Biorational Control:

Biorational insecticides are less harmful for people and the environment. They are often target-specific, meaning they control select pests with minimal harm to non-target organisms like people, pets, or beneficial insects. The correct identification of the pest and proper timing of the biorational is necessary for effective control.

Halofenozide is an Insect Growth Regulator (IGR) that inhibits development of grubs. IGRs must be applied when grubs are small – the best time is July to August.

Nematodes like *Steinernema* or *Heterorhabditis* are microscopic roundworms that will feed on grubs in the soil. They require a moist environment, so water soil before and after application in early evening or on a cool, overcast day. Nematodes can be ordered online from insectaries.

Acelepryn (chlorantraniliprole) is a reduced-risk insecticide that will kill grubs without harming most beneficial insects. Acelepryn is currently sold at nursery supply stores and is recommended for professional lawn care specialists.

Conventional Control:

Imidacloprid can also be used as an effective control of grubs. Soil applications of imidacloprid can be made while the grubs are small and feeding on roots in July to mid-September.

When using any pest control products, it is important to carefully read and follow the product label directions for use. Always be sure that the pest you want to control and the plant you are spraying are listed on the label. Be aware of potential risks to bees and to aquatic organisms.

For more information, search "Japanese beetle" at www.extension.umn.edu

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Minnesota Landscape ARBORETUM

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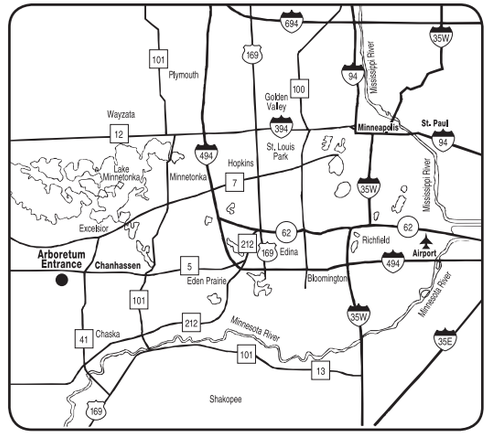

Minnesota Landscape ARBORETUM

How to Manage Japanese Beetles

Without Harming the Enviroment

www.arboretum.umn.edu

UNIVERSITY OF MINNESOTA

Japanese Beetle

Genus and species:
Popillia japonica

Family:
Scarabaeidae

Order:
Coleoptera

Japanese beetles likely arrived in Eastern United States as early as 1900 and have been moving relentlessly westward ever since. Recognizing this pest's two life stages and knowledge of safe and effective management is essential for homeowners to protect their landscapes. This pest is doubly troublesome: the grubs feed on roots of grasses while adult beetles feed on leaves and flowers of many species of ornamental plants.

Protect Your Ornamentals From ADULTS

Adult Japanese beetles have metallic green heads, coppery wings, and five white hair tufts along each side.

Emerging around July 4th in Minnesota, the adults feed on many species of ornamentals, including roses, grapes and lindens. Japanese beetles feed in large groups in sunlight, chewing irregular holes in leaves and devouring flowers.

Cultural Control:

Simply picking off adults and dropping them into soapy water or rubbing alcohol is an effective control for small infestations and a great job for the kids!

We do not recommend using pheromone traps – the traps use a rose odor and the female beetle sex pheromone as an attractant. However, the beetles may miss the trap and land on nearby landscape plants, causing damage.

Conventional Control:

If damage is beyond tolerable levels, conventional insecticides may become necessary.

Imidacloprid* is a conventional insecticide that can be applied to the soil or to the leaves as a foliar spray. In either form, imidacloprid will kill adults as they feed.

Foliar sprays of contact insecticides such as **acephate** and **carbaryl** or pyrethroids such as **bifenthrin**, **cyhalothrin**, or **cyfluthrin** can also be used. These insecticides kill beetles as they walk on treated leaves.

Products sold in stores with ingredients such as azadirachtin, neem oil, orange oil, garlic oil, and pyrethrins (without the additive piperonyl butoxide) did not kill adults according to University studies.

In Minnesota, use insecticides from July through September when adults feed and lay eggs.

**These recommendations are for certain active ingredients found in yard and garden insecticidal products. Active ingredients are listed on the front labels of these products.*

Protect Your Lawn From GRUBS

Grubs are the larval or immature form that feed on grass roots. They curl in a C-shape and grow an inch long.

Grubs hatch in July and begin feeding on grass roots. The following May grubs resume feeding. In mid-June, grubs form a pupa to transform into adults. Adults emerge from soil around July 4th in Minnesota and fly to grapes, ivy, and lindens to feed.

Damaged lawns turn brown due to lack of roots. Grubs feed on roots of green grass adjacent to brown grass. Animals digging for grubs further damage grass as shown on the left.

Make sure you have white grubs before choosing a treatment, as most turf damage is caused by fungi or bacteria, not insects. Check for grubs under brown patches in grass before considering insecticides.