it's common to see both live and dead blades in a grass patch affected by RMG feeding (Figure 3). Eventually, the entire plant turns from yellow to brown and quickly dies. Although RMG infestations can be found on the rough fairways of a golf course, infestations on greens are more noticeable than on other regions of the course. The closely mown grass on greens is already under stress from management conditions and may be less able to tolerate RMG infestation, leading to quick mortality. The most common turfgrasses planted on golf course greens are ultra-dwarf cultivars of bermudagrass such as 'TifEagle', 'MiniVerde', and 'Champion'. RMG infestations are also reported in lawns.

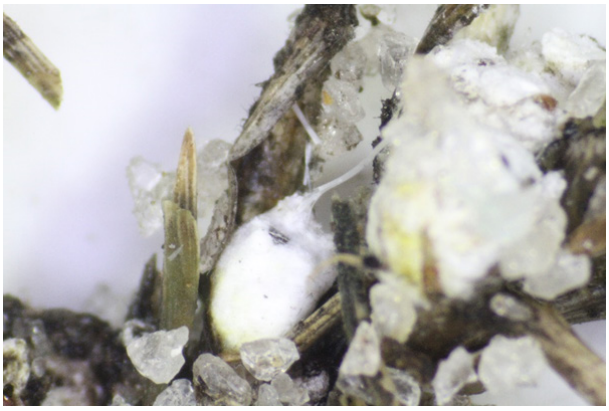

Figure 1. RMG-infested bermudagrass appears white and waxy at the base of the nodes. *Photo: Shimat Joseph*

Figure 2. RMG-infested bermudagrass in golf course greens has yellowing and stunted growth, symptoms that may be mistaken for drought stress. *Photo: Shimat Joseph*

Figure 3. Grass mortality due to RMG feeding. *Photo: Shimat Joseph*

Biology

Adult RMGs are dark red or purple in color but covered with woolly, white wax. The RMG reproduces mainly without mating, so most of the RMGs found are females. A single female produces up to a range of 150-200 eggs. Males are rare, but if found, they look like small flies with two wings. Adults reproduce throughout the year, especially when the air temperature is above 59 °F. The RMG population builds over the season and damage typically becomes noticeable in late August to September in Georgia. Winter diapause, a resting stage, is not reported in RMG, which suggests that they can be active in the winter months.

After hatching from the egg, the immature RMG undergoes three nymphal stages before molting into adult females. Unlike a typical mealybug where both nymphs and adults have legs and can move around, only the first nymphal stage of RMG is mobile, and the rest of the nymphal stages and adult are immobile. The mobile first nymphal stage is often referred to as the "crawler." Once the crawlers settle on the grass node within a leaf sheath, they insert their feeding tube into the phloem tissue (Figure 4). A RMG in the second nymphal stage enlarges into a sac by losing all of its appendages, including its legs and antennae. There could be as many as 50 nymphs developing on a grass node. The nymphs mature into adults in about two months. Adults live about four months and die once egg laying is completed. RMG infestations are often seen on unmanaged grass patches along the sides of road or railway lines. Crawlers are dispersed by wind and human traffic.

RMGs produce honeydew as they feed. The honeydew is eliminated through a hollow, waxy filament, which is about 1 inch long (Figure 5). This filament is a unique feature of RMG that carries the waste away from the insect body, which reduces the potential invasion of microbial pathogens. The honeydew appears as a spherical, translucent droplet at the end of the filament, which bursts into a fine spray. Ants and honeybees are attracted to honeydew (Figure 6). The sugars in honeydew provide carbohydrate sources for these foraging insects.

RMG adults can withstand short periods of extreme temperatures. If the extreme temperatures persist for a longer period, it can affect their fecundity and survival. Adult mortality reaches 100% if the temperature persists at 106 °F for two days, which may occur in south Georgia. Nymph and adult RMGs can remain alive for five and six weeks, respectively, without feeding.

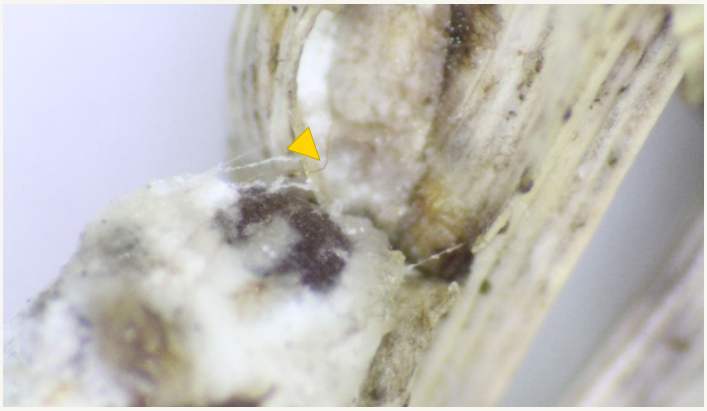

Figure 4. The feeding tube used by the RMG.
Photo: Shimat Joseph

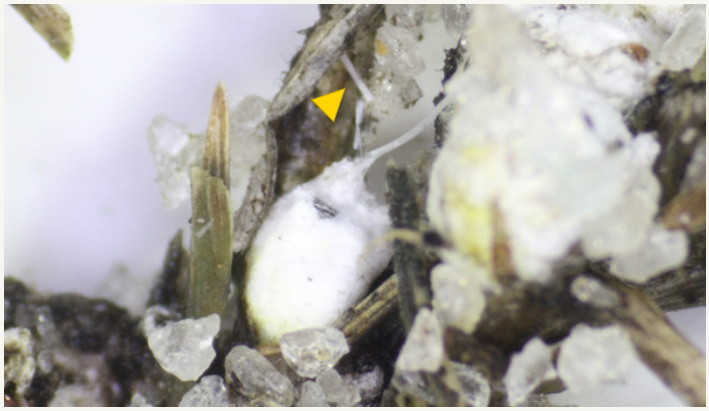

Figure 5. The hollow, waxy filament used by RMG to excrete honeydew.
Photo: Shimat Joseph

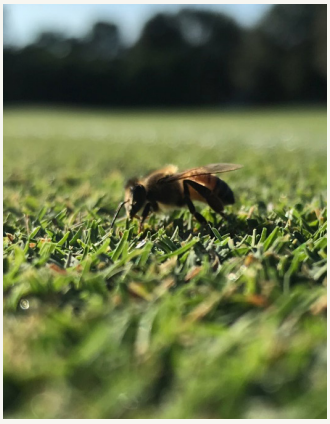

Figure 6. Honeybees are attracted to the honeydew produced by RMGs.
Photo: Rob Wolverton

Management

Studies show that bermudagrass is the turfgrass type most susceptible to RMG, whereas St. Augustinegrass, buffalograss, and zoysiagrass are intermediately resistant. Centipedegrass, seashore paspalum, bahiagrass and tall fescue are the most RMG-resistant grass types.

In the 1950s, soon after RMG was established in the continental U.S., researchers explored biological control agents in the native range of the pest. After evaluating several parasitic wasps, about five species, *Anagyrus antoninae* from Hawaii, *Pseudectroma europaea, Xanthoencyrtus phragmitis, Boucekiella antoninae* from France, and *Neodusmetia sangwani* from India were released in several sites in Texas and Florida. Researchers recorded 68.8% and 50-83% parasitization of RMG by a parasitic wasp (*N. sangwani*) in Texas and Rio Grande Valley in Texas, respectively. After releasing parasites, RMG populations remained at low levels and rarely emerged as pests for decades. This low incidence of RMG is attributed to effective biological control provided by established populations of parasitic wasps. In the last decade, RMG populations have emerged as a serious pest in certain pockets of the Gulf states, but a recent survey found that RMG parasitism was sparse and non-uniform across the Southern U.S. Although the exact reason behind low levels of parasitism is not clear, recent invasion of the red imported fire ant (*Solanopsis invicta*) has been implicated for the RMG resurgence. It is believed that red imported fire ants tend the RMG populations for honeydew and in turn provide protection by preventing parasitism by the wasps.

Insecticide options for RMG have not been explored in the past, as parasitic wasps and general predators such as big-eyed bugs and spiders provided excellent control. Recent trials show that thiamethoxam (Meridian) can reduce RMG populations on golf course greens, and other promising products are on the horizon. Because honeybees are attracted to honeydew produced by RMG, insecticide applications should be avoided when honeybees are active.

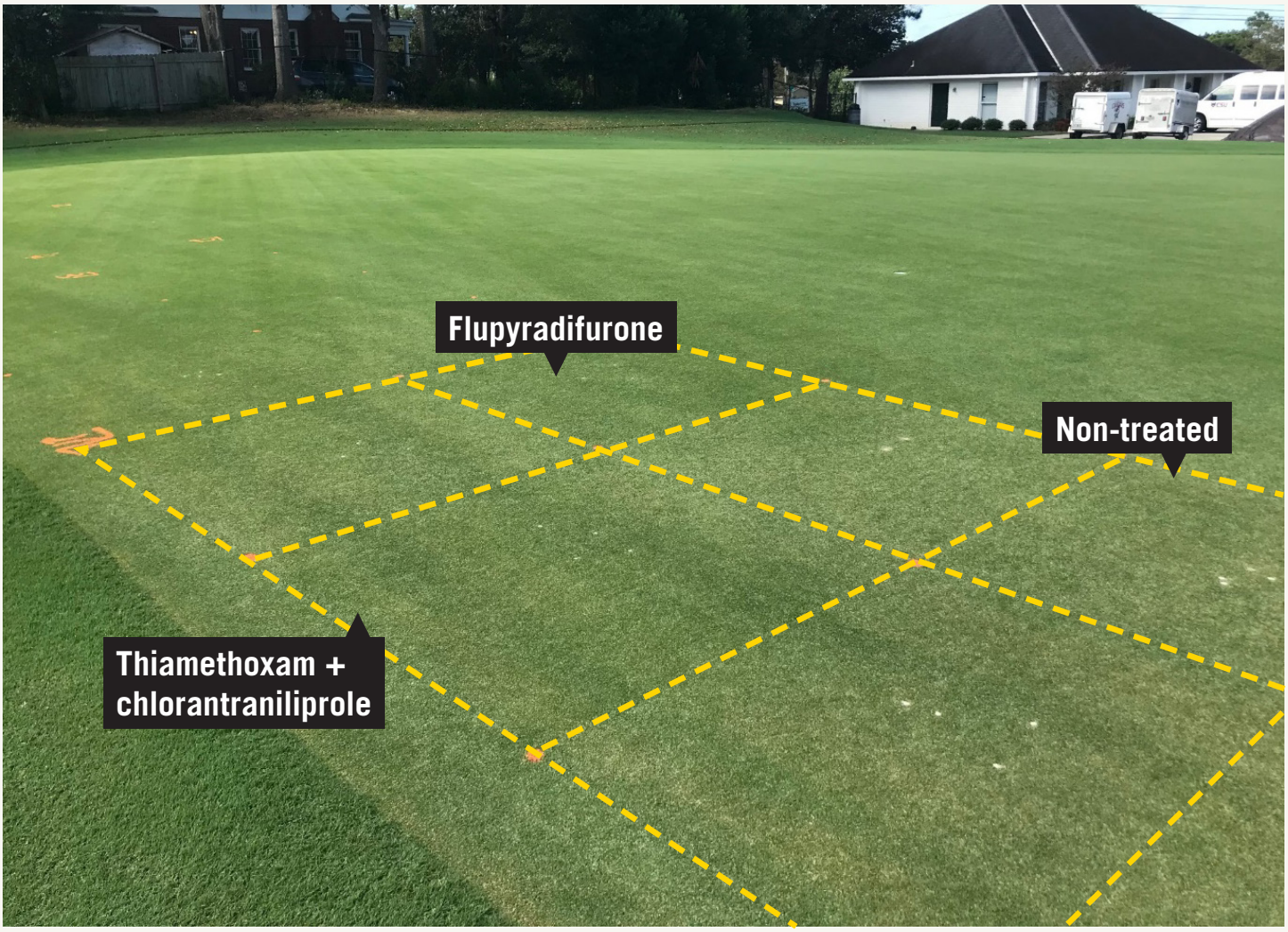

Figure 7. Bermudagrass plots treated with insecticides effective against RMG have improved grass growth and color compared to untreated areas.
Photo: Rob Wolverton

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Circular 1159 **June 2019**

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