

# FOREST HEALTH ALERT

From the Missouri Department of Conservation

## Japanese Beetles



**Tree species affected:** Japanese beetles are known to feed on over 300 plant species. Linden (basswood), elm, crabapple, sycamore (planetree), sassafras, plum, cherry, birch, and bald cypress are commonly damaged, as well as rose, grape, and Virginia creeper.

**Concerns:** Lacy, skeletonized leaves. Partial or entire defoliation.

**Description:** Japanese beetles feed on the upper surface of leaves, leaving behind veins. Damage is frequently seen near the top of the tree or plant first. These beetles often feed in large groups.

### ***What is the lifecycle of the Japanese beetle?***

Japanese beetles spend most of their one-year lifecycle underground as a white, c-shaped grub. These grubs feed on grass roots and can damage turf if populations are high. Grubs pupate in late spring and emerge from the ground as adult beetles around early to mid-June. These beetles then fly to potential host plants, particularly those in full sun. If a plant is found to be palatable after a test bite, then the beetle remains on the plant to feed. This feeding damage causes the plant to emit floral scents that are then attractive to other Japanese beetles, leading to large congregations of the beetles on certain plants. After mating, each female beetle lays 40-60 eggs in the soil over the course of her 30-60 day lifespan. These eggs hatch into grubs in July and August. Most adult Japanese beetles are gone for the year by mid-August.

### ***If I control the Japanese beetle grubs in my lawn, will I have fewer beetles next year?***

Controlling Japanese beetle grubs in your lawn won't significantly reduce the number of beetles you see next year. Japanese beetles are strong fliers and can continue to fly in from neighboring areas over a mile away. Grub control may have more of an impact if you live in a forested area where turf grass is uncommon.

### ***Do weather conditions impact Japanese beetle populations?***

Drought conditions in July and August can lead to the death of many newly hatched grubs. During severe droughts, irrigated or low-lying wet areas may be the only places that grubs survive. Unfortunately, Japanese beetles are well-adapted to winter conditions typically seen in Missouri, so it is unlikely that populations will be reduced by average winter weather.

### ***Will Japanese beetles kill my trees?***

Healthy, established trees can typically tolerate a heavy amount of feeding damage. However, this damage is a source of stress for trees. You can help your trees by watering them 2-3 times per month during dry times to avoid additional stress from drought. A good rule of thumb is ten gallons of water per inch of a tree's diameter.

### ***Should I use a Japanese beetle trap?***

Be cautious when using Japanese beetle traps as they are very effective at bringing beetles in from areas well outside of your yard. Traps don't catch all the beetles they attract, so nearby plants may be heavily damaged by feeding. If you decide to use a trap, place it at least 100 feet away from plants you want to protect. Dispose of trapped beetles frequently by dropping them into a bucket of soapy water. Plans for a mass trapping system are available through Lincoln University Cooperative Extension at <https://ipm.missouri.edu>.



***Japanese beetles feeding on aromatic sumac.***

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### ***How can I control adult Japanese beetles?***

**Hand-picking** is an effective and environmentally friendly method of control on low-growing trees and plants. By targeting early or light infestations, you may prevent further feeding damage by limiting the amount of floral scents emitted by the host plant. Shake stems and branches with Japanese beetles over a bucket of soapy water. Beetles are typically sluggish and easy to capture early in the morning.

**Insecticides are not compatible with trying to maintain a pollinator-friendly yard and should never be used on flowering plants or trees that will attract bees and other pollinators.**

**Organic insecticides** containing azadirachtin, spinosad, or *Bacillus thuringiensis galleriae* (pending registration in Missouri) may be effective deterrents for a few days. Neem oil is useful in deterring beetles from feeding if used at the first sign of damage and when infestations are light. These treatments are considered more pollinator-friendly than other insecticides but should still be used with caution.

**Broad-spectrum insecticides** are available for control of Japanese beetle adults (e.g. acephate, carbaryl, cyfluthrin, permethrin, zeta-cypermethrin); check the label to confirm Japanese beetles and your plant species are listed. These chemicals may need to be reapplied at labeled intervals, especially in hot or rainy weather. Avoid using these products on blooming plants as they could kill pollinators for several days after application.

**Systemic insecticides**, such as those containing imidacloprid, can be applied as a soil drench to protect some types of trees and shrubs from adult Japanese beetles (follow all label restrictions). In order to be effective, these products need to be applied when trees begin to break dormancy (usually around mid-to-late April) as it can take 4-6 weeks for a large tree to translocate the insecticide from the soil to the leaves. **Due to impacts on pollinators, systemic insecticides should not be applied before or during the bloom period of any tree or shrub.** In addition, the use of systemic insecticides containing **imidacloprid is NOT ALLOWED on linden (basswood)**, a common host tree of Japanese beetles. Product labels contain specific restrictions due to impacts on pollinators.

### ***Are there any biological controls for Japanese beetles?***

No biological controls are commercially available for managing adult Japanese beetles. Two products are available for biological control of Japanese beetle grubs in the soil. Neither product is 100% effective.

⇒ Milky spore (milky disease bacteria) is a long-term control technique that may slightly reduce grub populations in 2-3 years. Introduce milky spore into several spots in your yard in a grid pattern. Once in the soil, the spores will be present for many years. Milky spore requires specific temperature and moisture conditions to infect grubs.

⇒ Species of *Heterorhabditis* and *Steinernema* nematodes will attack grubs but need to be applied up to three times annually during the grub stage. Soil moisture is critical for nematode survival.

### ***What should I do next year to protect my trees and plants?***

Keep an eye out in mid-June for Japanese beetles. Handpick beetles when possible. Preventing early feeding damage can protect trees and plants in the following weeks. If populations can't be removed by hand, spray an insecticide labeled to control Japanese beetles on your particular tree or plant species. Repeat, if needed, at labeled intervals.

For large established trees, help reduce stress caused by Japanese beetle feeding through good tree care practices: water trees 2-3 times per month during drought conditions, avoid wounding by mowers and weed trimmers, and keep mulch rings no deeper than 3 inches.



***Sycamore with skeletonized leaves***



Questions? Contact your local forester with the Missouri Department of Conservation.

Find contact information for your county and more at [mdc.mo.gov](http://mdc.mo.gov).