Japanese Beetle

*Popillia japonica*
Japanese beetle adults chew on leaves and flowers of many plants.
Flowers are often a favored plant part targeted by adult Japanese beetles.
Japanese beetle larvae (grubs) – among the most damaging turfgrass insects in the US

Japanese beetle affects yard/garden plants in two distinct ways
White grubs prune the roots, producing drought stress symptoms
Skunk digging damage associated with white grub infestations
Managing Japanese beetle in the larval (white grub) stage
Recommendations for Japanese Beetle Larval Control

• Cultural Controls
• Biological Controls
• Chemical Controls
Recommendations for Japanese Beetle Larval Control

• Cultural Controls
  – Promotion of root growth to tolerate larval feeding
  – Allowance of some soil drying during critical JB life stages
  – Provision of water to allow tolerance and recovery from root loss
Grasses with larger root mass are better able to tolerate effects of root pruning insects.

Mowing height greatly affects root mass of turfgrasses!
Generalized Life History Sequence of Japanese Beetle
Early stages of Japanese beetle grubs are highly sensitive to soil drying.
Recommendations for Japanese Beetle Larval Control

• Cultural Controls
  – Promotion of root growth to tolerate larval feeding
  – Allowance of some soil drying during critical JB life stages
  – Provision of water to allow tolerance and recovery from root loss
As grubs get older, more root pruning occurs.
Recommendations for Japanese Beetle Larval Control

• Cultural Controls
• Chemical Controls

• Biological Controls
  – Insect parasitic nematodes (*Heterorhabditis* spp.)
  – *Bacillus thuringiensis* var. *galleriae*
  – Milky spore
Insect Parasitic Nematodes ("Beneficial Nematodes", "Predator Nematodes")
Nematodes enter insects through natural openings

*Heterorhabditis* spp. nematodes can penetrate directly through the body wall.
Insect Parasitic Nematodes Can Control Many Turf Insects

- White grubs
- Billbugs
- Cutworms and sod webworms
- Mole crickets
Grubs turn a reddish color when killed by *Heterorhabditis* nematodes.
White Grub Larval Treatments

- Imidacloprid (Merit, Zenith, Criterion, etc.)
- Clothianidin (Arena)
- Chlorantraniliprole (Acelepryn, Scott’s Grub-Ex)
- Trichlorfon (Dylox, Proxol)
- *Heterorhabditis* spp. parasitic nematodes
- *Bacillus thuringiensis* var. *galleriae* (grubGONE!)
New biological control for Japanese beetle - and other grubs?

Bacillus thuringiensis var. galleriae
Milky Spore for Japanese Beetle?

Used to permanently establish a biological control organism — not useful for immediate control.
Milky Spore for Japanese Beetle?

Long term: May help produce some reduction in numbers of larvae surviving to adulthood. However, infections typically only affect a small percentage of population.
Question: Does control of larvae in a yard affect the number of adults in a yard?

Answer: Very likely, NO
Adult beetles feed on both flowers and leaves of many ornamental plants as well as garden vegetables and herbs.
Skeletonizing injuries produced by Japanese beetle adults feeding on leaves
Flowers are often a favored plant part targeted by adult Japanese beetles.
Overlap of adult feeding on flowers – and use of those flowers by pollinators

Issue of unusual concern with Japanese beetle
Uber-host Plants Favored by Japanese Beetle Adults in CO

- Roses**
- Linden*
- Virginia Creeper*
- Silver lace**
Other Plants Commonly Grown in CO that are Highly Favored by Japanese Beetle

**Ornamentals**
- Hollyhock*
- Gaura**
- Rose-of-Sharon**
- Crabapple
- Japanese maple
- Peking cotoneaster

**Food Crops**
- Beans (green, edamame)
- Basil
- Raspberry*
- Grape

* JB populations overlap with flowering
** JB populations overlap >a lot< with flowering
Recommendations for Japanese Beetle Adult Control

- Physical/Cultural Controls
  - Traps
  - Hand Picking
- Chemical Controls
Japanese beetle controls

Hand Picking
Japanese beetle traps are excellent for detecting presence of the insect in an area.
Japanese beetle traps are minimally useful - at best - for control of existing Japanese beetle infestations!
If you insist on using a Japanese beetle trap

- Do not place them anywhere near (at least 30 feet away from) any plant on which Japanese beetles feed
- Avoid placing them in a site where they are likely to draw beetles from long distances
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….and preferably give the trap to your neighbor!
OTC Chemical Controls Most Effective for Control of Japanese Beetle Adults

- Most pyrethroids (e.g., cyfluthrin, permethrin, bifenthrin)
- Carbaryl
- Acetamiprid
- Imidacloprid

Do not treat plants with flowers in bloom!
Overlap of adult feeding on flowers — and use of those flowers by pollinators

Never apply persistent insecticides to plants that are in flower and attractive to pollinators!!
OTC Natural Products with Some Ability to Control JB Adults

• Pryethrins
• Azadirachtin
• Insecticidal Soaps?

Do not treat plants with flowers in bloom!
The Naturally-derived (usually Organic) Products for Use in JB Adult Control

- **Pyrethrins**
  - active ingredient in *pyrethrum*

- **Azadirachtin**
  - active ingredient in *neem seed extracts*
Overlap of adult feeding on flowers – and use of those flowers by pollinators

Never apply any insecticides to plants that are being visited by pollinators!!