

## **The Japanese beetle *Popillia japonica* Newman (Scarabaeidae: Coleoptera)**

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Gale E. Ridge  
Department of Entomology  
The Connecticut Agricultural Experiment Station  
123 Huntington St.  
P.O. Box 1106  
New Haven, CT 06504-1106

Telephone: (203) 974-8478 Fax: (203) 974-8502  
E-mail: [Gale.Ridge@ct.gov](mailto:Gale.Ridge@ct.gov)



Photo by Rose Hiskes

### **Japanese beetle with foliage damage**

### **Introduction**

The Japanese beetle was accidentally introduced to the United States on the roots of nursery stock from Japan brought in for the 1916 World's Fair. Lacking any natural enemies which kept it in check in Japan, it quickly spread across the Eastern and Midwest states becoming a serious plant and agricultural pest. Isolated populations are now found in Oregon and California. Other beetle pests with similar biology's are Asiatic garden beetle, Oriental beetle, and the chafers also cause damage.

### **Description**

The adult Japanese beetle is ½ inch (10mm) long and metallic green with coppery-brown wing covers. They have six small white patches of hairs along each side. Males and females look alike except the males are a little smaller.

### **Life cycle**

The Japanese beetle has a one year life cycle, 10 months as a white grub and 2 months as an adult. It emerges from the soil as an adult in late June and is active through July and August. The peak period is

July. Between feedings females drop to the ground, burrow down 3 inches and lay up to four eggs at a time. This is repeated until 40-60 eggs have been laid. Lawns that are well watered and cared for (with high nitrogen levels) are favored. Adults can live into the fall up to first frosts. After hatching, larvae (white grubs) feed on grass roots until nearly full grown in late fall; then they burrow 4 to 8 inches down into the soil to hibernate through the winter. The following spring they return to the root zone of the lawn, feed and pupate before emerging as adults in late June.

## Damage

Adult Japanese beetles feed on over 300 species of plants, chewing out tissue between the veins effectively skeletonizing the leaves. They are gregarious and in high numbers can rapidly defoliate a plant. They feed during the day and are very active in hot sunny weather. Favorite foods are roses, fruit trees, beans, corn, tomatoes and numerous ornamental shrubs and plants. The larvae feed on the roots of turf grasses, woody and herbaceous plants and organic matter in the soil. Feeding can be so heavy that the turf separates from the soil and be lifted like a carpet. Other beetle grub species can also cause considerable damage to ornamentals and turf.

## Control

### White grub bio-control

- Bacterial Milky spore disease *Bacillus popolliae* Dutky, specific for Japanese beetle needs two to three years to build up in the white grubs to lethal levels; avoid killing the grubs while this is happening. It is not sustained through the cold winters of New England; soil temperature must be in the 70's ( F) during the grub stage in summer and early fall for effective results. *Bacillus thuringiensis* var. *buibui* is effective but not yet commercially available at this time.
- Entomopathogenic nematodes (microscopic roundworms) *Heterorhabditis* spp. and *Steinernema carpocpsae* strains can be effective against white grubs. They burrow into the grubs, releasing a bacterium into their guts which kills the grubs. These are living organisms so must be ordered from a supplier and shipped over night. Apply in September in warm soils on cloudy calm days and water in.
- Skunks and moles, and birds feast on white grubs, and can be a nuisance themselves. They are indicators of a problem.
- The wasp, *Tiphia vernalis* is a naturally occurring Japanese beetle parasite. The female wasp digs into soil, paralyzes the grub and deposits an egg, which hatches and consumes the grub.
- Reduce the watering of lawns in August. The eggs need water to mature and will abort if the soil is dry.

### White grub chemical control

- Imidacloprid (Brand names Merit or Scotts Grub-X) is 90% effective in killing against young grubs. Apply late May or early June. Older grubs are not affected by imidacloprid.
- Trichlorfon an organophosphate (brand name Dylox) is more than 75% effective. Apply in late September for quick kill, as rescue treatment.
- Halofenozide a growth regulator (brand name Mack 2) is more than 75% effective. Apply at egg hatch from mid-July through August.
- Azadirachtin a botanical insecticide as an insect growth regulator from the Neem tree is India can be used on white grubs (brand name Bonide grub beater insect control RTS).

The pesticides Diazinon and Dursban are no longer registered for residential use and are not available to homeowners for white grub control.

### **Adult bio-control**

- Fly parasite *Istocheta aldrichi* is a naturally occurring adult beetle parasite and when its numbers are high, can regulate beetle populations in the Northeast. Each female lays up to 100 eggs in 2 weeks on the thorax of female beetles. The hatched maggots bore into the adult beetles which quickly kills them.
- Trapping using yellow fin traps with trap bags below can trap up to 75% of beetles that approach them. Empty bags each day into a bucket of soapy water. Place on property lines or yard edges to attract beetles away from lawns, ornamental and garden areas. These traps can attract beetles from several neighborhood properties at one time. Traps using sex pheromones or floral scent lures should only be used during the breeding period of the beetles (late June-late August).
- Hand picking in early morning is helpful. Put beetles into a bucket of soapy water.

### **Adult chemical control**

- Azadirachtin is a botanical insecticide and insect growth regulator from the Neem tree in India under numerous brand names including Azatin XL and Orazin 3% EC
- Rotenone is a botanical insecticide, from several plants including barbasco, nekoe, timbo, cub, and haiari.
- Pyrethrins (pyrethroids) a botanical insecticide and its synthetic derivatives cyfluthrin, bifenthrin, and deltamethrin etc., are effective. They are replacing many older pesticides on the market.
- Carbaryl (brand name Sevin). Very toxic to bees, so should be used carefully.
- Imidacloprid (brands Merit, Grub-X) can be used as a systemic in perennials.

Numerous other compounds are available for Japanese beetle control. Going to a good garden or agricultural center will provide you with many good choices.

In using any of these pesticides, be careful near water and check for environmental fate. Always follow label directions.

Mention of a product or company is for informational purposes only and does not constitute an endorsement by the Connecticut Agricultural Experiment Station.