

William T. Kemper Center for Home Gardening

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A Guide to Beneficials in the Home Garden

Beneficials are living assets to the home garden. Some reduce pest populations to reasonable levels, while others pollinate crops, providing better yields. Some are predators that catch and eat certain pests, while others are parasites that consume their victims alive. Some are diseases that kill or weaken their victims and others are decay organisms that enrich the soil.

Often we think of a beneficial as an insect, like a praying mantis or a ladybug (lady beetle), but beneficials are not limited to the insect world. Many members of the animal kingdom are beneficial to our gardens. There are also diseases and even some plants that are beneficial to other plants.

Beneficial predators eat garden pests, either by piercing their bodies and sucking out the contents or by chewing and ingesting them. Predators are usually larger than their prey and are much fewer in number as illustrated by the lacewing larvae in the picture on the right, which is eating scale insects (white oblongs). Most predators are indiscriminate feeders, eating anything they can catch. Nearly every order of insect includes some species that are beneficial. There are beneficial beetles, flies, true bugs, ants, bees, wasps, mantises, lacewings, dragonflies and thrips. Beneficial arachnids include all spiders, predatory mites and daddy-longlegs. Many other members of the animal kingdom are predators of garden pests, including centipedes, most birds, and creatures, like bats, snakes and even moles, that not all gardeners welcome into their home landscapes.



Beneficial parasites, like predators, consume some part of their prey. Unlike predators, however, parasites are usually much smaller than their prey, more numerous, and only attack a single, specific host, as in the example on the right. A tiny parasitic wasp laid its eggs on this hornworm (a type of caterpillar that is the larval stage of a sphinx moth). After devouring the hornworm alive from the inside, the wasp larvae emerge onto the outer skin of the caterpillar and spin white cocoons in which to pupate. Later, a tiny wasp will emerge from each cocoon and fly away in search of a mate and a hornworm on which to lay its eggs. In the garden beneficial parasites are usually parasitoids, parasites that kill their host. They are usually parasitic wasps, parasitic flies, nematodes, or bacteria.



Beneficial pollinators move pollen from the anther of a flower to the stigma, an action that is crucial for the pistil (ovary) to develop into seeds or fruits. Without the movement of pollen by insects, 90% of all flowering plants would not exist, including many of our food crops. King among the insect pollinators are bees, as in the picture on the right showing a honeybee with bright, golden pollen loaded onto its hind leg. However, anything that moves pollen from one flower to another can be a pollinator, including humans. Some plants are wind pollinated, for example, many shade trees and grasses. Others plants require insects, bats, or hummingbirds. The shape of some flowers may require a specific pollinator. Among the insect pollinators are bees, wasps, flies, butterflies, moths, beetles, and lacewings.



Beneficial decay organisms help break down dead plants and animals into a form of organic matter that is necessary for plant growth. Without their help, the world would be literally covered in dead plants and the bodies of animals, but they also have other important functions. Without organic matter in and on the soil, most of the plants we wish to grow would not be able to absorb the nutrients they need. In addition to enriching the soil, organic matter also reduces soil compaction and improves both soil drainage and its water-holding capacity. The organisms of decay include bacteria and many kinds of fungi, like the stinkhorn shown in the picture on the right. Fungi are often found showing off their skills as beneficial decayers in mulch, which is comprised of dead plant tissue, the very thing that decay organisms consume. Many insects are also part of the decay process. Chief among these are probably ants and flies (or at least the larval stage of flies, called maggots), but there are many others, such as, beetle and moth borers that only attack dead wood (for example, firewood) and bristletails. Other invertebrate involved in the decay process include earthworms, millipedes, sowbugs and pillbugs. The organisms of decay are varied, numerous and absolutely essential to all other organisms on the planet.



In order to keep beneficials in our gardens, we must provide them with an environment compatible with their existence. They need sufficient food and water for themselves as adults and sufficient food and water for their offspring. They need a safe home for the summer and a safe place to spend the winter. They need the proper plants or prey upon which to lay their eggs or feed their offspring. If we remove or fail to provide any of these requirements, they will either leave for greener pastures or die.

Strategies for keeping beneficials in the home garden

1. Know your friends from your enemies. For identification and advice:
 - a. Visit the Missouri Botanical Garden's Gardening Help website (<http://www.gardeninghelp.org>). You may email your questions and pictures or bring a sample to the Plant Doctor Desk or call to talk to master gardeners at the Horticulture Answer Service at 314-577-5143, between 9 a.m. and noon, Monday through Friday.
 - b. Or contact your local extension office (<http://www.csrees.usda.gov/Extension/>). For St. Louis City and County, questions involving gardening are handled by the Missouri Botanical Garden.

2. Observe and evaluate possible pests. If the "pest" is not damaging your plants, then it may not be a pest at all or it may be benign or it may be infested with either a parasite or a disease, like the hornworm discussed earlier. These nonfeeding pests should be left in place to allow the disease or parasite infecting them to spread to other pests.
3. Before using any pesticide, check for the presence of beneficials. This precaution should be taken even when hosing off your plants with ordinary water, because the beneficials may be just as incapable of finding their way back to your plants as the pests you hosed off. Some of our most voracious beneficials are the larval stages of certain insects, such as, green lacewings and lady beetles, and the larvae cannot fly back to your plants because only adult insects have wings.
4. Tolerate larger pest populations on some plants, especially in early spring, because a large population of pests will attract egg-laying adult beneficials.
5. Tolerate some damage throughout the year. Most plants can easily tolerate a few holes in a leaf or a few missing leaves, but if there are not enough pests in your garden to sustain beneficials, the beneficials will leave or die, and without them, the pest population in your garden will explode.
6. Restrict preventive pesticide use to special plants and special circumstances; such as, a young plant that could be killed by a heavy infestation or a treasured heirloom plant handed down from generation to generation or a pest situation that cannot be controlled in any other way (see Strategy 1 for who to consult in this situation).
7. Know your pesticides and what they do. Read the label and realize that for every pest killed by a pesticide, there probably exists a beneficial that will be killed by the same pesticide. **(A pesticide label only lists the pests that it is labeled to control, not everything that it kills.)** Also, realize that overuse can cause pest populations to explode because the beneficials that could have controlled the pests are dead and it will take more time for new beneficials to find your plants than for the pests to find them.

Note: Insecticidal soaps, although non-toxic to most adult beneficials, may kill the larval stages of the same beneficials, because insecticidal soap kills soft-bodied insects and most larvae are soft-bodied.

8. Restrict fall cleanup to specific plants that overwinter pests on or in their foliage, such as, bearded irises, peonies, garden phlox, vegetables, and fruits. Leaf litter and plant debris provide a winter home for many beneficials, including ladybugs (lady beetles). Also, many birds search through leaf litter for winter food. Instead of reducing plant debris, consider providing more. Predatory ground beetles, centipedes, and other beneficials overwinter in undisturbed soil and under logs or boards.
9. Fill your garden with nectar plants, because many beneficials supplement their diet with nectar and pollen and are attracted to these plants. For a list of nectar plants suitable for your area, visit Pollinator Partnership online (<http://pollinator.org/guides.htm>).