

Attracting, Importing and Using Beneficial Insects -- Part 1

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Attracting or importing beneficial insects into your yard or garden is a great way to reduce the number of detrimental insect pests without having to resort to toxic pesticides or insecticides.

Predators, Parasites and Pollinators -- oh my!

There are four categories of beneficial garden insects:

Predators are generally larger than their prey and consume many pest insects throughout their lifetime. They are often considered general feeders, which means that they eat a variety of insect species. Unfortunately, some predators, like the voracious praying mantis, will eat just about anything in its path, including other beneficials. Both immature and adult predatory insects consume garden pests and some feed on pollen and nectar at various stages of their life-cycle. (The picture above shows a ladybug larvae feeding on aphids.)

Parasites, on the other hand, lay their eggs on or inside a host insect or egg. When their eggs hatch, the young larvae consume the host, eventually killing it. Parasitic insects are usually much smaller than their host and tend to be more insect specific than the predators. However, this is not always the case. The tiny trichogramma (wingspan: 1/50th of an inch), is a parasitic wasp that attacks the eggs of at least 200 different moth and butterfly species preventing the leaf-eating caterpillar from emerging (think cabbage loopers and corn earworms).

Pollinators help keep plant species growing and producing year after year. As much as 80% of the world's flowering plants require pollination to produce fruits and seeds -- including two thirds of all food plants. Honey bees, butterflies, beetles, flies, and wasps are all well-known pollinators. A lesser known beneficial insect, the hover fly, not only pollinates plants in its adult stage, but feeds on soft bodied pests, like aphids, in its larval stage.

Tip: Use short-lived organic sprays only as a last resort to reduce the risk of harming pollinating insects (see Protecting the Birds and Bees). If they're gone, all of your best efforts spent fertilizing, pruning, watering and weeding will be wasted. Encourage or import pollinators whenever possible.

Decomposers are essential for breaking down garden waste and enriching the soil by releasing nutrients into a form that is usable by plants. They include a diverse group of soil-dwelling and wood-boring insects and are largely responsible for creating the rich, dark organic layer of soil (humus) that blankets a portion of the earth. Without these insects we would be "neck-deep" in excrement and dead plant and animal tissue. (Three cheers for the decomposers!).

There are two ways to get predatory and parasitic insects into the garden. They can either be lured naturally (see Attracting Beneficials), or imported -- bought and released into the garden. But before you head out to purchase a bunch of "good bugs," come up with a game-plan for your backyard.

Integrated Pest Management

A great way to formulate a plan and deal with unwanted pests is to use a pest management strategy known as Integrated Pest Management (IPM). This common sense approach to pest control utilizes a number of environmentally friendly techniques to keep pest numbers low and under control. Treatments are timed to have the most impact against the pest and cause the least amount of harm to its natural enemies.

Start off by monitoring for pests daily when you water. Don't forget to look on the underside of leaves -- it's a great hideout for hungry bugs and their eggs. By checking your plants frequently you'll be able to find pests while they are still young and not quite so numerous.

Next, figure out what pest you are dealing with. If you aren't sure, ask your local extension service. It also helps to know a little something about the pests life-cycle so that control methods can be selected and administered when they will be most effective.

Decide how much damage you are willing to deal with. The idea is to control the pest, not eradicate it. Can you live with a few holes in the leaves of your broccoli? How do you feel about chewed up tomatoes?

Attracting, Importing and Using Beneficial Insects -- Part 2 – Beneficial Insects and Pest Controlled.

If you need to take action use pest control methods that are least harmful to you, your plants, and the environment. This is where the beneficials come in to play.

Below is a list of several predators/parasites and the pest species they control.

Beneficial Species	Pests Controlled	Release Instructions
Aphid Midge (<i>Aphidoletes aphidimyza</i>)	Aphids	Release 2 to 5 per 10 square feet. Repeat weekly for at least three weeks. Ideal for greenhouse use.
Aphid Parasite (<i>Aphidius colemani</i>)	Aphids	Release 2 to 5 per 10 square feet, depending on pest level. Repeat weekly for a minimum of three times.
Bumble Bee (<i>Bombus impatiens</i>)	Crop Pollination	A hive of 40 to 60 worker bees will cover up to 5,000 square feet.
Fly Parasite (<i>Muscidifurax zaraptor</i> , <i>Spanglia</i> spp.)	Filth Flies	For best results, start releases early, before flies become a problem. Release 500 parasites per large animal (cow, horse) and 250 parasites per medium sized animal (goat, sheep). For manure and compost piles use 5 parasites per cubic foot.
Fungus Gnat Predator (<i>Hypoaspis aculeifer</i>)	Sciarid fly and fungus gnat larva as well as other soil dwelling insects	Apply 10,000 predators per 200 to 1,000 square feet, depending on pest levels.
Green Lacewing (<i>Chrysoperla rufilabris</i>)	General predator of many soft-bodied pests and their eggs, including aphids and spider mites.	Use 1,000 lacewing eggs per 1,200 square feet. A second release two weeks later, may be necessary.
Ladybug (<i>Hippodamia convergens</i>)	General predator of aphids and other soft-bodied pests, mites and eggs.	Release 2,000 per 1500 square feet when pest levels are low to medium.
Leafminer Parasite (<i>Diglyphus isaea</i>)	Attacks leafminer larva in the mine	Release 500 to 1,000 parasites per 44,000 square feet. Repeat every other week for up to 3 weeks.
Mealybug Destroyer (<i>Cryptolaemus montrouzieri</i>)	Used against all species of mealybugs and will feed on soft scale and aphids, if necessary.	Apply 2 to 5 per plant (0.5 per square foot) depending on level of pest infestation. Most active at temperatures 70° F, or higher.
Minute Pirate Bug (<i>Orius</i> spp.)	A general predator of many soft-bodied pests, including thrips, small caterpillars, leafhoppers, scale, spider mites and aphids.	Use 5 to 10 per square foot of growing space. Best results are achieved when released in the late afternoon or early morning.

Praying Mantis (<i>Tenodera aridifolia sinensis</i>)	A general predator, it attacks just about any insect in its way, including other beneficials.	Use 3 egg cases for areas less than 5,000 square feet -- increase this amount for larger growing areas.
Predatory Mite (<i>Phytoseiulus persimilis</i>)	Two Spotted Spider Mites	Release 1,000 predators per 350 square feet or 1 to 2 per infested plant leaf. A second release should be made one week later, if pest levels are high.
Spined Soldier Bug (<i>Podisus maculiventris</i>)	Attacks more than 100 different insect pests, including flea beetles, cabbage loopers, corn earworms and Colorado potato beetles.	Apply 5 to 10 Soldier Bugs per plant, depending on pest numbers. Reapply if pest numbers are high.
Thrips Predator (<i>Amblyseius cucumeris</i>)	Consumes thrips, as well as mites, honeydew and pollen.	Release 25,000 predators per 1,000 square feet. Repeat every few weeks, if necessary.
Trichogramma Wasp (<i>brassicae, minutum, pretiosum</i> spp.)	Seeks out and destroys the eggs of over 200 moth and butterfly species that are leaf eaters in their caterpillar stage.	Release 5,000 parasites per 5,000 square feet. Make releases weekly for 3 to 6 weeks.
Whitefly Parasite (<i>Encarsia formosa</i>)	Greenhouse Whitefly	Apply 2 to 4 parasites per square foot of infested area. Best results are achieved when temperatures exceed 70° Fahrenheit.

Attracting, Importing and Using Beneficial Insects -- Part 3 – Maintaining Good Insect Habitat.

Maintaining Good Insect Habitat

Whether you choose to attract or import beneficial organisms, you'll need to provide an attractive space for them to live, or they won't stick around. There are several ways to maintain beneficial insects.

Choose plants that provide plenty of food. In general, insects will eat pollen and nectar from plants with small flowers. Attractive annuals and perennials can be sown throughout vegetable rows or planted as a border around the garden (see [Beneficial Borders](#)). Be sure there are both early and late bloomers in your seed mix so the insects have enough food when pests are less prevalent. Alyssum and pansies are early bloomers while goldenrod, sedum, and asters bloom later in the season.

For a list of [insectary plants](#) that will help attract specific beneficial insects check out the table below.

Insectary Plant(s)	Beneficial Species Attracted
Black Eyed Susan	Parasitic Wasps, Honey Bees, Hover Flies
Candytuft	Syrphid Flies, Hover Flies, Honey Bees, Ground Beetles
Caraway	Parasitic Wasps, Lacewing, Hover Flies, Big-Eyed Bugs
Clover	Tachinid Flies, Parasitic Wasps, , Ground Beetles, Big-Eyed Bugs, Hover Flies, Ladybugs, Honey Bees
Coreopsis	Ground Beetles, Syrphid Flies, Lacewing
Cosmos	Lacewing, Hover Flies, Parasitic Wasps, Big-Eyed Bugs
Dill	Ladybugs, Lacewing, Hover Flies, Parasitic Wasps
Dwarf Morning Glory	Ladybugs, Hover Flies
Evening Primrose	Ground Beetles, Honey Bees
Fennel	Parasitic Wasps, Hover Flies, Tachinid Flies, Damsel Bugs, Ladybugs, Lacewing, Big-Eyed Bugs
Lavender	Hover Flies, Parasitic Wasps, Honey Bees
Lemon Balm	Hover Flies, Parasitic Wasps, Honey Bees, Tachinid Flies
Parsley	Tachinid Flies, Parasitic Wasps, Hover Flies
Queen Anne's Lace	Minute Pirate Bugs, Hover Flies, Ladybugs, Lacewing, Parasitic Wasps, Tachinid Flies
Sunflower	Ladybugs, Syrphid Flies, Parasitic Wasps, Spined Soldier Bugs, Minute Pirate Bugs
Sweet Alyssum	Parasitic Wasps, Hover Flies, Aphid Predators, Tachinid Flies, Ground Beetles
Tansy	Lacewing, Ladybugs, Parasitic Wasps, Tachinid Flies
Yarrow	Ladybugs, Lacewing, Hover Flies, Parasitic Wasps, Honey Bees

By improving the diversity of plants in your backyard you can ensure your landscape is not only more attractive, but also meets a variety of beneficial insect needs. Including plants of different heights can be very helpful. Low growing plants, such as mint, clover and thyme, act as a shelter for ground beetles, while fruit trees and many flowering shrubs create a safe habitat for parasitic wasps and other flying insects. Leaf litter, mulch, and ground debris provides protection from birds as well as offering shelter from the elements.

Provide water. A shallow birdbath or dish filled with small stones will supply plenty of water for tiny beneficials. Insects can also drink from the wet leaves and puddles created by overhead sprinklers.

Avoid chemical use. Insecticides and pesticides will kill the insects you want to encourage as well as the ones you'd like to see disappear (see [Are Pests the Problem or Pesticides?](#)). If you must spray, select natural pesticides that are specific to the target pest. For example, *Bacillus thuringiensis* will control leaf-eating caterpillars, such as cabbageworms, gypsy moths, and hornworms without harming their natural enemies.

Note: Botanical insecticides (derived from plants), such as pyrethrum, rotenone and neem will harm all insects they come in contact with and should only be used after all other organic pest control methods have been exhausted. They do, however, break down more quickly in the environment than chemical pesticides, and as a result, have fewer harmful side effects.

Proper timing. Be sure to properly time the release of biological controls. Parasites with one specific host will need to be released when that host is available, just as prey-specific predators will need their food source around to dine on. Also, if pest levels are high you may need to knock down their numbers with a strong stream of water or short lived organic insecticide, such as insecticidal soap, to establish control, then release natural enemies to maintain control.

When purchasing predatory or parasitic insects, make sure to get all the release information you need to provide the best situation for your new garden allies.

Challenges with Using Beneficial Insects

There are a few problems that can arise with using beneficial organisms. Some are general feeders and will eat other beneficials along with pests. Try to be specific about the natural enemies you import and look for prey-specific feeders, if possible.

Another aspect of using biological control and natural enemies to control pests that can frustrate some growers is that they are not a quick fix. It may take up to five weeks to notice a decline in pest insects, but remember, this is a long-term solution that will ultimately lead to healthier plants and a healthier ecosystem.

"When we kill off the natural enemies of a pest. We inherit their work!" - C.B Huffaker