

# Japanese Beetle (*Popillia japonica*)

## Description and Lifecycle



Figure 1: Japanese beetles on flowers.

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Adult Japanese beetles feed on the foliage and fruits of more than 250 kinds of plants, but grape leaves are preferred hosts. The larvae are C-shaped grubs found in the soil and are serious pests of grass roots. The adult beetle has a shiny, metallic-green head and thorax with coppery-brown wing covers. Tufts of white hairs are located along the sides of the body. Adult beetles are about 1/2 inch long. This insect overwinters as a larva below the soil surface. Larvae feed principally on grass roots. During late spring, larvae move closer to the soil surface and complete their development; adults emerge in late-June or early-July. Eggs are laid in the thatch layer of soil and take 10 days to hatch. There is one generation per year. Adult beetles emerge from the ground in June and July and begin feeding upon foliage. Mating occurs at this time and eggs are laid in the ground. Eggs hatch in August and young grubs begin feeding on plant roots. Grubs continue to feed and grow until cold weather; at this time they tunnel 3 to 12 inches down and make overwintering cells. In the

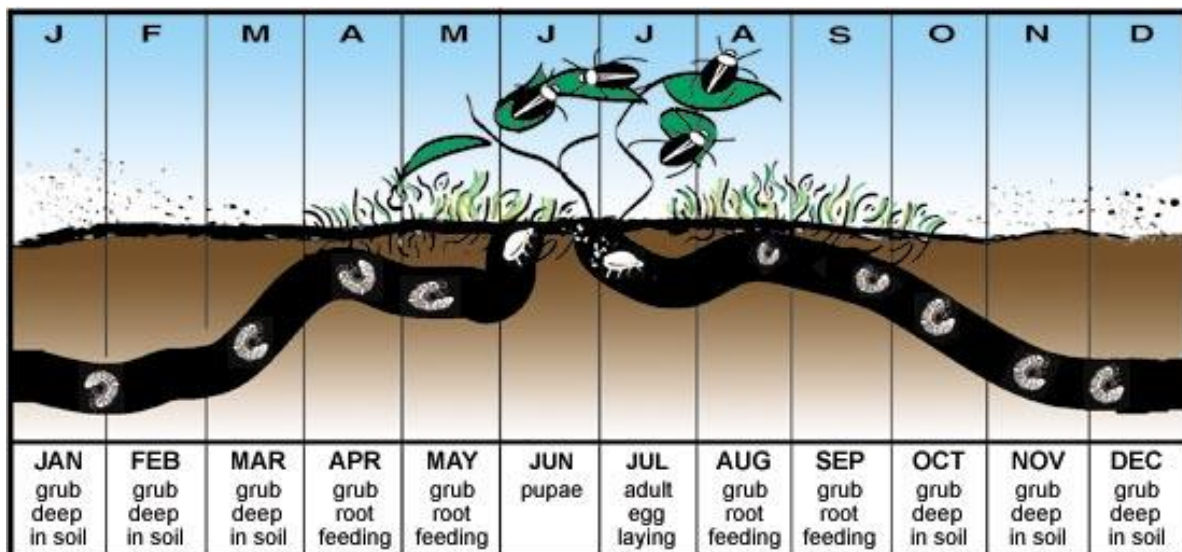


Figure 2. Japanese beetle life cycle.

<https://www.extension.umn.edu/garden/insects/find/japanese-beetles/>



*Figure 3: Life stages of Japanese beetle. Left to right: egg, first instar larva, second instar larva, third instar larva, pupa, and adult.*

spring when soil begins to warm, grubs move toward the surface where additional feeding may occur before pupation in May.

### **Damage Symptoms**

The adults feed on the leaves of both wild and cultivated grapevines. Beetles prefer foliage exposed to direct sunlight and often are seen clustered together and feeding on tender vegetative parts. Vines with thin, smooth leaves, such as French hybrids, are preferred over those with thick, pubescent leaves, such as Concord. Concord vineyards rarely need special attention for Japanese beetles. On the other hand, French hybrids and other thin-leaved cultivars require frequent inspection to prevent damage. Damaged leaves have a laced appearance; severely affected leaves will drop prematurely



*Figure 4: Adult beetles and characteristic feeding damage (skeletonized leaves).*

*Photo Credit: The Ohio State University;*

*<http://www.almanac.com/pest/japanese-beetles>*

### **Management and Cultural Control**

Currently there is no economic threshold on the number of beetles or amount of damage that requires treatment. If a susceptible cultivar is being grown, and growers previously have experienced high populations of Japanese beetles, control measures should be applied when beetles emerge and thereafter as needed. Japanese beetle infestations can be controlled by hand-picking, though with larger vineyards, that might be next to impossible to control. There are several natural controls including bird predators, parasitic wasps and diseases; however, relying on these alone is not reliable. Milky Spore Disease, while not toxic to humans or animals, is highly effective in

killing Japanese Beetles. It is available in both powder and granular form. Milky spore is a bacterium that attracts the Japanese beetle grub. Milky Spore will not, however, do much to control adult Japanese Beetles. Milky Spore is not harmful to the environment, and will not harm fish or animals. One solution to controlling adult Japanese Beetles is Rotenone. However, rotenone is highly toxic to beetles, fish and to some species of birds. While Rotenone is accepted by the USDA, ATTRA recommends only last resort and light uses of Rotenone. Rotenone is currently under review by ATTRA and is not OMRI listed. USDA dictates that preventative, cultural, mechanical and physical methods must be the first choice for pest control, and conditions for use of this product must be documented in the organic system plan. Under most circumstances, Rotenone should not be used for the organic control of Japanese beetle adults due to its toxicity to other insects and animals. It should be considered a last resort control measure. Be aware that using Rotenone may affect your vineyard's organic reputation. Also keep in mind that ATTRA is currently re-reviewing Rotenone and may restrict the use in the future. When tested by the OARDC, Rotenone was found to be only partially effective in controlling Japanese beetle populations. Nematodes can also be applied to control Japanese beetle populations. Heterorhabditis Bacteriophora Nematodes burrow themselves as far as seven inches and feed on the grubs. Since Nematodes are living organisms and are pest-specific, they are widely accepted as organic pest controls. Controlling Japanese Beetles this way requires proper timing applications to kill the grubs. It may be possible to control Japanese Beetles without spray if infestations are light by using traps. Typical traps have a white fin-like top that attracts Japanese Beetles visually as well as a scented attractant. The beetles fly into the fins and fall into a canister attached under the fins. The beetles are not killed in this process and will have to be disposed of. This method might work well in smaller fields, but vineyards larger than 1 to 5 acres may still see large defoliated areas.

## **Monitoring**

Japanese beetle lure and traps are available for monitoring, but these beetles are easily detected while walking through the vineyard. If skeletonizing of leaves becomes evident, thin leaved cultivars may need to be protected with an application of insecticide. The usual threshold for making a spray application is about 15% of the leaves damaged.