

The Beetles are Coming! Japanese Beetles are Gaining Ground in Oklahoma

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The beetles are coming! The beetles are coming! Since Paul Revere is not around to proclaim this warning, it's my job to alert you about another foreign invader, Japanese beetle (*Popillia japonica*). This pest has been steadily encroaching westward through Oklahoma as it continues its expansion from the eastern U.S. Japanese beetle is becoming one of our most significant horticultural pests because it congregates in large numbers to feed on the foliage, fruits, and flowers of more than 300 plant species. Some of its favorite ornamental host plants include roses (*Rosa* spp.), flowering crabapple (*Malus* spp.), zinnias (*Zinnia* spp.), birch (*Betula* spp.), and elms (*Ulmus* spp.). Japanese beetle is also an important pest of grapes (*Vitis* spp.).

Description: Adult Japanese beetles are robust and measure about 3/8 inch (9.5 mm) long and 1/4 inch (6.5 mm) wide. The body is metallic green with bronze wing covers. A row of five white tufts of hair are found along each side of the body next to the outer edges of the wing covers and is a key diagnostic feature (Fig. 1). The larva is a typical C-shaped white grub with a brown head and three pairs of short legs (Fig. 2). Larvae develop through three instars (stages) before pupating. First instar larvae measure about 1/16 inch (1.5 mm) long and fully grown third instar larvae are about 1-1/4 inch (32 mm) long.

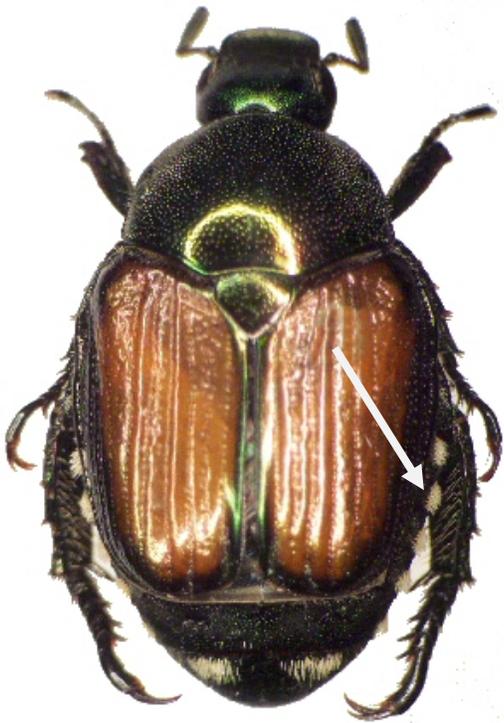


Fig 1. Adult Japanese beetle. Note white tufts of hairs along sides.



Fig 2. Larval Japanese beetle, C-shaped white grub.

Distribution: The Japanese beetle is native to Asia and the first U.S. report is from Riverton, New Jersey in 1916. The beetle is common in all states east of the Mississippi River, except Florida and Mississippi, and has been found as far west as Colorado. The distribution of Japanese beetle in Oklahoma is currently limited to approximately ten counties, but the beetle is widespread throughout several northeastern counties including Adair, Cherokee, Delaware, Tulsa, and Wagoner Counties. Isolated populations have been found in Creek, Kay, Oklahoma, and Payne Counties. Although additional county records do not exist, Japanese beetle likely occurs elsewhere in the state.

Life Cycle: Japanese beetles have one-year life cycles. Overwintering larvae migrate upward in March and April and resume feeding on plant roots until May. They then move deeper in the soil, form an earthen cell, and pupate. Adults emerge late June through July and are active during the day, commonly found feeding and mating in large numbers on susceptible plants. Females repeatedly enter the soil and can lay 40-60 eggs during their lifetime. Eggs hatch 1 to 2 weeks later and first instar larvae begin feeding on plant roots. The first instars molt in 17 to 25 days, while second instars take 18 to 45 days to develop and molt again. Most grubs reach the third instar stage by late September and by October they dig deeper into the soil to overwinter (Fig. 3).

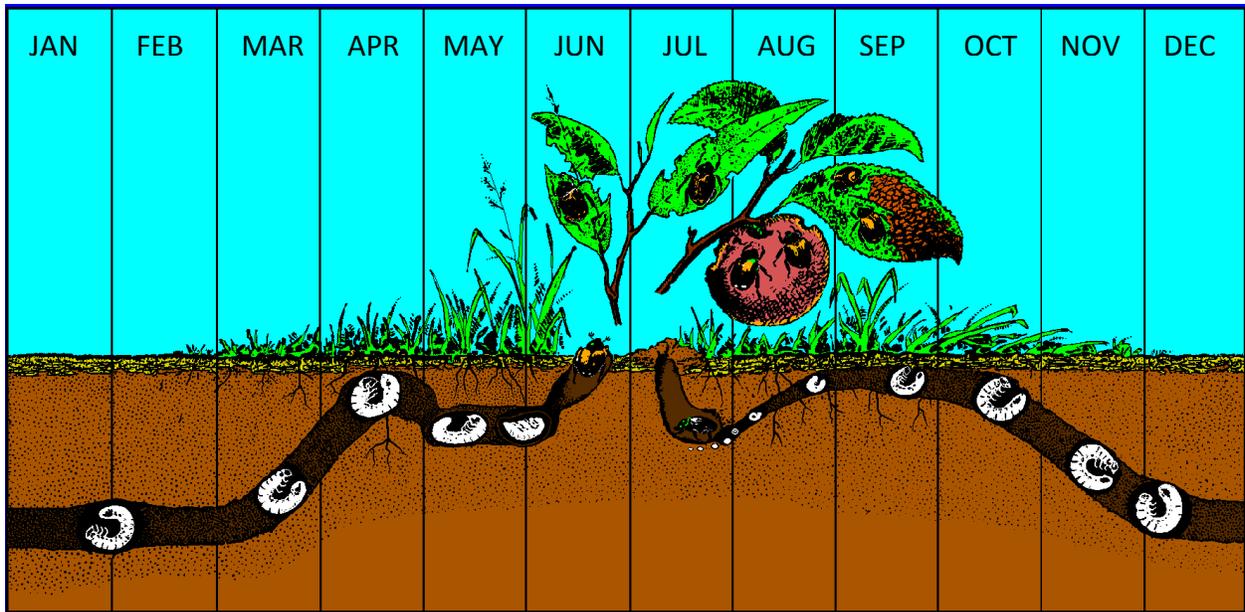


Fig. 3. Life cycle of Japanese beetle. David J. Shetlar, Ohio State

Hosts: Larvae feed on roots of turfgrasses as well as those of other plants. Adults feed on more than 300 different plant species and are considered major pests of ornamental, fruit, and vegetable plants. Japanese beetles are especially fond of flowering crabapple, roses, and grapes, so it is best to avoid planting these highly susceptible host plants. Also avoid planting Japanese maple (*Acer palmatum*), Rose-of-Sharon (*Hibiscus syriacus*), flowering cherry (*Prunus* spp.), and American elm (*Ulmus americanum*) as these are also favored by adult beetles. However, some varieties of certain host plants such as roses are less susceptible than others.

Damage: Adults feed during the day, preferring hot weather and plants located in full sun. Damage to foliage appears as skeletonized tissue with all but the leaf veins entirely consumed (Fig. 4). Adult feeding activity on fruits and flowers typically is characterized by holes in affected tissue; large numbers of beetles will often consume these plant tissues in their entirety. Healthy plants can survive even complete defoliation by the beetle, but young or weak host plants may not be able to withstand heavy attacks. In fruit and vegetable crops, yield may be reduced as a result of defoliation.

Cultural control: Handpicking adult beetles can be effective when they first colonize landscape plants. Beetles are less active in the morning and evening when it is cooler and can be killed by dropping them in a solution of soapy water. Japanese beetle traps, which contain a sex pheromone and a floral lure to attract both males and females, have been commercially available for several years. However, these traps usually attract more beetles than they capture, leaving landscape plants vulnerable. Adult Japanese beetles can fly one mile or more, so beetles that are caught in traps are readily replaced in the landscape by colonizing individuals. The only situation where traps may be useful is if traps are used across a large area

like an entire neighborhood. Traps should be checked and emptied regularly, but make sure to kill any live beetles by dunking them in soapy water.



Fig. 4. Japanese beetle feeding damage (skeletonizing) on Chinese chestnut.
Jerry A. Payne, USDA Agricultural Research Service, Bugwood.org

Biological control: Biological control of Japanese beetle is an active area of research, and several species of natural enemies have been released against this pest in other states. However, establishment has been limited for parasitic flies and wasps released for Japanese beetle control. Efforts are now being directed toward biological control of these beetles with disease-causing microbes. Several insecticide formulations contain these microbial agents.

Chemical control: There are many insecticides labeled for Japanese beetle control, and several are available to homeowners. Look for insecticide products containing acephate (Orthene), carbaryl (Sevin), bifenthrin, cyfluthrin, deltamethrin, lambda-cyhalothrin, or permethrin. Applications of imidacloprid (e.g., Bayer Advanced Tree & Shrub Concentrate) should be made at least 20 days prior to Japanese beetle adult activity. When adult activity is heavy, insecticide sprays may be needed every 5 to 10 days. In general, soil applications of insecticides to target larvae will not reduce adult Japanese beetle populations because they colonize from surrounding areas.

References:

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