

Recognize and Conserve Natural Enemies



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When you see insects on plants in your landscape, is your first impulse to try to spray them? This is a normal reaction since large populations of harmful insects can build up and have devastating effects on host plants. But before you attempt to control a "pest," take time to identify the "suspects" properly. Are you really sure they are harmful?

Most species of insects and mites in your landscape are harmless. Some are even doing important pest management work for you. These useful insects, mites, and spiders are referred to as "natural enemies" or "beneficials." In a diverse landscape, there are usually plenty of beneficials already at work, quietly keeping pest populations at tolerable levels.

To encourage natural enemies in the landscape, maintain a habitat that allows beneficials to survive and reproduce. When beneficials cannot completely manage pest populations, other control measures may still be necessary. If you know that beneficials are at work, choosing management tactics that will have the least impact on these useful creatures makes sense.

Use the following steps to maintain beneficials in your landscape:

1. CHOOSE A VARIETY OF PLANTS

Some key landscape plants are more susceptible than others to infestation by harmful insects and mites. Choose plants that are less susceptible to common pests.

Maintain a diversity of plants in your landscape and try to include some plants native to your area. Plant a variety of flowering plants to provide nectar and pollen, alternative food for natural enemies. Groundcovers, trees, and shrubs combined to form a complex ecosystem will harbor good populations of beneficial organisms.

2. LOOK FOR PESTS AND THEIR EVIDENCE

Look for insects and mites on plants from time to time. Use a magnifying lens if necessary. Most species that you observe will either be beneficial or "just

visiting," so look for damage on plants as well.

It is not always easy to tell what is causing a plant problem, but some symptoms are evidence that harmful insects, mites, or slugs are present. Slugs and insects with chewing mouthparts can be responsible for plant tissue disappearance, causing skeletonizing of leaves or holes in leaves and flowers. Other insects and mites harm plants by feeding on sap or plant fluids, which causes curling and discoloration of leaves. Insects that bore into plants make holes in trunks, twigs, and stems. Mites often make a very fine webbing, while slugs leave slime trails. Many pests leave specific droppings that can be used to detect their presence.

3. IDENTIFY THE HARMFUL ORGANISMS FIRST

Pests are often found in large numbers, and they usually are closely associated with the damage they cause. Check for descriptions of pests in garden reference books and on Web sites. Many of the best books focus on the host plant and give a list of the pests associated with each. These references often have drawings or photographs and detailed descriptions of each pest. Try to match the pest with the written description, but keep in mind that many insects have immature life stages that look and act very different from the adults. If you are not sure of the identification, check with an expert. Your local extension office is a good place to turn to for help with accurate identification.

4. IDENTIFY THE NATURAL ENEMIES

Beneficial insects tend to be inconspicuous and occur in smaller numbers than the pest populations. Look carefully among pest populations for smaller numbers of insects that look different. Signs of the presence of beneficials include white or brown cocoons on the backs of harmful caterpillars or swollen, parasitized aphids. These signs are often easier to see than the beneficials themselves.

Natural enemies of pests can be divided into two categories depending on how they feed on pests. They are referred to as predators or parasites.

Predators capture and eat pests.

Generally, they will consume a variety of pests, providing general insect population control. Some of the most important predators you are likely to see in your garden include the following groups:

Spiders have eight legs and no wings. They are important natural enemies and can have a significant impact on pest populations. Although the bite of a few spiders can cause a reaction in humans, they are usually harmless if not provoked.

Lady beetle adults are commonly called "ladybugs." Adults are dome-shaped, 1/16- to 3/8-inch beetles with black spots on orange or yellow front wings. There are other types of lady beetle adults that are solid black, solid orange, or black with red spots. Some species are quite tiny. Lady beetle eggs are orange or yellow, spindle shaped, and laid in groups. Ladybug larvae look somewhat like tiny black and orange alligators—totally different from the adults. They are usually found on plant foliage, near colonies of pest insects. Some lady beetle larvae are spiny; some have a white, waxy appearance and could be mistaken for mealybugs.

Lacewing adults are green or brown 1/4- to 1/2-inch long insects with lacy, delicate wings. They are often seen around foliage, but they are also attracted to lights at night. The larvae are shaped somewhat like lady beetle larvae, but they usually are less brightly colored. The tiny eggs are distinctive because the female green lacewing attaches them to the foliage with a thin stalk, making them look like white droplets on a string. Lacewings eat a variety of small insects, and the larvae are especially voracious.

Syrphid flies are also known as hover or flower flies because they hover around flowers, behaving like tiny bees. The larvae are small and sluglike and eat small, soft-bodied insects such as aphids and whiteflies.

Predatory midge larvae are found among colonies of aphids or mites. They are small, orange, maggotlike, legless larvae up to 1/8-inch long.

Predaceous mites are very important predators of harmful mites. They are teardrop shaped, often tan or brown,

and faster moving than the pest mite species. You need a magnifying lens to see them because of their small size. Predatory mites are sensitive to non-selective pesticides. Their effectiveness as predators is most noticed when they are destroyed by a pesticide application, allowing pest mite populations they normally keep in check to rage out of control.

Parasites grow in or on the bodies of their prey.

Most insect parasites are tiny, inconspicuous species of wasps and flies. You are not likely to find the parasitic insects themselves, but you may find evidence of their presence. Look for eggs of pest species that are a different color, mummified pest insect bodies with holes where a parasite emerged, or cocoons on the backs of harmful caterpillars. Unlike predators, beneficial parasites tend to attack a small number of pest species or closely related species groups.

CHOOSE CONTROL METHODS CAREFULLY

Natural enemies are sensitive to the effects of certain pesticides. They tend to reproduce more slowly than pests and will usually take longer to rebuild their populations after a pesticide application. If the beneficials are destroyed, pests that no longer have adversaries may multiply more quickly. This increase could result in infestations that are worse than they would have been had nothing been done at all.

Sometimes the amount of damage done by a pest species is not serious enough to justify using control measures. If you decide you need to manage pests, consider a physical or biological pest control method, if possible. (See IPM fact sheet *Pest Management Methods* for more information on choosing a control method.) If you must use a registered pesticide, selectively use the least toxic one possible. Avoid applying spray to plants or parts of plants where it is not necessary. Try to conserve natural enemies by leaving areas untreated where they can survive. Use pesticides that have the least persistence yet are still effective against the target pest, such as Bt against leaf-eating caterpillars.

SELECTED REFERENCES

A videotape, *Insects and Spiders and Mites, OH MY!* is available through the Publications Distribution Center, The Pennsylvania State University, 112 Ag Administration Building, University Park, PA 16802, phone: 814-865-6713.

Delaware Cooperative Extension has a fact sheet on beneficial insects on its Web site at bluehen.ag.s.udel.edu/deces/hyg/hyg-14.htm.

Purdue University has a fact sheet with color photographs called *Common Natural Enemies* that can be downloaded from www.entm.purdue.edu/Entomology/ext/targets/e-series/EseriesPDF/E-92.pdf.

FOR MORE INFORMATION

Penn State Cooperative Extension, the University of Delaware, and the Southeast Pennsylvania IPM Research Group have been working together to provide information and educational materials on IPM and landscaping.

This fact sheet, *Recognize and Conserve Natural Enemies*, is part of a series of educational fact sheets about using and understanding integrated pest management. Other topics in the series include:

- Creating Healthy Landscapes—Introduction
- Choose Plants Wisely
- Plant with Care
- Promote Plant Health
- Keep Plants Well Groomed
- Monitor Pests and Keep Records
- Pest Management Methods
- Use Nature's Signals to Manage Landscape Pests

Copies are available from your local extension office.

The Southeast Pennsylvania IPM Research Group is a collaboration of university and industry horticulture professionals who are inspecting landscapes across the region to monitor pest populations and share current IPM data. The group is partially supported by the Pennsylvania IPM Program (PAIPM). For more information about the research group, contact Penn State Cooperative Extension, Montgomery County, 1015 Bridge Road, Suite H, Collegeville, PA 19426-1179; phone: 610-489-4315.

Prepared by:
Karen Bernhard, Penn State master gardener
Gregory Hoover, extension entomologist
Casey Sclar, Longwood Gardens, IPM coordinator
Jim Stimmel, Pennsylvania Department of Agriculture entomologist
David Suchanic, Penn State Cooperative Extension educator
Emelie Swackhamer, Penn State Cooperative Extension educator

Title illustration by Mary Thompson