

Good Bugs/Bad Bugs

From the Ground Up

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Bad Bug: Aphid

- **Hosts:** a wide variety of plant material
- **Description:**
 - Small/Soft-bodied/Pear-shaped/Many colors/cornicles
 - Migratory stage winged
 - Suck sap from buds, leaves, twigs and fruit, leaving leaves stunted/distorted and fruit misshapen.
 - Can carry a number of plant viruses.
 - Excrete a sticky substance - "honeydew" - = sooty mold
- **Recommendations:**
 - Aphids are usually controlled by nature: beating rains & low temperatures, as well as fungus diseases, insect predators & parasites keep aphids in check.
 - Aphid enemies include lady beetles, syrphid fly larvae, aphid lions and small wasp parasites aka braconids.
- **Control:**
 - Wash away with a forceful stream of water
 - Insecticides: horticultural oil, insecticidal soap, acephate, malathion, cyfluthrin, or permethrin; Reapplication?



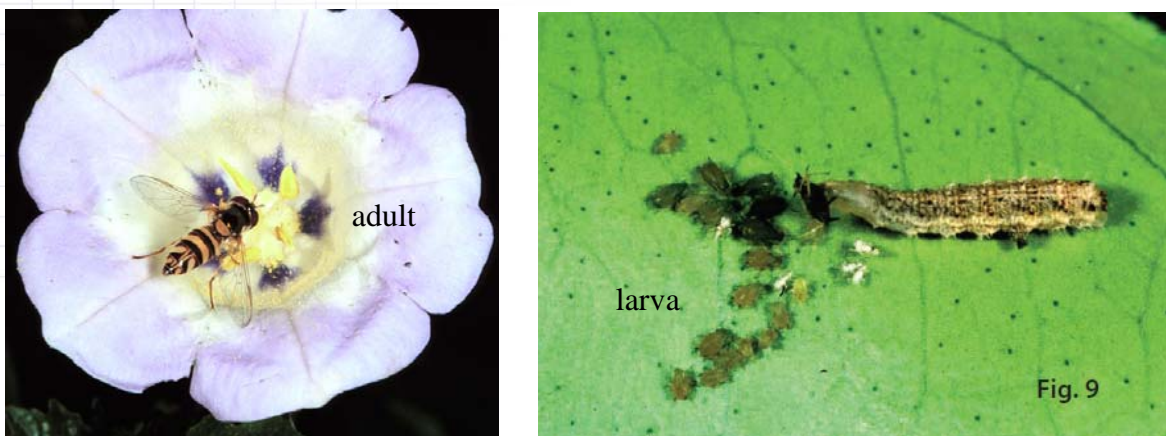
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Good Bug: Lady Beetles



Lady beetle adults and larvae attack aphids, mites, insect eggs and small insects.

Good Bug: Syrphid Flies



The harmless adults resemble bees, but the small larvae consume many aphids.

Good Bug: Green Lacewings



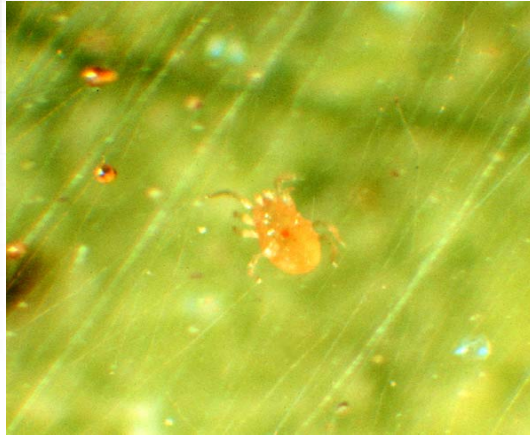
Green or brown, the lacewing, or aphid lion, is known to eat as many as 600 aphids.

Bad Bug: Mites

- **Hosts:** Many
- **Description:**
 - Eggs: colorless
 - Opaque as they age
 - Greenish-yellow as near hatching
 - Primarily feed on lower leaf surfaces, using piercing mouthparts to stab epidermal cells and stippling on upper leaf surfaces.
- **Recommendations:**
 - Strong sprays of water on all leaf surfaces 2x/week can dislodge mites
 - Horticultural oils and insecticidal soaps can help suppress all three life stages: eggs, immatures and adults and are kind to mite predators. Good coverage is essential. Repeat treatments are necessary.



Good Bug: Predatory Mites



Predatory mites move rapidly to catch/feed on their plant-eating counterparts. They are often white, tan, or orange.

Good Bug: Big-eyed Bugs



These small insects with big eyes attack spider mites, thrips, aphids and other insect eggs.

Bad Bug: Eastern Tent Caterpillar

- **Host:**
 - Wild Cherry is a favorite. Also attacks other ornamental shrubs, shade, and forest trees.
- **Damage:**
 - Construct webs in crotches/forks of trees.
 - Feed on leaves outside of the web, but stay in the web during the night/rainy weather.
 - 2 inches long, black, sparsely hairy; white & blue markings & a white stripe on the back.
- **Control:**
 - Clip off branch and destroy nest.
 - Use pole with object that can twirl the web and remove it from the tree
 - Apply insecticide when webbing begins. Use acephate (Systemic Insect Control), carbaryl (Sevin), cyfluthrin (Tempo, Multi-Insect Killer), permethrin (numerous trade names)



Good Bug: Assassin Bugs



Assassin bugs prey on aphids, caterpillars, beetles, leafhoppers, etc. They do not like to be handled.

Good Bug: Damsel Bugs



Damsel bugs resemble assassin bugs. They feed on aphids, leafhoppers, mites and caterpillars.

Good Bug: Predaceous Stink Bugs



Photo by Stephen B. Bambara



Many stink bugs are pests, but predaceous stink bugs feed on beetles and caterpillars both as adults and colorful nymphs.

Bad Bug: Grasshopper

- **Host:** Everything
- **Description:**
 - Most damage caused by differential and two-striped grasshopper, two of the largest
- **Control:**
 - Insecticides registered for grasshoppers are usually effective on those directly contacted by sprays.
 - Residual is limited
 - Apply to immature stages for best results.
 - Insecticides labeled for the widest variety of crops include permethrin (numerous trade names), cyfluthrin (Bayer Vegetable & Garden Insect Spray), carbaryl (Sevin) and gamma-cyhalothrin (Spectracide Triazicide).



Differential Grasshopper



Two-Striped Grasshopper

Good Bug: Soldier Beetles



Adults resemble fireflies
and are attracted to
milkweed, hydrangea,
and goldenrod.

They eat aphids, caterpillars,
mites, grasshopper eggs, and
small beetles.

Good Bug: Minute Pirate Bug



These bugs attack thrips, spider mites, aphids and small insects.

Bad Bug: Squash Bug

- **Host:** Squash & Pumpkin
- **Description:**
 - Piercing sucking mouthparts remove plant juices of mature plants. High squash bug populations can literally drain plants causing them to die and wilt.
 - Eggs are brownish red on lower leaf surface. Reduced yields and poor quality fruit may result from squash bug feeding activities.
- **Recommendations:**
 - Resistant varieties include Butternut, Royal Acorn, and Sweet Cheese.
 - Effective control relies on timely sprays with good coverage. Look for egg masses, treating when most eggs have hatched and when nymphs are small/medium. Control of hard shelled adults is difficult.
 - Subsequent treatments are usually required due to the continual presence of egg-laying squash bugs.
 - Effectiveness of treatment varied by the life stage of the insect.
 - Nymphs only: Spinosad (Captain Jack's Dead Bug Brew; Monterey Garden Insect Spray; Natural Guard Spinosad); Permethrin = moderately effective
 - Adults: cyhalothrin (Spectracide Triazicide) and cyfluthrin (BioAdvanced Vegetable & Garden Insect Spray).
 - Prevent overwintering with tillage.



Good Bug: Tachinid Flies



Heavily bristled tachinid flies lay eggs on caterpillars, beetle larvae, and bugs.

Good Bug: Ground Beetles



These beetles are large, dark, and sometimes metallic. They feed along the ground on soft-bodied insects, especially at night.

Good Bug: Tiny Parasitic Wasps



Micro- and mini-wasps can sting & lay eggs in caterpillars, aphids or insect eggs. Larvae consume their prey from within.

Good Bugs: Praying Mantids

Mantids seem to have a good reputation, but actually eat relatively few garden insects.



Good Bug: Wasps & Hornets



Though often considered pests, these insects feed heavily on caterpillars, flies and other soft-bodied insects.

Bad Bug: Emerald Ash Borer

- **Hosts:** Ash
- **Description:**
 - Adults are small (1/2 inch long), slender insects with emerald green bodies.
 - Larvae can reach 1.25 inches and are white to creamy white with brown heads.
 - All species of native ash can be killed including green, white and black.
 - Leaves a D-shaped hole (more common ash/lilac borer leaves a round hole).
- **Recommendations:**
 - Infected trees cannot be saved.
 - High value trees can be protected with preventative insecticide treatments.
 - As of early 2020, Emerald Ash Borer has been confirmed in Atchison, Doniphan, Douglas, Jackson, Jefferson, Johnson, Leavenworth, Miami, Shawnee and Wyandotte counties in Kansas.



Bad Bug: Bagworm

- **Host:**
 - Junipers and arbovitae . Also attack other ornamental shrubs, shade, and forest trees.
- **Description:**
 - Bags look like Christmas ornaments.
 - Young bagworms hatch in May in Kansas and start to spin silken bags around themselves.
 - Female is wingless (stays in the bag). Male is a small, gray, clear-winged wasp like moth.
 - Feed on foliage of host plant.
 - Often damage is not noticed until bagworm so large that it is hard to control.
- **Control:**
 - Small infestations can be picked off by hand.
 - Wait a couple of weeks after seeing first larvae appear before spraying.
 - Can use acephate (Systemic Insect Control), malathion, cyfluthrin (Tempo, Multi-Insect Killer), permethrin (numerous trade names)



Bad Bug: Blister Beetle

- **Hosts:** Tomatoes, beans, peas, potatoes, and other vegetables.
- **Description:**
 - Adult Striped & Gray are the most common. Beetles move in swarms, causing defoliation but don't stay in one area long.
 - Long, slender bodies & a relatively large head.
 - Release a caustic substance when crushed that can raise blisters on the skin.
- **Recommendations:**
 - May move on in a day or two.
 - If beetles are handpicked, wear gloves.
 - A number of stomach insecticides such as cyfluthrin (BioAdvanced Vegetable & Garden Insect Spray), permethrin (Bonide Eight and Hi-Yield Lawn; Hi-YieldGarden, Pet and Livestock Insect Control) and gamma-cyhalothrin (Spectracide Triazicide) are also effective for control.



Some 'generalizations' about insect management...

- ID is key – and difficult...
- Scouting regularly is a bother – but a necessity...
- Not all insecticides are created equally – but many are effective
- Coverage is key
- ALWAYS read and follow label directions
- Understand product limitations, PHI's, and reapplication intervals
- Biological control is 'tricky'

Conservation Biological Control

- A biological control practice that includes any activity designed to protect, attract, or maintain existing populations of natural enemies
- Providing plants that attract natural enemies and supply a food source, such as nectar for adults.
- Install/incorporate 'trap plants'. These are plants generally located within or around the perimeter of the garden that attract insect pests that then serve as a reservoir for natural enemies, allowing natural enemies to move back and forth.

Conservation Biological Control Example



Flowering Plants (e.g. Zinnia) That Are Attractive To Beneficial Insects And Butterflies

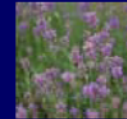
How to attract natural enemies...

Plants That Attract Natural Enemies

- Queen Anne's Lace (*Daucus carota*)



- Yarrow (*Achillea* sp.)



- Sweet Clover (*Melilotus* sp.)

- Sweet Alyssum (*Lobularia maritima*)

- Buckwheat (*Fagopyrum sagittatum*)

- Dill (*Anethum graveolens*)



- Fennel (*Foeniculum vulgare*)

- Coneflower (*Echinacea* sp.)



- Coreopsis (*Coreopsis* sp.)

How are they most effective?

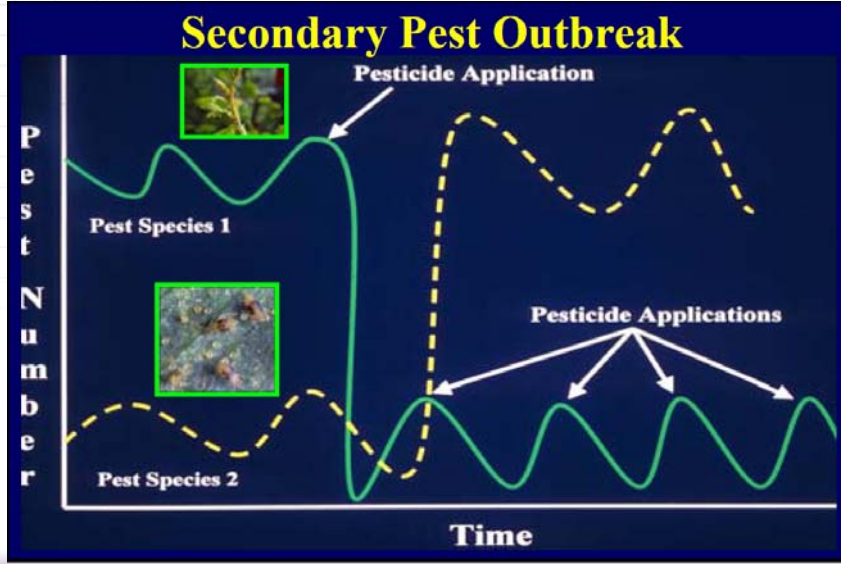
- * Flowering plant species can differ widely in their attractiveness to natural enemies.
- * Flowering plants should bloom early in the crop production cycle in order to attract natural enemies before pest damage occurs.
- * Flowering plants should attract fewer pests than the actual crop.

Human Disturbance

Many Insect And Mite Pests That Attack Horticultural Plants Are Associated With Some Type Of Indirect Response To Human Disturbance Factors



Unintended Consequences?



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Really awful, no good very bad Bad Bug: Bed Bug

This is a public service announcement approved by KSU Entomologists to help the public understand what this increasingly popular nuisance insect pest looks like.

I hope this lovely insect parting shot doesn't give you nightmares...

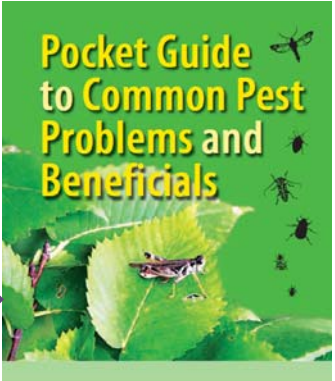




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Resource Links/Contact Information


- <https://hnr.k-state.edu/extension/info-center/>
- <https://bookstore.ksre.ksu.edu/pubs/S158.pdf>
- Encouraging Beneficial Insects in the Garden: Oregon State: <https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/pnw550.pdf>
- Meadowlark Extension District Offices:
 - Oskaloosa: (785) 863-2212
 - Holton: (785) 364-4125
 - Seneca: (785) 336-2184





Kansas State University Agricultural Experiment Station and Cooperative Extension Service



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