

biological
control



*Questions
and Answers
for the
Home Gardener*

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Questions and Answers for the Home Gardener

What Is Biological Control?

Biological control is, generally, using a living organism to control a specific pest. When you choose a predator, parasite, or disease that will attack a harmful insect, you are manipulating nature to achieve a desired effect. A complete biological pest control program may range from choosing the pesticide that is least harmful to beneficial insects to raising and releasing one organism to have it attack another, almost like a “living insecticide.”

What Are the Advantages of Biological Pest Control?

As part of an overall Integrated Pest Management (IPM) program, biological control methods can reduce the legal, environmental, and health hazards of using chemicals in the garden. In some cases, biological control methods are less expensive than certain insecticides. Some biological control measures can actually prevent economic damage to plants. Unlike most insecticides, biological controls are often very specific for a particular pest. People, animals, or helpful insects may be completely unaffected or undisturbed by their use. There is also less danger to the environment and water quality.

What Are the Disadvantages?

Biological control takes more intensive management and planning. It can take more time, require more record-keeping, and demand more patience and education or training.

To be successful, you need to understand the biology of the pest and its enemies. Many of the predators you will want to use in your home garden are very susceptible to pesticides. Using them successfully in an IPM program takes great care. In some cases, biological control is more costly than pesticides. Often, the results of using biological control are not as dramatic or immediate as the results of pesticide use. Most natural enemies attack only specific types of insects, whereas broad-spectrum insecticides may kill a wide range of insects. But this seeming advantage of insecticides can be a disadvantage when it kills beneficial insects.

What Is a Beneficial Insect?

In your garden, a beneficial insect is any insect that preys upon a harmful insect that damages your garden. Beneficial insects are the “good” insects that destroy insect pests. The beneficial insect might eat the harmful insect immediately, the harmful insect may be paralyzed and eaten later, or the beneficial insect may lay eggs so that its offspring will consume the harmful insect. For example, lacewing larvae that eat aphids, paper wasps catch caterpillars and feed them to their young, and tiny parasitic wasps lay eggs into other insects and their offspring eat the insect from within.

How Can I Protect the Beneficial Insects Already in My Garden?

First identify any unknown insects in your garden. Then you will know whether an insect is eating a plant, looking for another insect to eat, just seeking shelter, or merely passing through. If you find a harmful insect, you can determine how much damage it could cause and if a chemical is needed. Since chemicals can also kill beneficial insects, they must be used wisely and only if needed. Wise use includes choosing the correct chemical and using it at the correct strength, at the correct time, and in the correct place. When chemicals are necessary, look for one that kills the pest without harming your beneficial insects.

Pest insect population often recover more quickly than the predator insect populations, so you don't want to kill all the insects in your garden. (This is why outbreaks of harmful insects sometimes follow chemical treatments.)

How Can I Identify an Insect?

Use field guides, gardening reference books, and N.C. State University's online guide to local insects at the following Web addresses: <http://www.ces.ncsu.edu/depts/ent/notes/> <http://www.cals.ncsu.edu/course/ent425/compendium/index.html> http://ipmwww.ncsu.edu/current_ipm/otimages.html. You will need to identify beneficial insects in any life stage. If you are uncertain, ask your county's Cooperative Extension center for help. Trained and experienced agents and specialists will be able to help.

Which Sprays Are Safest to Use?

The three most common "safe" compounds contain *Bt*, horticultural oil, or insecticidal soap. All three are available as ingredients in different brand-name products.

- Bt* is an abbreviation for *Bacillus thuringiensis*, which is a bacterium that attacks only specific insects and makes them sick. It will not harm the beneficial ones. Be sure that the pest you wish to kill is listed on the label because not all strains of this bacterium work on all insects.
- Horticultural oils are specially refined oils that can be sprayed on insects. Only certain insects are susceptible, and the spray kills only the insects that it touches.
- Insecticidal soaps are special formulations of soaps (not the same as dishwashing detergent). Insecticidal soaps will kill only fragile pest insects that it touches.

Can I Add Beneficial Insects to My Garden?

Yes. You may catch beneficial insects and release them in your garden, or you may buy them from supply houses. But purchasing beneficials is "buyer beware." Because the government doesn't regulate this industry, the quality of material you could receive varies widely among producers and suppliers. To become well informed before choosing a supplier of beneficial insects, read *Purchasing Natural Enemies*, AG-570-1, and *Application of Natural Enemies*, AG-570-2. They are available from your Extension center.

Some of the beneficial insects offered for sale may not be suited to our climate, may not be appropriate for release in a garden, or are very specific regarding which insects they attack. For example, praying mantids are commonly sold as natural insect controls. However, mantids tend to be ambush predators, eating anything that passes in front of them that they can subdue. In other words, they do not seek out insects like caterpillars, aphids, and thrips that are typical garden

pests. Therefore, these entertaining, watchable insects are essentially useless for pest control. Another example is ladybeetles. A single lady beetle adult or larva can consume many aphids. But when hundreds of them are collected into a container and released, they also tend to fly away and disperse in order to avoid competing with each other for food. Don't forget that there has to be a lot of food to support a lot of insects. So if your garden is not full of harmful insects, it won't support large numbers of beneficial ones. It is best to strive for a balance of low levels of both harmful and good insects.

What Else Can I Do?

- When pests are present, don't overlook handpicking the insects from the plant and destroying them. Some insects may respond to traps, baits, or sticky cards placed in or near the garden.
- Don't overfertilize. Too much nitrogen will promote vegetative growth and stimulate an increase in aphid and mite populations.
- Provide a diverse habitat. Natural enemies often do better when they have a diversity of hosts or plants. Raise flowering plants to provide an alternative food source of pollen and nectar for many beneficial insects, such as syrphid flies, robber flies, lady beetles, and parasitoid wasps. They can also provide shelter and humidity.
- Employ cultural practices. Some plants will lure a pest away from the desired plant. Then, when the time is right, you can apply pesticides to the lure or "trap" plant. This is known as "trap cropping."
- Supplement the needs of the beneficial insects. In addition to planting flowers for food, leave undisturbed natural areas either within or around the garden to provide nesting and over-wintering sites for beneficial insects, such as lady beetles and parasitic stingless wasps.

How Do I Start?

Identify the pests in your garden. List the control measures that will be helpful against these pests. Then develop a plan.

Biological, cultural, chemical, and mechanical controls can all be used to assemble an integrated pest management (IPM) plan for your home garden. Determine your priorities. Are you interested in using fewer chemicals? Can you tolerate a few holes in leaves? Consider the cost of your program. Do you want to spend less money? If you can identify your goals ahead of time, you will be able to evaluate your success later. Biological control does not offer a simple,

complete answer to all insect problems in the garden, and it certainly is not magic. You may not be able to eliminate the use of chemical insecticides. Learn what you can expect from any of the parasites or predators you purchase for release in your garden. Are they the correct species? When should you release them? Will they all fly away when you open the container, or be dead the next day?

Using biological control in your home garden takes knowledge, patience, and motivation, but you can also reap great rewards.

Sources of Additional Information

- Your local county Cooperative Extension center
- N.C. State University publications available at your Extension center:
 - Biological Control: Purchasing Natural Enemies*, AG-570-1
 - Biological Control: Application of Natural Enemies*, AG-570-2
 - Ten Most Wanted Insects* poster, AG-571
- Biological Control Virtual Information Center on the Web at <http://ipmwww.ncsu.edu/biocontrol/biocontrol.html>
- Directory of Producers of Natural Enemies of Common Pests. Bio-Integral Resource Center, PO Box 7414, Berkeley, CA 94707. Cost: approximately \$10.00

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