



Asiatic Garden Beetle in Cotton

Authored by Sean Malone, Research Specialist, Tidewater Agricultural Research and Extension Center, Virginia Tech; and Tim Bryant, Assistant Professor of Entomology and Extension Specialist, Department of Entomology, Virginia Tech

Overview

Asiatic garden beetle (AGB), *Maladera formosae* (Brenske) (syn. *Maladera castanea* (Arrow)) (Coleoptera: Scarabaeidae) was introduced into the mid-Atlantic region of the United States in the 1920's from Asia. AGB now occur throughout the eastern United States from Florida to Canada, and west into Kansas. This insect feeds on numerous host plants including ornamentals, turfgrass, vegetables, fruit, weeds (e.g., marehail, ragweed, pigweed), and field crops. Reports of AGB injury to corn, soybean, and cotton did not start to appear until the 21st century. In 2023 and 2024, there were multiple reports of AGB feeding on cotton in southeast Virginia and northeast North Carolina.

Description

Fully developed larvae (grubs) are up to 5/8-inch long, C-shaped, with white/cream color bodies and an orange-brown head capsule (Fig. 1). They tend to be more active and aggressive when disturbed than other white grub species. AGB larvae have distinctive “puffy cheeks,” a white bulbous structure behind the mouthparts (Fig. 2). The pattern of spines (raster) underneath the end of the abdomen are smile-shaped (Fig. 3). This pattern of spines or hairs is a key distinguishing feature for white grub species.



Figure 1. Asiatic garden beetle larvae (S. Malone, Virginia Tech).



Figure 2. Characteristic white “puffy cheeks” of the Asiatic garden beetle larva (G. Gregory, Virginia Tech).



Figure 3. Smile-shaped raster pattern of the Asiatic garden beetle larva (G. Gregory, Virginia Tech).

Adults are a chestnut brown/mahogany color with an iridescent sheen, about the size of a coffee bean (3/8-inch long) (Fig. 4). The femur and tibia of the hind legs are flattened.



Figure 4. Lateral view of an Asiatic garden beetle (G. Gregory, Virginia Tech).

Life cycle

AGB undergo complete metamorphosis (egg, larva [3 instars], pupa, adult). In southeast Virginia, adult emergence is extended over several months, beginning in mid-April and peaking in early June (Fig. 5). Adults occur throughout the summer and fall. Adults are active at night and burrow into the soil to hide during the day, making them difficult to detect and manage. After mating, eggs are laid in clusters in moist soil. Eggs hatch in 10-14 days and the developing larvae feed on plant roots and organic material. Second and third instars overwinter in the soil and feed on host plants the following spring, followed by pupation and completing the cycle with adult emergence. There is one generation per year in the United States.

Injury to cotton

AGB are an occasional pest of cotton in southeast Virginia and northeast North Carolina. The adults feed at night and cause leaves to appear ragged (not skeletonized). The beetles typically feed close to the ground. With large infestations, cotton may be severely defoliated; terminal bud injury and seedling death may also occur (Fig. 6). Replanting may be needed in some cases. Larvae do not appear to injure cotton roots.



Figure 5. Adult Asiatic garden beetle black light trap captures (total per 3-4 nights) in southeast Virginia, 2024.



Figure 6. Cotton seedlings defoliated by Asiatic garden beetle (S. Malone, Virginia Tech).

Monitoring

In early spring, use a shovel to dig then break apart soil samples for AGB larvae. AGB prefer soil types consisting of >80% sand (Pekarcik et al. 2024), so focus on sandy land and areas with a history of AGB injury. Take multiple samples in each area, digging about 6 inches deep. Later in the season, both larvae and adults can be scouted by pulling up weed hosts. In southeast Virginia, adult activity begins in mid-April. When nighttime temperatures are 60-70°F, AGB adult activity is generally limited to crawling, with feeding occurring near daytime hiding places. Once nighttime temperatures rise above 70°F, AGB will fly to their preferred host plant to feed. Pitfall traps, which target crawling insects, captured few AGB in studies to determine the best way to sample in Virginia. Adults are readily attracted to lights and may be monitored with black light traps or other light traps. Round holes in the soil about the diameter of a pencil are a clue that adults have emerged. A nighttime field visit can confirm the

presence of adults. Economic thresholds have not been developed for AGB in cotton.

Control

Generalist predators and entomopathogenic nematodes may assist with AGB control. Hand-picking beetles at night, use of light traps, and crop barriers can reduce numbers, but may not be practical for field crops. Proper weed management will remove food sources and oviposition sites. Given the beetle's nocturnal activity, a brief study was conducted in northeast North Carolina to compare chemical control with a day vs. nighttime spray. No difference in efficacy was found when comparing the two timings of application (Fig. 7). This study also found bifenthrin (i.e. a pyrethroid) to have efficacy for adult beetles, but there are currently no insecticides labeled for AGB in cotton, including pyrethroids. As cotton grows and develops, it is better able to tolerate defoliation.

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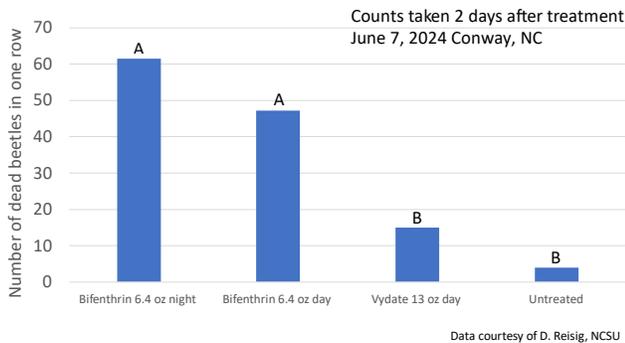


Figure 7. Asiatic garden beetle spray trial comparing bifenthrin sprayed during the day or at night and Vydate (oxamyl) sprayed during the day. Counts represent the number of dead adult beetles found in treated plots. Data courtesy of Dr. Dominic Reising, North Carolina State University.

Reference

Pekarcik, A.J., C.M. Ranger, E.Y. Long, and K.J. Tilmon. 2024. Eliminating explanations for *Maladera formosae* (Coleoptera: Scarabaeidae) preponderance in sandy soil. *J. Econ. Entomol.* 117(4):1518-1525.
<https://doi.org/10.1093/jee/toae138>