

Asiatic Garden Beetle in Field Corn

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Order: Coleoptera

Family: Scarabaeidae

Species: *Maladera castanea* (Arrow)

Size: The adult beetle is 5/16 to 7/16 of an inch long (slightly smaller than a Japanese beetle adult). A fully developed grub (third instar) measures about 3/4 inch long

Color: The adult is chestnut brown or reddish brown in color and faintly iridescent (Fig. 1). The grub (immature stage) is off white except for a distinct head capsule and three pairs of true legs that vary from in color from orange to dark brown.

Description: The beetle abdomen is covered by a pair of hardened forewings, or elytra, which are not used in flight. Instead, their main purpose is to protect the hind wings, which are folded up under the elytra when the

insect is not in flight. The grub has a distinct head capsule and three pairs of true legs and will fold into a 'C' shape when disturbed (Fig. 2). It is very easy to differentiate an Asiatic garden beetle grub from other annual white grub species with the aid of a 10x power hand lens. The grub has a single transverse row of spines on the underside of the last abdominal segment, or raster, and a 'Y' shaped anal slit (Fig. 3).

Range: The Asiatic garden beetle is native to Japan and China and was first introduced into the United States in the 1920s. It commonly occurs throughout the north-

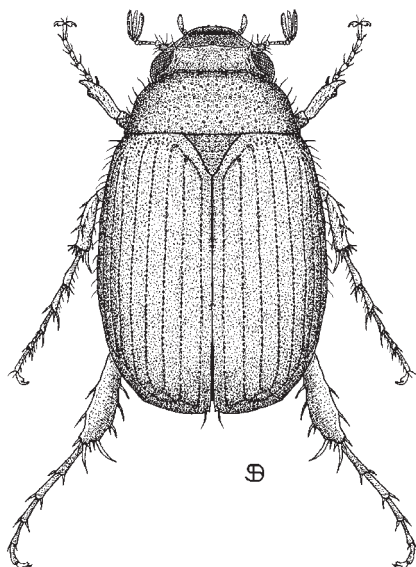


Fig. 1. Adult Asiatic garden beetle
(Courtesy of David J. Shetlor)



Fig. 2. Grub of an Asiatic garden beetle



Fig. 3. Raster pattern of an Asiatic garden beetle grub

eastern part of the country, from New England to as far south as South Carolina.

Habitat: The Asiatic garden beetle is known to feed on more than 100 plant species, with some of the more important hosts including fruits, vegetables, flowering plants, weeds, and grasses.

Life Cycle: The life cycle of the Asiatic garden beetle is similar to other annual white grub species with four distinct life stages, egg, larva (or grub), pupa, and adult. Adult beetles are present from late June to late October, but are most abundant from mid-July to mid-August. Adults are nocturnal and feed only at night. During the day, adults can be found just below the soil surface near favored host plants. After feeding for several nights, the female mates and begins laying eggs in small clutches over a period of several weeks. A clutch may contain up to 20 eggs, and a single female will deposit anywhere from three to 15 clutches in the soil at depths of 1 to 2 inches depending on soil type and moisture. Eggs begin hatching about two weeks after being laid, usually from late July to early August. Newly hatched grubs (first instar) feed on roots and decaying organic matter and molt to the second instar stage in September. Many second instar grubs do not reach the third instar stage until the following spring. Asiatic garden beetle grubs have been reported to overwinter at soil depths of 8 to 17 inches depending on soil type; however, for most soils in Virginia, the grubs usually overwinter within the top 4 to 6 inches. The following spring, overwintering second and third instar grubs return to just beneath the soil surface and feed for several weeks. When immature development is complete, pupation occurs in earthen cells at depths of up to 6 inches. The pupal stage lasts from eight to 15 days and adults emerge shortly thereafter. Adult emergence usually occurs when nighttime temperatures exceed 70°F, typically in late June.

Type of Damage: The grub injures seeds and newly developing roots of corn seedlings in a manner similar to other annual white grub species. They are typically more common in loamy to sandy loam soils compared to heavier soil types. On germinating corn seeds and seedlings, the grubs will chew off the fine rootlets, interfering with the uptake of water and nutrients, especially phosphorus. Severe injury results in unthrifty or dead seedlings, which in turn, results in a poor crop stand.

Feeding injury by adults on leaves and other above-ground parts of corn is not considered of economic importance. However, adult feeding can cause serious injury on certain turfgrass species and other host plants. Typical injury to turfgrass by Asiatic garden beetle adults results in irregular holes toward the margin of leaves, and severe injury leading to complete defoliation with the exception of the midrib.

Control

Sampling: To identify cornfields at risk from Asiatic garden beetle, sampling should be done two to three weeks before corn planting. Recommended methods for pre-plant sampling include baited wire traps (Fig. 4) and direct soil sampling methods. It should be noted that the corn/wheat bait station method (another pre-plant soil sampling technique) was designed for sampling wireworms only (Fig. 5). Recent Virginia field trials have indicated that the corn/wheat bait station often attracts various species of annual white grubs; however, no economic thresholds currently exist for this method.

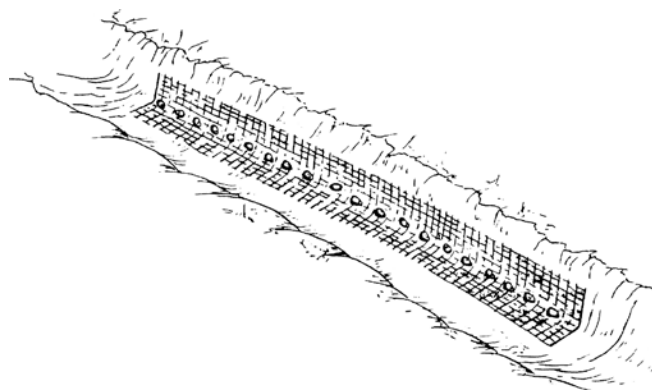


Fig. 4. Baited wire trap in ground

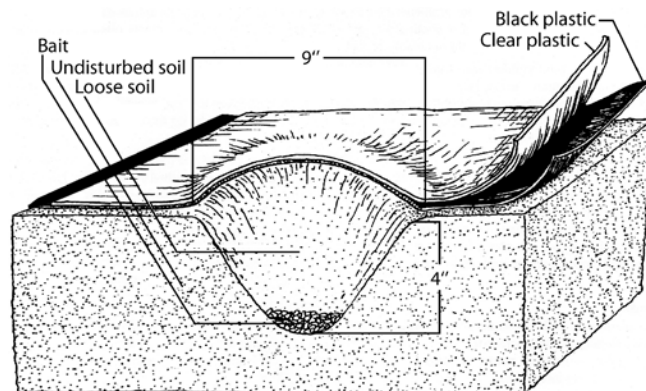


Fig. 5. Bait station

The baited wire trap method consists of placing 20 untreated corn seeds spaced evenly along a 2-foot long by 3-inch wide wire-mesh strip (1/4-inch wire mesh opening) that is bent lengthwise at a 90° angle to keep the seeds in place. Traps should be installed in 2-inch deep furrows and covered with soil at least two weeks before planting. A good rule of thumb for fields up to 10 acres in size is to install one to two baited wire traps per acre that are spaced uniformly throughout the field. For larger fields, one baited wire trap per acre is suggested. Keep in mind that the more traps used the better the sampling estimate will be.

After two weeks the traps should be removed from the soil to inspect the seeds and developing roots for signs of feeding injury. An average of 5 percent feeding injury to corn seeds per trap is a nominal economic threshold for annual white grubs. For more details on baited wire traps, refer to the *Pest Management Guide: Field Crops*, Virginia Cooperative Extension publication 456-016, <http://www.pubs.ext.vt.edu/pmg/>.

The direct soil sampling method consists of counting all white grubs in a 4- to 5-inch deep 1-foot square of soil. One soil sample per acre should be taken in fields up to 10 acres in size. For fields larger than 10 acres, one soil sample per two acres should be sufficient. An average of two or more annual white grubs per soil sample is considered a nominal economic threshold for

this method. An advantage of soil sampling over the baited wire trap method is that only one visit per field is necessary. The baited wire trap method requires two visits, one to install the traps and one to inspect them.

Scouting methods and research-based economic thresholds for the adult stage of the Asiatic garden beetle have not been developed.

Chemical Treatment: Many soil insecticides labeled for corn rootworm control often provide acceptable control of annual white grubs and other secondary soil pests, such as wireworms and seedcorn maggots. However, it is important to carefully check the label for specific rate information because some products require higher application rates for annual white grubs than for corn rootworms. In addition, current Bt corn hybrids for corn rootworms are ineffective against annual white grubs and other secondary soil insects.

Additional information on application rates and methods for annual white grub control is available in the most recent edition of the *Pest Management Guide: Field Crops*, Virginia Cooperative Extension publication 456-016, <http://www.pubs.ext.vt.edu/pmg/>. Because rescue treatments are largely ineffective for annual white grubs after the crop has been planted, insecticide application at the time of planting is often necessary to protect the crop and to avoid replanting.