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GARDEN FACTS
University of Wisconsin–Extension
Japanese beetles

Japanese Beetles

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Japanese beetle adults

Japanese beetle grub

The Japanese beetle is considered the single most important pest of turfgrass in the United States. It was first discovered in this country in southern New Jersey in 1916. Japanese beetles inhabit every state east of the Mississippi River.

The beetle's spread is apparently governed by temperature and precipitation levels. It adapts to regions where the mean summer soil temperature is between 64° and 82°F and winter soil temperatures are above 15°F. Beetles thrive in areas where precipitation is uniform throughout the year, with an average of at least 10 inches during the summer.

Shiny, metallic green Japanese beetle adults are slightly less than ½ inch long. They have coppery-brown wings that do not entirely cover their abdomens. Six patches of white hair along the sides and back of the body are visible under the edges of the wings. Males and females have the same markings, but females are typically slightly larger. Newly hatched larvae are approximately ⅛ inch long and translucent creamy white. When feeding begins, the hind section appears gray to black. The typical C-shape of Japanese beetle larvae is similar to that of other white grub species.

Plants attacked and damage caused

Japanese beetles feed on the foliage or flowers of more than 300 species of plants, including fruits, vegetables, ornamentals, field and forage crops, and weeds. Norway and Japanese maples, birch, crabapples, purple-leaf plums, roses, sassafras, mountain ash and linden are highly preferred ornamental hosts. Adults feed on the upper surface of the foliage of most plants, consuming soft mesophyll tissues between the veins and leaving a lace-like skeleton. Often the upper canopy is defoliated

first or most severely. Trees receiving extensive feeding damage turn brown and become partially defoliated.

Japanese beetle grubs feed below ground on the roots of turfgrass and ornamental plants. As a result, they reduce the plants' ability to take up enough water and nutrients to withstand the stresses of hot, dry weather. First evidence of injury by grubs in turf appears as localized patches of pale, dying grass that display symptoms of drought stress. As grubs develop further and feeding increases, damaged areas rapidly enlarge and coalesce to a point where the turf is not well-anchored and can be rolled back like carpet. At this point, it is likely too late to save the turf. Moreover, skunks, racoons and the like often cause additional damage as they forage for the grubs.

Life cycle

Japanese beetles have only one life cycle per year. Adult females begin laying eggs soon after they emerge from the ground and mate in late-June. The adults are most active in the afternoon in full sun.

Females leave ornamental plants where they feed and mate, and burrow two to four inches into the soil (under the turf) in a suitable area to lay their eggs. Eggs hatch in about two weeks, after which grubs begin feeding on the roots of turfgrass.

The grubs grow quickly and by early September are nearly full-grown (about one inch long). Mid-summer rainfall and adequate soil moisture are needed to prevent eggs and newly hatched grubs from drying out. Adult females instinctively select areas with higher soil moisture content to lay their eggs to ensure survival of their offspring. Older grubs are relatively drought-resistant and will move deeper into the soil if conditions become dry.

Grubs can also withstand high levels of soil moisture, so excessive rainfall or irrigation will not typically affect them. As soil temperatures in the fall cool to about 60°F and the first significant frost occurs, grubs begin to move deeper into the soil. Most grubs overwinter in the soil about two to six inches below the surface, although some may go as deep as 20 inches. They are inactive when soil temperatures fall below 50°F. In the spring, when soil temperatures reach 50°F, the grubs begin to move up into the root-zone to resume feeding for about three to five weeks. Thereafter, they stop feeding and begin creating an earthen cell where they transform (pupate) into adults.

Control

It is important to understand that both adults and grubs can cause damage. Japanese beetle adults are capable of flying considerable distances (up to one mile) from other areas; therefore, controlling the insects at one stage will not preclude potential problems with the other. Control options for each life stage are presented below.

Adults

Physical removal and trapping. Removing beetles by hand or trapping may provide adequate protection for small plantings when numbers of beetles are low. However, the presence of beetles on or in the proximity of a plant will attract more of the insects. Consequently, Japanese beetle traps often attract more beetles and result in subsequent damage to plants.

Chemical control. Several insecticides are labeled for use against adult Japanese beetles. Always follow label directions. Treat foliage and flowers thoroughly. For optimal control, apply chemical control in the afternoon when beetles are most active.

Grubs

Cultural control. Because eggs and young grubs have difficulty surviving relatively dry soil conditions, withholding irrigation during peak adult beetle flight may help to reduce grub populations. However, adequate soil moisture in late August and September can help damaged turf recover from grub damage.

Biological control. Although there are a few biological control products that allegedly control Japanese beetle grubs, the performance of these products has been inconsistent. Such products include Milky spore disease, insect-parasitic nematodes, and fungal pathogens such as *Beauveria bassiana* and *Metarrhiizium*.

Chemical control. Several insecticides provide adequate control of Japanese beetle grubs. However, not all control products perform equally. Until recently, the traditional approach was to apply short-residual products after eggs had hatched and before grubs had caused visible damage. This is termed "curative" control.

The optimal timing for curative treatments is mid- to late-August. Carbaryl (Sevin), Diazinon, and Trichlorfon (Advanced Lawn Grub Killer) are three active ingredients that all provide effective curative control. Although chlorpyrifos (Dursban) is labeled for grub control, it does not provide acceptable results. Due to the development of new and improved insecticide chemistries, long-residual or "preventative" controls are now available and becoming the preferred management strategy. Such control products are applied prior to the laying of eggs, sometime in mid- to late-June. Such new products include the active ingredients halofenozide (MACH 2 or Grub-B-Gone), imidacloprid (Merit or Bayer Advanced Lawn Grub Control), and thiamethoxam (Meridian).

References to pesticide products in this publication are for your convenience and are not an endorsement or criticism of one product over similar products. You are responsible for using pesticides according to the manufacturer's current label directions. Follow directions exactly to protect the environment and people from pesticide exposure. Failure to do so violates the law.

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