

Pest and Beneficial Insects in the Garden

Arlington Reads, Arlington Grows - Central Library Garden

Wednesday June 13, 2018 - Don Weber, USDA Agricultural Research Service

There's a whole world of insects in every garden! Most are not harmful, and many perform useful functions such as pollination, predation on pests, and hastening breakdown of compost and crop residue. And, some of them are beautiful and entertaining.

Of course, as pretty or productive as our gardens may be, they are not the Garden of Eden. Some insects there want to eat our food (or fiber, or houses); in sufficient numbers, these can be pests. There many ways to deal with pests in the garden, while maintaining a healthy environment.

A pest is simply an organism (insect, mite, pathogen such as fungus or bacterium, or plant (=weed)) in the wrong place. Virtually every group of organisms has benefits. Think of a beetle which eats a weed, a plant we do not want in our garden. That's an example of a herbivorous (plant feeding) insect which is performing a beneficial function. Viruses which infect suppress insect pests are beneficial: who would have thought of a beneficial virus?

In small gardens, particularly urban gardens with little surrounding vegetation, pests can show up by chance without their natural enemies. This can result in local outbreaks and damage to garden plants. Here are some tips on dealing with the inevitable appearance of pests in your garden:

- ❖ Build a healthy garden environment. Have blooming plants in and around your vegetables and fruits, and if possible have a perennial component which maintains an ecosystem and its services year-round. Rotate crops from place to place when possible, to discourage buildup of diseases and pests. Build the soil with compost and cover crops.
- ❖ Be aware of your plants and their accompanying fauna. If you detect pests early on, whatever intervention you take will be more effective. This puts a premium on learning about insects and their life cycles! Of course it is best to know all insects, mites, millipedes, etc., however, unlike with plant species, this is impossible. Recently though, a book keying all the *genera* (genus singular = group of species) of North American insects has finally become available (Marshall reference below). Crop-associated insect pest species tend to show preference for feeding by plant families. The better you know your groups of crops – and weeds – by their families, the more that insect occurrence and feeding will start to make sense, and be easier to remember. Here is an example and **we will see some of these pests today!**
 - Cole crops (cabbage, kale, collards, broccoli, cauliflower, kohlrabi) and related mustard-family crops (mustard greens, bok choy, turnips, radishes, weeds such as shepherds purse, wild and garden cresses) host a limited number of potential pest insects which include:
 - caterpillars: imported cabbageworm, diamondback moth, cabbage looper
 - aphids: cabbage, turnip, potato and green peach (the first two are specialists and the first species is most damaging)
 - harlequin bug: overwinters in all stages, most damaging pest for cole crop group overall in this area and to the south
 - cabbage root maggot and related root maggots: worst in wet, cold soil, and on small seedlings

- ❖ Employ easy and safe methods of pest control like row covers, hand-picking and insecticidal soap sprays. Your goal is not to eliminate all plant-feeding insects, but to reduce them while encouraging their natural controls.
- ❖ Recognize natural enemies. They are extremely varied in form and function. For instance, for aphids, lady beetles are important predators. For caterpillars, predatory wasps and hornets may be very important in the warmer months. But other natural enemies can be very effective as well. Syrphid fly larvae eat aphids, and tiny parasitoid wasps attack aphids, forming “mummies” from which new wasps emerge, as well as caterpillars like cabbage worm and tomato hornworm. **WHAT NATURAL ENEMIES can we see today?**

Trichogramma egg parasitoid ==>>



- ❖ Give a helping hand to beneficial natural enemies. Adults of many species such as syrphid flies and parasitoid wasps feed on shallow-nectary flowers like dill and daisies. That’s why planting flowering plants can discourage pests in your garden.
- ❖ Think twice before using pesticides in the home garden. You may (or may not) solve one problem while creating others. One reason is that pesticides may decrease beneficial insects more than pests, allowing pests to reproduce more rapidly afterwards. The resulting need for repeated chemical control has been called the “pesticide treadmill.”
- ❖ If in spite of your best efforts, a crop is repeatedly damaged by pests, try to outsmart them. Change your planting times, cover seedlings with row covers, seek resistant varieties, rotate to a new location, and recognize not all crops thrive everywhere. Gardening is a learning experience and the best gardeners – and farmers -- continue to learn from their mistakes.

❖ **ARE THERE POLLINATORS VISITING? What plants need insect pollination?**

2/3 of crops need pollination. Common examples are squash, cucumbers, beans, peppers, tomatoes, eggplant, and almost all fruit trees. What are the common pollinators?

- honeybees – native to Europe and Asia; hives are complex societies; new pathogens
- bumblebees – diverse native species; social but only queens overwinter; active in cool weather when honeybees are not
- native solitary bees (leafcutter bees, mason bees, digger bees, many others) – very important but less known than social bees. Example, squash bee, a specialist. Identify bees at <http://www.discoverlife.org/20/q#Identification>
- wasps – more important as predators than as pollinators
- flies – many species, some especially attracted to foul-smelling flowers
- beetles – poorly known, but many visit flowers
- butterflies and moths – very well-known; not all are good pollinators; moths visit fragrant flowers at night
- hummingbirds – limited role as pollinators in our area (but very exciting to have visit)
- bats – none are pollinators in our area, but important in the tropics

Books: Garden Insects (in the Library browse under 635.0497 and nearby)

Cranshaw, Whitney, and David Shetlar. 2018. Garden Insects of North America, 2nd edition. Princeton University Press. \$35.

Flint, Mary Louise. 2018. Pests of the Garden and Small Farm, 3rd ed. University of California Statewide Integrated Pest Management Project, Publication 3332. \$35.

Flint, Mary Louise, and Steve H. Dreistadt. 1998. Natural Enemies Handbooks: An Illustrated Guide to Biological Pest Control. University of California Statewide Integrated Pest Management Project, Publication 3386. \$17.

Grisell, Eric. 2001. Insects and Gardens. Timber Press. \$26.

Olkowski, William, Sheila Daar, and Helga Olkowski. 1995. The Gardener's Guide to Common-sense Pest Control. Taunton Press. \$19.

Books: Insects in General (in the Library browse under 595.7 and nearby)

Marshall, Steven A. 2006. Insects: Their Natural History and Diversity. Firefly Books. \$59.85, and a hardback bargain at 732 pages richly illustrated with color photos.

Berenbaum, May R. 1995. Bugs in the System: Insects and Their Impact on Human Affairs. Addison Wesley. \$14.

Cranshaw, Whitney, and Richard Redak. 2013. Bugs Rule! An Introduction to the World of Insects. Princeton University Press, \$50.

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Ground beetle (Carabidae)



Jumping spider (Salticidae)



Rove beetles (Staphylinidae)



Damsel bug (Nabis)

Assassin bug (nymph)

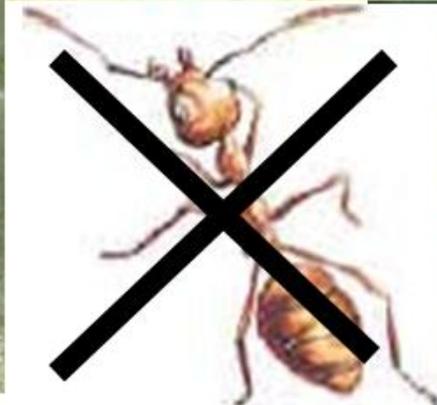


Minute pirate bug (Orius)



Big-eyed bug (Geocoris)

Know your friends! Learn to recognize common NATURAL ENEMIES of APHIDS



Syrphid (hover) fly adult

7-spotted lady beetle adult

Lacewing adult

Minute pirate bug adult (1 mm long)

Syrphid larva (maggot) on leaf

Lady beetle larva

Lacewing larva

Parasitoid wasp laying egg into aphid host

Spotted pink lady beetle

Ants help aphids !

Aphids killed by fungi

Mummified aphids (parasitized)