



Japanese Beetle

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Introduction

Japanese beetles (*Popillia japonica*) are destructive, invasive beetles that were accidentally introduced to the United States, probably in the soil of imported nursery stock. This pest has a wide host range and is difficult to control. Japanese beetle belongs to the family Scarabaeidae in the order Coleoptera.



Figure 1. Adult Japanese beetles feeding together on a rose bud (Whitney Cranshaw, Colorado State University, Bugwood.org).

Description

Adults are bright metallic green with coppery wing covers and a series of white tufts of hair along the edge of the abdomen (Figs. 1 & 2). They measure about 10 mm (0.4 inch) long. Adult Japanese beetles are smaller than the similarly colored but much larger green June beetle (19 mm or 0.75 inch long).

The small eggs (about 1.5 mm long) deposited in the soil are rarely observed. Japanese beetle larvae are similar to other species of white grubs with an off-white body and a tannish-brown head (Fig. 3). They curl into a C-shape when not actively crawling. Japanese beetle larvae have a distinctive V-shaped row of spines on the end of the abdomen that distinguishes them from other species of white grubs.



Figure 2. An adult Japanese beetle (Joseph Berger, Bugwood.org).



Figure 3. Japanese beetle larva (David Cappaert, Bugwood.org).

Distribution

Japanese beetles were first found in New Jersey in 1916. They have since spread throughout the eastern United States and west of the Mississippi. This pest is also found in isolated but expanding populations east of the Rocky Mountains. Japanese beetle has been well established throughout Virginia since the early 1970s.

Host Plants

Adult Japanese beetles feed on a wide variety of trees, shrubs, and herbaceous plants. They can

severely damage the foliage of fruit, shade, and ornamental trees as well as grapes and small fruits. They can also be pests of vegetables such as corn and green beans, and field crops. The larvae, known as white grubs, can reach pest status on many varieties of grass grown for turf and lawns in Virginia.

Life History

Adult beetles begin emerging from the ground in late June to feed on foliage; most have emerged by mid-July (Fig. 4). Females release a pheromone to attract males. Mated females dig small burrows in the soil and lay eggs from mid-July to mid-August. Eggs require soil moisture to expand and develop before hatching in 8-9 days. The young grubs feed and develop until the soil cools in the fall, at which time they stop feeding and tunnel down about 10-20 cm (4-8 inches). When soil temperatures begin to warm in the spring, the grubs move up towards the soil surface and begin feeding again. Grubs reach maturity between late May and early June, and then pupate in the soil. Adult beetles emerge several weeks later and complete the cycle. There is one generation per year.

Damage by Adults

Adult Japanese beetles chew small holes in leaves between the leaf veins. This damage gives the leaves a lacy appearance and is called skeletonizing (Fig. 5). Heavily damaged trees and plants will take on a brownish cast as damaged leaves dry out and die. Adults will also feed on flower buds (Fig. 1), ripe fruit, and the silks of corn ears.

Damage by Larvae

Japanese beetle larvae feed just below the soil surface on the roots and lower sections of host plants. Once the roots are severed, damaged turf first becomes discolored and later turns brown as though it was suffering from drought. Sections of damaged turf can often be pulled back like a piece of carpet, exposing the feeding grubs underneath it. In general, densities of 6-7 grubs per square foot are needed to cause noticeable damage to turf. Yards with large populations of Japanese beetle grubs will have many large irregular-shaped brown patches. Sometimes lawns will show damage from skunks, moles, and birds digging through the turf in search of grubs to eat (Fig. 6). For more information about this pest in lawns, see [Beetlemania \(VCE SPES-33NP\)](#).

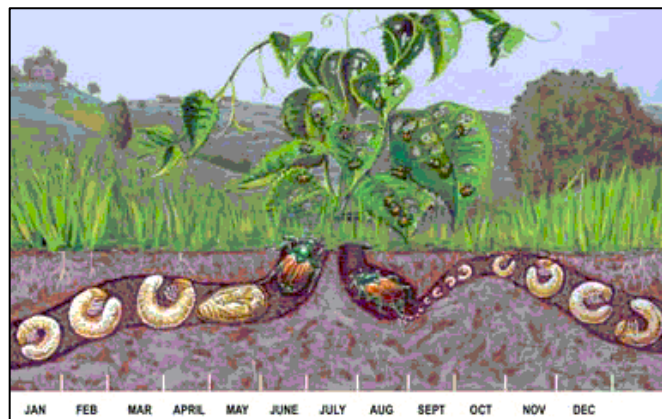


Figure 4. An illustration of the Japanese Beetle life cycle (Joel Floyd, USDA APHIS PPQ).



Figure 5. A leaf skeletonized by adult Japanese beetles (Steven Katovich, Bugwood.org).



Figure 6. Lawn damage due to Japanese beetle larvae (M.G. Klein, USDA ARS, Bugwood.org).

Cultural and Biological Control Strategies

Drought conditions in late July and early August reduce the number of successfully hatching Japanese beetle eggs and limit the establishment of the young larvae, resulting in fewer adult Japanese beetles present the following year. Keep this in mind when irrigating lawns and turf as the additional water may help the eggs and larvae survive in dry weather conditions.

Milky spore disease, caused by the bacterium *Bacillus papillae*, may work in some areas under some conditions, but reported results have ranged from effective to no control. No research from replicated university trials is available to judge the effectiveness of milky spore disease on Japanese beetle management. If milky spore is applied, do not apply insecticides for 2-3 years afterward so that enough Japanese beetle larvae are present in the soil to host the bacteria and allow it to increase in density for effectiveness.

Entomophagous nematodes can be effective in controlling Japanese beetle larvae. Apply preparations containing *Heterorhabditis* spp. on the soil of affected areas in mid-August. Irrigate with about 6 mm (0.25 inch) of water both before and after applying the nematodes to enhance establishment.

Trapping adult Japanese beetles using commercially available traps baited with lures can be effective, but can also draw additional beetles into the yard from surrounding areas. Place the traps at least 9 meters (30 feet) away from plants that you wish to protect. Empty the beetles out of the trap bags or collection containers several times a week when the adults are actively flying. Traps with lures are more effective in reducing Japanese beetle populations when used as a broad community effort.

The following plants are less likely to be attacked by Japanese beetles: arborvitae, ash, boxwood, cedar, dogwood, euonymus, fir, forsythia, holly, juniper, lilac, magnolia, pine, privet, red oak, red and silver maple, red mulberry, spruce, and yew. Consider using these in your yard and landscape instead of plants more attractive to Japanese beetles.

Netting can be used to cover small, favored host plants, but it must be left on for most of the summer. Long-term use of netting may actually damage the plants by restricting their growth. Hand picking adult beetles works only in isolated cases. Drop the beetles into soapy water and dump out after they drown. A powerful wet/dry vacuum with soapy water in the bucket can be useful, too.

Chemical Control

For turf: Apply a registered insecticide in late July or early August when grubs are small and before damage becomes extensive. Applications at other times of year are much less effective. See sampling

technique and insecticide recommendations in the [Home Grounds and Animals Pest Management Guide \(VCE pub. 456-018\)](#).

For home gardens: See recommendations in the [Home Grounds and Animals Pest Management Guide \(VCE pub. 456-018\)](#).

For fruit trees and other home fruit: Follow the appropriate spray schedule provided in the [Home Grounds and Animals Pest Management Guide \(VCE pub. 456-018\)](#). Use insecticides specifically labeled for fruit and follow the wait period indicated on the label before harvesting any fruit.

For ornamental trees, shrubs, and herbaceous plants: Apply a systemic insecticide as a soil drench in May or June so sufficient insecticide is present in the plant when the beetles begin feeding. Applications made after the beetles start feeding in late June will be less effective than those applied earlier in the season. Contact insecticides kill beetles present on host plants at the time of application, but not those arriving after the insecticide has dissipated. Contact insecticides will likely require repeated applications over the season to manage Japanese beetles. Beetles in rose blooms are rarely controlled by insecticide treatment. See recommendations for systemic and contact insecticides in the [Home Grounds and Animals Pest Management Guide \(VCE pub. 456-018\)](#).

Revised

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