

Landscape & Ornamentals

Department of Entomology

JAPANESE BEETLES IN THE URBAN LANDSCAPE

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Infestations of the Japanese beetle are found in rural and urban areas throughout Indiana. This insect is most damaging to lawns, trees, flowers, fruits, and gardens in urban landscapes but may also cause economic injury to some agriculture crops.

DESCRIPTION AND HABITS

The Japanese beetle is about 1/2 inch long, and is metallic green and bronze in color with a row of white tufts (spots) of hair on each side of its body. Adult beetles are most active from mid-July through August. They can feed upon more than 300 different species of plants, but are especially fond of roses, grapes, smartweed, soybeans, corn silks, flowers of all kinds, flowering crab, plum and linden trees, as well as, overripe and decaying fruit.

The beetle larvae (grubs) develop in lawns, turf, and cultivated land from eggs laid by the female in mid-summer. These grubs feed primarily on the roots of grasses and other plants. They pass the winter in the grub stage, complete their growth the following spring and emerge as beetles beginning in mid-June.

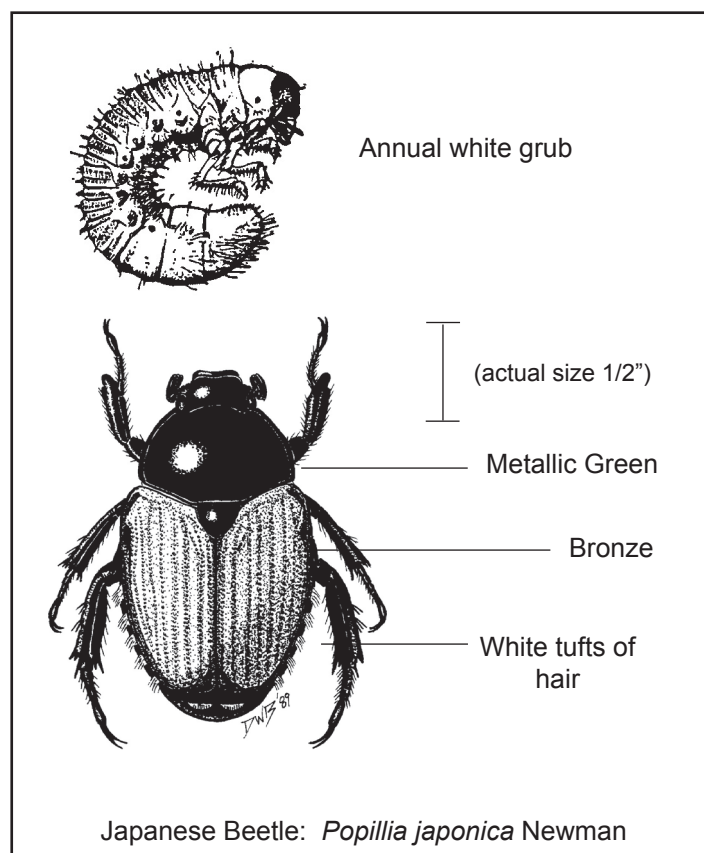
Adults can fly considerable distances (1-2 miles) to feed on leafy plants or to lay eggs. In areas of heavy infestation, the adults will attack and injure flowers and foliage, and the grubs may seriously damage lawns and cultivated crops by feeding on the root systems.

PROTECTING LAWNS

Control with Insecticides. Several insecticides will protect lawns from Japanese beetle grubs and other soil insects (see also *Extension Publication E-61 "Turfgrass Insect Management"* <<http://extension.entm.purdue.edu/publications/E-61.pdf>>) if applied at the proper time and according to label directions (Table 1). A rule of thumb to remember for grub control is that the smaller the grub - the easier it is to control.

Granules (G) can be applied with a fertilizer spreader calibrated to insure even distribution. Emulsifiable concentrates (EC, E) must first be diluted in water, then applied as a spray. Both spray and granular applications should be watered in for best results. Watering turf both before and after pesticide application has been shown to increase efficacy. Japanese beetle grubs hatch from eggs in late July or early August.

Because they are most susceptible to insecticides at this time and also because feeding damage can be prevented, early August is the critical time to have controls in place. Also remember that insecticides are applied to protect the turfgrass from grub damage. That is why it is important to know **IF** grubs are present and **WHAT DEVELOPMENTAL STAGE** they are in at the time of application. Recent studies have shown that many grub control applications are wasted because grubs were not present in the first place. Apply controls only if a history of grub problems warrant an application or if sampling the soil indicates 5 or more grubs per square foot.



Chemical Insecticides* for White Grub Control	Type of Application
Bacillus popilliae (Doom, Milky Spore)	Alternative
carbaryl (Sevin)	Curative
chlorantraniliprole (Acelepryn)	Preventative, Curative
clothianidin (Arena)	Preventative, Curative
dinotefuran (Safari)	Preventative
halofenozide (Mach II)	Preventative
imidacloprid (Merit)	Preventative
thiamethoxam (Meridian)	Preventative, Early Curative
parasitic nematodes (Several trade names)	Alternative
trichlorfon (Dylox)	Curative

*Always apply according to current label directions and rates.

Preventative Applications. Preventative applications include the use of persistent chemicals that remain active in the soil for long periods of time. These may provide excellent grub control even when applied 2 months before egg hatch (early August). However, they are more effective the closer to the egg hatch date that they are applied.

Curative Applications. Curative applications are designed to control existing populations of grubs regardless of how mature they are. Curative only applications typically have less residual in the soil than preventatives but will kill the grubs more quickly after application. Irrigation also increases the effectiveness of these applications.

Alternative Applications. Control with “Milky Disease” Spore Dust. A specific bacterial spore dust has been shown to provide limited grub control in the soil, provided the population level is at least one grub per square foot. The spore dust is available in some garden supply stores or is available on-line. It should be applied in the spring or early fall. One treatment is usually sufficient since the bacteria that cause milky disease in the grubs continues to multiply in later generations.

Keep in mind that this material is effective **only** on Japanese beetle grubs and may require several years to provide control. Maximum results may not be seen for the first 2 to 3 years after application. Its major limitation is that it cannot be used in combination with other grub control products. Do not apply chemical insecticides to the milky spore treated areas. Insecticides drop the grub population level too low for the spores to multiply.

Control with “Parasitic Nematodes”. Recent developments in the use of parasitic nematodes to control grubs has met with variable results. Under special conditions, nematodes can be effective and are a viable, environmentally sound approach to Japanese beetle grub control.

PROTECTING ORNAMENTAL AND FOOD PLANTS

Control on ornamentals with insecticides. To protect ornamentals against the feeding of adult Japanese beetles, leaves should be coated with insecticide (Table 2) during the adult flight period. Typically, this may entail 2 treatments during the peak beetle flight. Homeowners should make their first application when damage is becoming intolerable and beetles are still abundant. The need for repeated applications can be curtailed by inspecting plants for additional beetle damage prior to applying a second treatment. Neem products containing Azadirachtin can be effective repellants that can reduce defoliation when applied regularly (but no more than weekly) during beetle flight. Apply before defoliation becomes intolerable. Soil application of imidacloprid, or acetamiprid can reduce the amount of defoliation caused by adults when applied to soil at the base of a tree. Applications to the soil in late May should give enough time for the trees to take up the materials into the leaves. In years when beetle populations are very high, noticeable defoliation may occur because adults need to consume insecticide tainted leaves in order to be killed.

Concentrate control efforts on trees that are susceptible to beetles (Table 3). When possible, replant with plants that are resistant to adult feeding (Table 4). Consult Table 5 to find crabapple varieties resistant to Japanese beetle.

Control on food plants with insecticides. Carbaryl, permethrin and malathion are safe to use on grapes and other food plants if harvest restrictions on the label are followed. Sevin is also available as a 5% dust to be used at the rate of 1/2 pound per 1,000 square feet.

Traps. Pheromone traps have long been used to monitor the activity of the Japanese beetle. The “Bag-A-Bug” trap utilizes both a pheromone and a floral scent to catch both sexes of the beetle. However, these traps are not recommended for beetle management because they attract more beetles than they can control, resulting in increased plant damage. Do not put traps in or near plants that are susceptible to Japanese beetle (Tables 3, 5).

Japanese beetle (white grub) (Photo Credit: John Obermeyer)



Japanese beetle (adult stage) (Photo Credit: John Obermeyer)

Table 2. Recommended Insecticides to Kill Adult Japanese Beetles on Plants

Insecticide	Formulation	Amount per 100 gallons	Amount per gallon	General Use Restriction (check label) H = Homeowner C = Commercial
Acephate (Orthene)	75% S 15.6% EC	1/3 lb. 1 1/5 cup	1/3 tsp. 1 1/2 Tbsp.	H, C
Acetamiprid (TriStar 70 WSP)	70 WSP	See label	See label	Soil application C
Azadirachtin (Various products)	Varies	See label	See label	Works as repellent
Bifenthrin (Talstar L&T and other site specific products)	0.7 F	5.5 - 10.9 oz.	1/3 - 2/3 tsp.	H, C
Carbaryl (Sevin and others)	4 F 2 F	1 qt. 2 qt.	2 tsp. 4 tsp.	H, C
Cyfluthrin (Tempo, Decathlon) (Bayer Lawn & Garden)	20 WP 0.75 EC	1.3 oz. -	- 1 Tbsp.	H, C H (Bayer)
Deltamethrin (Deltaguard (T&O))	4.75% EC	4 - 8 oz.	1/4 - 1/2 tsp.	H, C
Fluvalinate (Mavrik)	2 F	5 - 10 oz.	1/4 - 1/2 tsp.	H, C
Imidacloprid (Bayer Tree and Shrub)	2.9% C	See label	See label	Soil application H, C
Lambda-cyhalothrin (Scimitar CS)	9.7% EC	1.5 - 5 oz.	-	C
Malathion	57% EC	2 - 4 pt.	2 tsp.	H, C
Permethrin (Astro EC) Spectracide Bug Stop (Eight)	36.8% EC 2.5% EC	4 - 8 oz. -	1/4 - 1/2 tsp. 2 Tbsp.	H, C

Table 3. Landscape Plants Nearly Always Severely Attacked by Adult Japanese Beetle¹

Scientific Name	Common Name
<i>Acer palmatum</i>	Japanese maple
<i>Acer platanoides</i>	Norway maple
<i>Aesculus hipposastanum</i>	Horsechestnut
<i>Atlbaca rosea</i>	Hollyhock
<i>Betula populifolia</i>	Gray birch
<i>Castanea dentata</i>	American chestnut
<i>Hibiscus syriacus</i>	Rose-of-Sharon
	Shrub Althea
<i>Juglans nigra</i>	Black walnut
<i>Malus species</i>	Flowering crabapple, apple
<i>Plananus acerifolia</i>	London planetree
<i>Populus nigra italica</i>	Lombardy poplar
<i>Prunus species</i>	Cherry, black cherry, plum, peach, etc.
<i>Rosa species</i>	Roses
<i>Sassafras albidum</i>	Sassafras
<i>Sorbus americana</i>	American mountain-ash
<i>Tilia americana</i>	American linden
<i>Ulmus americana</i>	American elm
<i>Ulmus protera</i>	English elm
<i>Vitis species</i>	Grape

¹Courtesy of Sheiner, Townsend and Potter, University of Kentucky

Table 4. Landscape Plants Relatively Free of Feeding by Adult Japanese Beetle¹

Scientific Name	Common Name
<i>Acer negundo</i>	Boxelder*
<i>Acer rubrum</i>	Red maple
<i>Acer saccharinum</i>	Silver maple
<i>Buxus sempervirens</i>	Boxwood
<i>Carya ovata</i>	Shagbark hickory
<i>Cornus florida</i>	Flowering dogwood
<i>Diospyros virginiana</i>	Persimmon
<i>Euonymus species</i>	Euonymus (all species)
<i>Fraxinus americana</i>	White ash
<i>Fraxinus pennsylvanica</i>	Green ash
<i>Ilex species</i>	Holly (all species)
<i>Juglans cinerea</i>	Butternut
<i>Liriodendron tulipifera</i>	Tuliptree
<i>Liquidamar styraciflua</i>	American sweetgum
<i>Magnolia species</i>	Magnolia (all species)
<i>Morus rubra</i>	Red mulberry
<i>Populus alba</i>	White poplar
<i>Pyrus communis</i>	Common pear
<i>Quercus alba</i>	White oak
<i>Quercus coccinea</i>	Scarlet oak
<i>Quercus rubra</i>	Red oak
<i>Quercus velutina</i>	Black oak*
<i>Sambucus canadensis</i>	American elder*
<i>Synga vulgaris</i>	Common lilac

Most evergreen ornamentals, including Abies (fir), Juniperus, Taxus, Thuja (arborvitae), Rhododendron, Picea (spruce), Pinus (pine) and Tsuga (hemlock) are not attacked.

¹Courtesy of Sheiner, Townsend and Potter, University of Kentucky

*Unmarked species undergo little or no feeding. Species marked with an asterisk may suffer occasional light feeding.

Table 5. Classes of Crabapples Based on their Resistance to Japanese Beetle¹

Class I High Resistance	Class II Moderate Resistance	Class III High Susceptibility
Ann E. Bob White Brandywine Canar Candied Apple Centurion Harvest Gold Jack Jewelberry Louisa Prairiefire Red Jewel Sargent Silver Moon* Silverdrift Tea White Angle White Cascade	Candymint Sargent David Indian Summer Japanese Flowering Molten Lava Ormiston Roy Profusion Redbud Sinai Fire Snowdrift	Adams Baskatong Donald Wyman Doubloons Indian Magic Liset Madonna Mary Potter Prairie Maid Robinson Selkirk Sentinel Sugar Tyme Velvet Pillar White Candle

¹See ID-217 for varieties resistant to both Apple scab and Japanese beetle

*Not recommended for planting because of susceptibility to fireflight

READ AND FOLLOW ALL LABEL INSTRUCTIONS. THIS INCLUDES DIRECTIONS FOR USE, PRECAUTIONARY STATEMENTS (HAZARDS TO HUMANS, DOMESTIC ANIMALS, AND ENDANGERED SPECIES), ENVIRONMENTAL HAZARDS, RATES OF APPLICATION, NUMBER OF APPLICATIONS, REENTRY INTERVALS, HARVEST RESTRICTIONS, STORAGE AND DISPOSAL, AND ANY SPECIFIC WARNINGS AND/OR PRECAUTIONS FOR SAFE HANDLING OF THE PESTICIDE.

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