

Japanese Beetles in Oregon

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History and background

The Japanese beetle (Scarabaeidae: *Popillia japonica* Newman) is native to Japan, where it is a pest of minor importance. In Japan, a combination of few suitable larval habitats, cooler temperatures, and an effective parasite keeps Japanese beetle (JB) populations in check. Japanese beetle adults are generalists that can feed on more than 300 plant species, including field crops, small fruits and fruit trees, vegetables, and a wide array of ornamental plants, while JB larvae feed on grass root systems.

When JB's were first found in southern New Jersey in 1916, they benefited from a favorable climate and no natural enemies to manage population numbers. As American lawn culture rapidly increased in the 1950s and 1960s, JB numbers increased dramatically on the East Coast. Currently, JB's have successfully established throughout eastern, midwestern, and southeastern states in the contiguous U.S. Pockets of JB's have also been found in western states, including North and South Dakota, Texas, Colorado, and Idaho. Introduced populations west of the Rocky Mountains have been targeted for eradication.

In summer 2016, 369 JB's were trapped in northwest Portland (Washington County). The high number of catches in northwest Portland suggests that a localized infestation has been present for more than a year, and a breeding population has established. Based on trapping data, JB is not established outside of this area in Washington County. Over two-thirds of the 369 beetles caught came from three traps, out of approximately 150 traps in the immediate vicinity.

This is not the first time that the beetle has been found in Oregon. The Oregon Department of Agriculture (ODA) has conducted early detection surveillance for this pest species for over 35 years.

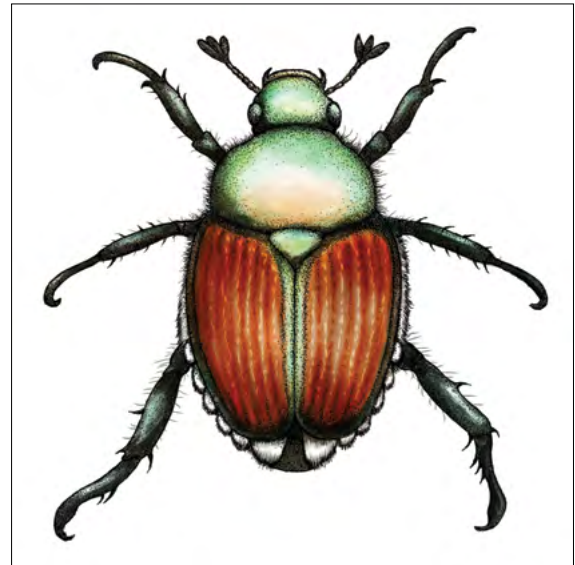


Illustration: Erik Simmons, © Oregon State University

Figure 1. Adult Japanese beetle *Popillia japonica*. Adult Japanese beetles have two white rear tufts and five white lateral tufts of hair. Adults can be found feeding on a wide variety of plants, including roses, grapes, maples, and corn.

Beetles have been captured in traps at the Portland International Airport (PDX) every year since 2000. The beetles are arriving on air cargo flights from eastern states that have established populations. High-density trapping and targeted insecticide treatments have prevented JB establishment at PDX.

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Identification

Adult JB are oval in shape, about $\frac{3}{8}$ " long, and have a dark green, metallic head and tan, metallic elytra (hardened forewings). Key characteristics of adult beetles include two white tufts at the rear and five white tufts of hair along each side of the abdomen (Figure 1).

Japanese beetle larvae, also known as grubs, have the typical 'C' shape of scarab beetle larvae. They are also known as white grubs because of their creamy, almost translucent color (Figure 2).

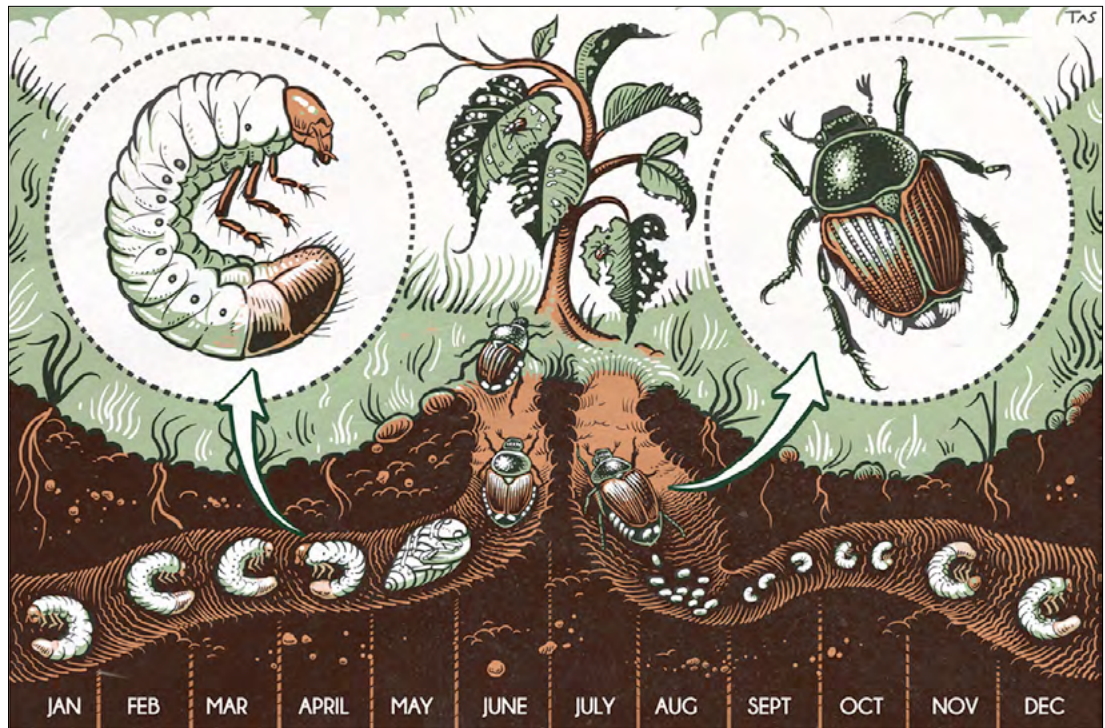


Figure 3. General life cycle of Japanese beetle: egg, grub, and adult stages. In early June, the grub pupates. It emerges from the soil in late June and July as an adult, mates, and lays eggs. Females live for a few weeks feeding on trees, shrubs, and flowers in the morning and returning to the turf in the afternoon to lay more eggs. Eggs hatch in July, and grubs are almost full grown by late August. Grubs dig deep in the soil for the winter months and then move upward in spring as the soil warms. Grubs do best in warm, slightly moist soil that has plenty of organic matter and tender grasses, but they can survive in almost any soil type.

Illustration by Thomas Shahan, courtesy of ODA.

Life cycle and scouting

Because the JB is new to Oregon, the exact timing of its life cycle may be slightly different than in eastern states. It typically has one generation per year, with adults emerging in early summer. Females lay 40 to 60 eggs over a 2- to 3-week timeframe during the summer months. The beetles overwinter as grubs and are close to the soil surface in the fall and in the spring (Figure 3). Grubs begin feeding when they emerge from the egg. Active feeding in the soil occurs from summer until early fall and then to a lesser degree in the spring, when soil temperature increases.

If they become established in Oregon, adult JBs will appear in gardens during the summer months. Adult beetles are very strong fliers. Thus, if you see adults in your garden, it does not necessarily mean that there are grubs beneath your lawn. The adults may have flown in from another location and may not choose to lay eggs in your lawn. Adult females prefer to lay eggs in warm, slightly moist soil with lots of organic matter.

Illustration: Erik Simmons, © Oregon State University



Figure 2. Japanese beetle larva. Note the 'C' shape and creamy color.

Photo: Steven Depolo. Used with permission.



Figure 4. Adult JB damage showing characteristic “skeletonization” of the leaf.

Japanese beetle damage

Japanese beetle damage varies with the life stage of the insect. Adults feed on plant foliage, skeletonizing the leaves by feeding between leaf veins (Figure 4). The beetles also feed on softer plant tissues such as flower petals, which can cause a more generalized, ragged feeding pattern. Grubs live in the soil and feed on grass roots. Pastures, natural grassy areas, golf courses, and lawns are particularly vulnerable. Grub feeding can result in severe root pruning that limits the plant’s ability to acquire water and survive in drought stress situations, often resulting in large dead patches of grass (Figure 5).

Reporting suspicious beetles

Early detection and rapid response to eradicate the JB is the best defense to keep it from becoming established in Oregon. If you find a JB suspect in your yard or garden, bring it to your local OSU Extension office for identification or report it to the Oregon Department of Agriculture, either online at oregon-invasiveshotline.org or by calling 1-866-INVADER. Keen eyes and a timely report could be vital for keeping this pest from establishing in Oregon.

Control measures

Cultural controls

Commercial traps are available for homeowners to use, but their effectiveness is mixed. The trap



Photo: David Smitley, Michigan State University. Used with permission.

Figure 5. Larval JB turf damage in Lansing, Michigan.

includes a female sex pheromone that attracts both males and females, thus reducing egg-laying. At this time, JB traps are best used by commercial and government organizations for monitoring purposes rather than as a landscape JB control.

Homeowners can grow plants that are less attractive to the beetles, and avoid or replace plants preferred by the beetles.

- Plants resistant to JB feeding include: dogwoods, pines, and lupines.
- Ornamental plants that JBs particularly prefer for feeding are Japanese maples, grapes, roses, and hibiscus.

Japanese beetle adults can be managed by hand. Gardeners can shake infested plants and plant parts over a jar of soapy water to remove and kill the beetles.

Reducing or eliminating irrigation to lawns when adult females are laying eggs and early instar larvae are developing can help reduce their survival. Allowing lawns to go dormant during the summer months could be a useful management tactic.

Prevention

Be cautious when sharing plants with friends and neighbors. Check for grubs that could have been moved in the soil when you trade or share plants.

The Japanese beetle is not widely established in Oregon. The current infestation is limited to Cedar Mill and Bethany areas of Washington County. We do not recommend that individual homeowners use products to control beetles on their property at this time. The Oregon Department of Agriculture is planning an intensive trapping and treatment program in Spring 2017.

Biological control

Soil applications of parasitic nematodes can reduce JB numbers. *Heterorhabditis* species (including *H. bacteriophora* and *H. megidis*) as well as *Steinernema glaser* have been shown to be effective for this pest. You can buy these from suppliers of biological control organisms.

Another biological control option is to apply the bacterium *Bacillus thuringiensis galleriae* (Bt), which provides effective control of first-instar larvae in grasses. Look for a Bt formulation that is effective against beetles.

Chemical controls

If managing a grub population is necessary to preserve turfgrass from feeding damage, insecticides applied according to the pesticide label can be effective. Treatment timing can vary depending on the product. Biological controls such as nematodes or Bt can be effective in mitigating turf damage on small areas (such as residential lots) if used according to label specification.

Be sure to select insecticides that minimize impacts to beneficial insects such as bees: read the pesticide label and look for specific precautionary statements designed to protect bees. Some pesticide labels include a bee advisory box and a bee hazard icon that indicate a pesticide's potential hazard to bees. To learn more about pesticides that minimize impacts on bees, consult *How to Reduce Bee Poisoning from Pesticides* (PNW 591) (see "For more information").

Adult JB can be managed through insecticide applications; however, repeated sprays are necessary, as many insecticides will remain effective for only 2 to 3 weeks or less. There are several synthetic insecticides that can be used for adult control, but many of these may harm bees. For this reason, avoid spraying plants when they are in bloom. Bio-rational insecticides, such as insecticidal soaps, aromatic oils, and neem, are generally ineffective against the adults.

Although chemical control is an option for JB management, homeowners are encouraged to focus their efforts on cultural or biological control methods. These have been found to be successful in residential settings.

For more information

How to Reduce Bee Poisoning from Pesticides

(PNW 591). Oregon State University Extension Service.

Integrated Pest Management of Japanese Beetle in North Dakota (E1631). North Dakota State University Extension Service.

Managing the Japanese Beetle: A Homeowner's Handbook. United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS).

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