

## Attracting Beneficial Insects

*To lure good bugs to your garden, first get to know the players, then give them the right habitat*

It happens every spring. First a few aphids appear on the cole crops. I barely notice. A week later the aphids have doubled. I start to get concerned. After another week the number has grown again. Should I panic? Reach for the soap spray? Will my helpers come to my aid again this year? And then, one morning, there they are, lady beetles wandering among the aphids, dining contentedly. In a few days there's hardly an aphid to be found. I'm always amazed that the lady beetles come in such numbers, and at the right time. And they always do the job.

Our garden consists of numerous vegetable beds surrounded by a diverse border of annual and perennial flowers, herbs, and fruit trees. Next to the garden are wild areas where some of the less troublesome weeds grow to maturity. And among the vegetable beds are plots of alfalfa, clover, and buckwheat. In these places dwell a militia of beneficial insects, ready to emerge to eat or parasitize other insects that may be harmful to our plants. On a warm summer day, I can see a light haze of tiny parasitic wasps visiting the fennel flowers in search of nectar. The nectar will sustain them while they look for aphids or caterpillars in which to deposit their eggs. It's a relief to have such formidable allies. I haven't needed even an organic pesticide in 15 years

To create a welcoming habitat for your insect helpers, first you need to know something about them. A good way to start is to grab a hand lens and a picture book of insects and take a rough census of your resident population. If you've avoided using pesticides and have a variety of plants growing, you may find many allies already present. The ones you're most likely to see include lady beetles, ground beetles, lacewings, hover flies, a couple of true bugs, and a few tiny wasps. These can be divided into two groups: those that eat their prey directly (predators) and those that deposit their eggs on or into their host (parasitoids).

**Beetles** -- The two kinds of beetle that are most helpful are lady beetles (a.k.a. ladybugs) and ground beetles, both predators.

**Lady beetles** -- Lady beetles prey on aphids and other soft-bodied insects. The adults will eat as many as 50 aphids per day. If you have enough aphids, and the beetles stick around long enough to lay eggs, each hatched larva will eat some 400 aphids before entering its pupal stage. There are many species of lady beetle that attack many different prey. The adults are independent, flighty creatures. If you buy some at the garden center and release them into your garden, be prepared to watch most of them fly away to your neighbor's yard. Those that stay, though, will be a big help.

**Ground beetles** -- they don't fly much, preferring to run away when disturbed. You probably won't see them unless you uncover their hiding places. If I see them at all, it's when I'm picking up old piles of weeds. They're relatively large (about 3/4 inch), and dark, with long, jointed legs. They're nocturnal hunters, rooting among leaf litter for insect eggs and larvae.

Our garden is also home to hoards of soldier beetles, which show up for the late spring aphid feast. And I sometimes encounter mite-and-snail-destroying rove beetles that inhabit piles of decaying organic matter.

**Lacewings** -- When the fairylike green lacewing flutters silently by in search of pollen or nectar, I find it hard to imagine it in its fiercely predacious larval stage, during which it devours aphids, caterpillars, mealybugs, leafhoppers, insect eggs, and whiteflies. It even eats other lacewings. Up close, the larva looks like a tiny (1/2 inch) alligator. If you keep a supply of flowering plants, adult lacewings may take up residence. If you decide to introduce beneficial's to your garden, lacewings are the most effective predators you can buy.

**Hover flies** -- With their striped abdomens, hover flies look like small bees, but they move through the air more like flies, zipping from plant to plant, hovering briefly before landing. The hover, or syrphid, fly is one of many predatory flies and the most conspicuous beneficial in our garden. I can find them just about anytime anywhere in the garden. They visit a variety of flowers in search of pollen and nectar, and they lay their eggs near aphids or other soft-bodied insects. The eggs hatch into hungry larvae that eat up to 60 aphids per day.

**True bugs** -- There are bugs and then there are true bugs. True bugs, like the minute pirate bug and the big-eyed bug, belong to the insect order *Hemiptera*. Many are plant feeders but many are predacious, with tubular mouthparts they insert like a straw to suck the juices out of their prey.

**The minute pirate bug** is a tiny (1/12 inch) predator with a wide-ranging appetite; it eats aphids, thrips, mites, whiteflies, and insect eggs. It lays its eggs on the leaf surface near its prey; nymphs hatch and begin feeding. The cycle from egg to adult takes only three weeks.

The other important true bug is the **big-eyed bug**. It's a little bigger than the minute pirate bug and has a similar diet. It also eats nectar and seeds, so it may stay even if it can't find an insect to eat.

You might come across some other common predatory true bugs, including **assassin bugs**, **damsel bugs**, **thread-legged bugs**, and a couple of species of **stinkbug**.

**Parasitic wasps** -- These very helpful creatures, ranging in size from small to minuscule, will defend your garden against caterpillars like corn earworm, tomato fruitworm, cabbageworm, and tent caterpillars. The smallest and perhaps most popular parasitic wasp is the trichogramma, a dust-size creature that lays up to 300 eggs in moth or butterfly eggs. You can buy them through the mail if you're expecting an infestation of caterpillars. They don't live very long so timing their release to coincide with the presence of pest eggs is pretty important.

**Braconid, chalcid, and ichneumid wasps** are much larger than trichogramma, and parasitize caterpillars directly, laying eggs in or on the caterpillar. The hatching eggs eventually either kill the host or disrupt its activities. Braconids parasitize aphids as well. If you're scouting with a hand lens and notice some mummified aphids with neat circular holes in them, you'll know a braconid was there. A young wasp developed inside the aphid and ate its way out.

**If you build it, they will come** -We're living in a bug-eat-bug world. And I want to keep it that way. To do so, I've transformed my garden into an insectary, a habitat where my beneficial insect friends will feel at home. I provide them with food, water, and shelter. I keep the soil covered with organic matter. And I avoid putting any harmful chemicals into their habitat.

The menu for beneficials changes constantly as the pest population shrinks and swells, and as different flowers come into bloom. Many of the predators and most of the parasites will use pollen and nectar for food. I try to sustain them throughout the year by growing a variety of flowers that bloom at different times. Since many of the beneficials are tiny or have short mouthparts, I offer them tiny flowers with short nectaries. Many plants in the carrot and aster families offer just that.

I water my garden with overhead sprinklers, so insects always have puddles and wet leaves to drink from. If I were using drip irrigation, I'd offer them water in a saucer filled with pebbles, so they don't drown.

Just like the rest of us, beneficials need protection from heat and rain. They need to hide from birds and insects who would make a meal of them. Again, a variety of leafy plants offers protection. Ground beetles hide in low-growing ground covers and in mulch or leaf litter. Flying insects hide in shrubs, on the undersides of leaves, even among the petals of marigolds.

**Beneficials** also need a reason to stay on when they've finished cleaning up the crops or at the end of the season when you've cleaned up the garden. Consider trying to recreate in a corner of the yard or on the edge of your garden the thick, wild diversity of a hedgerow by using a variety of early-flowering shrubs, perennials, and grasses to provide year-round shelter and a place for alternative prey to dwell. Keep this beneficial insect reservoir as close to your garden as you dare. If the insects get too comfortable in the hedgerow, they might not be inclined to travel very far for a meal. As long as there is a place for pests, the beneficials may stay to eat in your weedy refuge rather than head for the neighbor's yard.

### **Gardening strategies that attract beneficials**

Insect allies hate dust. Keeping the soil covered at all times, either with mulch or with growing plants, conserves moisture, moderates temperatures, and eliminates dust. It also provides habitat for ground and rove beetles. Try not to eliminate every weed. Leave some for the insects.

If you use selective insecticides to rid yourself of pests, you run a very strong risk of ridding your beneficials of prey, as well, even if you're using relatively benign products, like Bt or other biologicals. Nonselective pesticides could rid you of beneficials altogether. I believe there's no place in an insect habitat for these chemicals. When you abandon chemical control for biocontrol, you may experience a sudden increase in pests. It may take a while for the beneficial insect population to expand to the point that you can relax your guard. In the meantime, I'd rely on less-harmful botanical and natural controls to slow down the bad guys until the good guys show up.

**Creating a habitat** for wild insects is a very imprecise activity. With experimentation and observation you may hit on the right combination of insectary plants that encourages the right combination of insects for your garden. Your success will probably vary from year to year as the climate and vegetation change and new pests arrive. You should expect the development of a habitat where pests and beneficials exist in a rough balance to be an effort of several years rather than a season or two. Despite the presence of so many beneficials in our garden, I still find myself from time to time having to hand-pick squash bugs or rub scale from branches of the fruit trees.

### **There are a lot of plants to choose from**

Creating your habitat can be a colorful affair. Start luring beneficials quickly with annuals like alyssum, cosmos, zinnias, sunflowers, and marigolds. At the same time, set out perennial flowers and herbs, including golden marguerite (*Anthemis tinctoria*), yarrow, lavender, mint, fennel, angelica, and tansy. Beneficials are also fond of dill, parsley, and cilantro flowers. When you've finished harvesting these herbs, leave the plants in the garden to flower. I like to let a small patch of carrots run to flower. Their blossoms are sweetly fragrant; beneficials love them.

I try to intersperse insectary plants with my vegetables. I figure if the target pests are close by the pollen and nectar source, there's a greater likelihood the beneficials will find them. If you add to all this a patch here and there of alfalfa, buckwheat, or clover (all quite attractive to beneficials), you'll be well on your way to establishing an arsenal of insect allies. Your garden will be healthier and safer because of it.

It's mid-October and the walking stick cabbage is covered with whiteflies. If I shake a plant, a fluttering cloud rises from the waxy leaves. A few hover flies move among the plants, depositing eggs on the leaves. With lens in hand, I turn over each leaf and look closely at the mass of whitefly eggs, nymphs, and adults. A few hover fly larvae are feeding on the whiteflies. I notice that a couple of larvae have already pupated. New hover flies will emerge in a few days and begin looking for pollen and nectar. A large Asian lady beetle is grazing through the crowd. I guess I can relax. It looks like the insects have this outbreak under control.