

# JAPANESE BEETLE

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The Japanese beetle, *Popillia japonica* Newman, is a minor pest of peaches. However, if adults are abundant and feeding on fruit, they should be controlled. Japanese beetle is a destructive introduced pest that was first found in the United States in New Jersey in 1916. In its native Japan, where the beetle's natural enemies keep its populations in check, Japanese beetle is not a serious plant pest. In the United States, the Japanese beetle found a favorable climate and an abundant food supply with a near absence of its natural enemies. It infests much of the southeastern United States.

## DESCRIPTION

The life stages of the Japanese beetle are typical of white grubs. The white oval eggs are usually about 1/16 inch (2 mm) long. Eggs are placed in the soil where they absorb moisture, become rounder, mature, and hatch. The larvae are white grubs that can be separated from other soil-dwelling white grubs by the presence of a V-shaped series of bristles on the abdomen or raster. First instar larvae are 1/16 inch (2 mm) long, while the mature third instars are about 1-1/4 inch (32 mm) long. The pupae are light reddish brown, about 1/2 inch (13 mm) long and 1/4 inch (6 mm) wide. The adults (Figure 1) are a brilliant, metallic green color, generally oval in outline, 3/8 inch (9 mm) long and 1/4 inch (6 mm) wide. The wing covers are copper brown, and the abdomen has a row of five tufts of white hairs on each side. These white tufts are diagnostic. The males have a sharp tip on the foreleg tibia, while the female's tibia has a long rounded tip.



Figure 1. Adult Japanese beetle.

## SEASONAL HISTORY AND HABITS

The Japanese beetle overwinters as a partially grown grub in the soil. This beetle completes one generation each year. Larvae mature from late April to late May. They pupate, and the adult beetles emerge from mid-May through July, with a peak in July. On warm sunny days, the new beetles crawl onto low growing plants and warm for a while before taking flight. Adults live four to six weeks. The first beetles out of the ground seek out suitable food plants and begin to feed as soon as possible. These early arrivals release an aggregation pheromone (odor). This odor attracts additional adults, which gather in masses to feed. In cool weather, the adults may feign death by dropping from the plants when disturbed, but normally they will take flight. Newly emerged females release a sex pheromone to attract males. Mating is common in pastures and on the food plants. After feeding for a day or two, the females leave feeding sites in the afternoon and burrow into the soil to lay eggs at a depth of 2 to 4 inches. Females may lay 1 to 5 eggs scattered in an area before moving. Egg-laying females may leave the following morning or linger for a day or two before returning to feed and mate. This cycle of feeding, mating, and egg laying continues until the female has laid 40 to 60 eggs. Most of the eggs are laid by mid-August. If the soil is sufficiently moist, eggs will swell in a few days. Egg development varies from 8 to 30 days. Larvae dig to the soil surface where they feed on roots and organic material. Where Japanese beetle larvae are abundant in grasses, their tunneling creates a soft, spongy feel underfoot. Generally, grubs are in the third instar by early fall and are ready to dig into the soil to hibernate. Grubs can burrow up to 4 to 8 inches into the soil in colder regions. Grubs are closer to the surface when soil temperatures are moderate. Grubs can be expected at the surface when surface soil temperatures reach 60°F. Grubs continue development in the spring, forming pre-pupae from May into June. The pre-pupa voids its gut contents and has a translucent appearance. The pupa is formed in the split skin of the pre-pupa in an earthen cell 1 to 3 inches beneath the soil surface.

## PLANT INJURY

Japanese beetles feed on over 400 species of broad-leaved plants, but some 50 species seem to be preferred. Adults are primarily leaf skeletonizers; they eat the leaf tissue between the veins, leaving the veins behind. Attacked leaves are lace-like, and often wither and die. The adults also attack flower buds and fruit. Commonly attacked hosts include peach, cultivated and wild grapes, raspberry, plum, rose, apple, cherry, corn, soybean, Virginia creeper, hibiscus, marshmallow and Indian mallow, hollyhock, dahlia, zinnia, elm, horse chestnut, linden, lombardy poplar, willow, crapemyrtle, bracken and sensitive fern, elder, evening primrose, sassafras, and smartweed. The grubs will feed on a wide variety of plant roots, including grasses, ornamental trees and shrubs, and garden and truck crops. Japanese beetle larvae especially relish tall fescues, perennial ryegrasses, Kentucky bluegrass, and bent grass. The grubs can kill small seedling plants, but most of their damage occurs in grasses. Heavily infested turf feels spongy underfoot and can be easily pulled back like old carpet to reveal the grubs. Large populations of grubs kill the turf in irregular patches.

## CONTROL

Japanese beetle adults are easily seen. The lace-like appearance of foliar feeding and the occasional fruit feeding are also easy to detect. Regular orchard monitoring for cultural and pest evaluations should detect Japanese beetles before serious injury occurs. When Japanese beetles are readily evident, begin checking fruit for damage. Apply insecticide sprays if significant new damage is present and repeat sprays if additional fruit damage continues. Cover sprays are typically helpful in controlling or suppressing Japanese beetles. It may be necessary to apply additional insecticide if feeding Japanese beetles are abundant.

Traps are of limited value because they capture beetles from up to a mile away. To assure reliability, traps must be emptied every other day to prevent rotting beetles from releasing ammonia, which actually repels Japanese beetles.

Several parasitic wasps, especially *Tiphia popilliavora* and *T. vernalis*, and the winsome fly, *Hyperrecteina aldrichi*, have been imported and are now established in several eastern states. Unfortunately, these parasites do not seem to be reliable in reducing Japanese beetle populations below damaging levels, although the *Tiphia* appear to be more efficient in southern states.