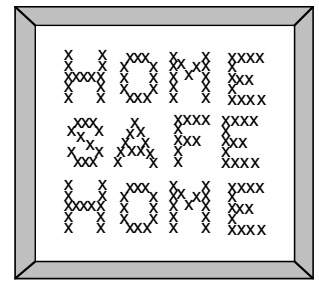


Alternatives

A Washington Toxics Coalition Fact Sheet



Garden Insect Pests

by Philip Dickey



Your garden is part of a complex ecosystem in which plants and animals interact on many levels. When you try to eliminate one particular weed or insect, the results may not be what you expect. Garden pesticides can kill bees and other beneficial insects, birds, and earthworms.

Insect control is one of the biggest problems that all gardeners have to deal with. Let's face it, there are thousands of insects in the garden, and a few of them like to eat your vegetables as much as you do. It's depressing to find your newly planted peas mowed off at ground level overnight. No wonder, then, that so many people respond by visiting their neighborhood hardware store to purchase a bottle of insecticide. And these days there is an insecticide available for every bug. What's wrong with that approach?

Your garden is part of a complex ecosystem in which plants and animals interact on many levels. When you try to eliminate one particular weed or insect, the results may not be what you expect. Your actions also affect other living species, including many not considered pests. Garden pesticides can kill bees and other beneficial insects, birds, and earthworms. They can contaminate nearby streams or ponds directly or through runoff. Chemical controls can backfire when insects develop resistance and become more difficult to control. Pesticides that are no longer wanted become a hazardous waste and must be disposed of at a household hazardous waste facility.

One of the extra benefits of gardening organically is that you know the food you grow is completely safe to eat. That is a reassuring thought these days, when one pesticide after another is found to contaminate the fruits and vegetables we buy at the grocery store. Home pesticide use probably poses a much greater health risk because the applicators are amateurs!

So what can you do about those insects besides spraying? There are many effective strategies for preventing and minimizing pest damage without using toxic chemicals. Just keep in mind that the complete elimination of pest damage is not realistic or even desirable.

Insect Control: Overall Philosophy

Insect management should begin when you plan your garden or flowerbeds. A little extra thought at this stage can reduce your headaches later. Your insect problems will be determined largely by what you plant, where and when you plant it, and how you fertilize and cultivate. Good planning involves learning about your plants—their requirements and their potential pests—and taking the time to design a landscape which gives the plants what they need, discourages pests, and encourages natural predators.

The next step is to set reasonable limits of pest damage. While you may not enjoy seeing holes in your lettuce leaves, you can tolerate some nibbles as long as you get a good crop of unchewed ones. Planting is a good time to assess your harvest needs and to make a note of how much loss is acceptable. Plant some extras for the insects to eat, and be prepared to monitor for damage beyond that level.

As your garden grows, watch for signs of pest damage—chewed leaves, wilted plants, eggs on the leaves—or the pests themselves. Identify the pests, either directly or by their telltale damage. When pest damage approaches the level you have set as unacceptable, begin with the least toxic or intrusive control tactics—usually physical controls such as hand removal of insects or affected leaves. If this is inadequate, you may need to try something a little more drastic, perhaps introduction of additional natural predators.

Usually you can find a non-toxic control that will drop the pest population to an acceptable level, and then you can discontinue controls while you continue monitoring.

Now let's look in detail at some of the general tactics that will help to minimize many garden pests.

General Pest-Control Tactics

■ Plant Selection

The choice of what you grow will determine to a large extent what pests you have to deal with. Some plants have almost no pest problems, while others almost seem to come with the insects included in the seed packet. As much as possible, choose to grow the varieties that are least prone to damage. This doesn't necessarily mean you can't grow your favorite flowers or vegetables, but you may need to look for slightly different varieties. If you grow pest-prone plants, expect more problems, and set your acceptable level of damage higher.

Healthy plants are less susceptible to insect attack than unhealthy ones. Try to grow plant species and varieties that are well-adapted to your climate, soil conditions, and available light levels. They will be more vigorous than those which have to struggle to survive. Buy seeds from companies in your local area—they specialize in varieties that should do well.

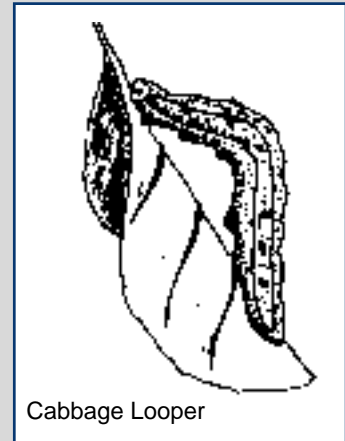
Plant a variety of different kinds of vegetables and flowers so that no single pest can destroy your garden. Diversity in the garden encourages a rich mixture of pests and predators which can better maintain a dynamic balance.

■ Timing

Sometimes pest problems in annuals can be reduced by planting at times when pest populations are low. Fall or early spring plantings may have a chance to produce a good yield before insects are active. Experiment with planting at different times. West of the Cascades, spinach planted in the fall or very early spring is less prone to leafminer attack than if it is planted later in the summer. Early radishes will have far fewer worm-holes than late summer radishes.

Some Common Garden Pests

Cabbage Pests. Besides cabbages themselves, the cabbage (Brassica) family includes broccoli, brussels sprouts, kale, and cauliflower. All are susceptible to a number of pests that can cause serious problems. The **cabbage maggot** is a white, worm-like larva, about 3/8" long, with a blunt end. Adult flies lay eggs in the soil at the base of the plant stem. The maggots tunnel into the stems and roots causing the plants to wilt and become susceptible to diseases. Pupae overwinter in garden soil. The best control strategy is to prevent flies from laying eggs. The surest way to do this is to rotate your cabbage crops and cover them with Reemay™ tents. The rotation is essential to protect the plants from eggs already in the ground, which would hatch out under the tents. Fall plantings of broccoli, brussels sprouts, and kale should be less susceptible than spring plantings.



Cabbage Looper

Wilting cabbages may also indicate **club root**, a fungal disease. Rotating cabbage plants to different parts of the garden will reduce club root.

Cabbage loopers are light green caterpillars which loop as they walk. They eat large ragged holes in the leaves and bore into developing heads. Hand picking is the most effective non-toxic control, and it can make a sizeable dent in the infestation quickly. Pheromone (sex attractant) traps are also available. If these methods fail, B.t. is an effective biological control, but remember that it kills all caterpillars, so use it with care.

Cutworms. Cutworms are gray or brownish caterpillars that curl up when disturbed. They feed at night and hide in the soil during the day. Eggs are laid in the soil, and the larva or pupa overwinters in the soil. Cutworms slice off the stems of seedlings at soil level. If it looks like a lawn mower went through your plants, you may have cutworms. The most effective strategy is to protect individual seedlings with a 3" collar made from stiff paper or plastic, pressed 1" into the ground. Hand removal of cutworms from plants or nearby soil will help. Use a hand trowel to push aside mulch or soil to expose the worms that may be hiding underneath.



Leafminer Damage

Leafminers. Leafminers tunnel between leaf layers to produce a telltale series of white or brown tracks and blotches. Spinach, beets, turnips, and cabbage are especially vulnerable. Adult leafminers are little black flies which lay their white bar-shaped eggs in rows on the undersides of leaves. It is the larvae which tunnel into the leaves and do the damage. The most effective control is to screen out the fly by covering seedlings with a fine netting, such as Reemay.™ You should remove any infested leaves immediately; often a good crop can still be harvested. The eggs can also be easily scraped from the undersides of leaves with a fingernail.

Mites. Mites are actually arachnids, not insects. They are almost too small to see with the naked eye but are visible with a magnifying glass, especially if you tap several leaves with a white sheet of paper to dislodge them. Signs of mite damage include yellow, dry leaves, sometimes with yellow or white spots. Most fruits and vegetables are susceptible. Use a forceful spray of water from time to time to knock mites from the leaves. If needed, a soap spray is also effective.

Whiteflies. Whiteflies are pinhead-sized insects which look like dandruff when shaken off a plant. Like aphids, they suck plant juices, causing leaves to turn yellow and plants to weaken and die. Whiteflies exude a sticky honeydew which attracts ants and hosts a black fungus. The most effective treatment is insecticidal soap. Spray every 2 or 3 days for 2 weeks, being sure to thoroughly wet both sides of the leaves.

Weevils. Weevils include a whole family of small beetles. Since they feed at night and hide in the soil during the day, you are not likely to see them, but their damage is easy to spot. Weevils may eat entire leaves to the stem. They also eat roots. Most vegetables and many fruits are susceptible. For annual vegetables, a thorough fall garden cleanup and crop rotation are effective. If a particularly severe infestation occurs, replanting again a few weeks later may be successful. A dusting of diatomaceous earth around plant stems or on plant surfaces may help. Predators include birds and beneficial nematodes. Beneficial nematodes can be purchased and released into the soil around planting time. SureFire™ Teflon® Insect Barrier can be around the trunk of rhododendrons to prevent root weevil damage to leaves.

■ Maintaining Plant Health

Give your plants the nutrients, water, and light they need for steady, vigorous growth. The requirements vary for different plant species. Some plants like moist soil; others prefer dry. Some plants need lots of light, while others cannot tolerate full sun. Light levels and soil moisture should be addressed in the garden planning stage because physical placement may determine these levels. Nutrient demands vary, too. Do a little reading to see what type of nutrients each plant needs and then add soil amendments such as lime, bone meal, and compost to provide what is required.

Follow individual plant recommendations for watering. A common mistake is to water too often and too shallowly. A long slow soaking is usually preferable to a short heavy watering, much of which may run off. Don't apply water faster than the soil can absorb it. Adding organic matter to the soil will help it to absorb and retain moisture. Watering in the early morning rather than late in the evening will reduce the chance of mildew problems.

■ Cultivation

When and how you turn the soil can affect both insect and weed problems. In the annual vegetable garden, it is usually better to do the major soil turning in the fall, after the summer plants have finished their production. This reduces the number of pests that overwinter in the garden and begin to attack your seedlings in the spring. You can combine this activity with a general garden clean-up to remove all dead plants and debris which may harbor pests. Turn the soil deeply (6 to 8") to bury those pests that prefer to overwinter on the surface and to bring to the surface those that overwinter below the soil. You can also add soil amendments at this time.

In the spring, till shallowly (about 2" or less) with a rake about two weeks before planting. This will remove new weed seedlings (which insect larvae like to eat) without bringing up weed seeds from deeper in the soil. It also brings up some larvae for the birds to eat. Cultivate again shallowly when you are ready to plant.

■ Crop Rotation

Some insect pests (and plant diseases) can be greatly reduced if you do not plant the same crops in the same place year after year. Rotate your crops in the garden on a regular basis.

■ Physical Controls

Physical controls include screening (such as Reemay™), which prevents insects from laying their eggs on plant leaves, or barriers to deter slugs or ants. Hand picking of insect eggs and larvae or removal of infested leaves are also examples of physical controls. Physical controls are the preferred choice because they involve minimum disruption of the ecosystem.

■ Biological Controls

Biological controls are essentially those that nature has provided. Most of the time they work quite well without any human intervention. Most pests have predators which keep their populations in check. Some important predators for insect pests are birds, other insects, or parasites. When you see birds, lacewings, or lady bugs in the garden, you know that they are eating your pests. Birds in particular will be encouraged to visit your yard if you provide bushes and trees for them to perch and nest, water for them to drink, and some food in the winter months.

Now and then, pests get the upper hand. Usually this is temporary, and balance is restored in time. However, sometimes we need to help out a little by supplementing the predator levels. Many types of predators are available commercially.

An effective biological control for caterpillars is a bacterium called B.t. (*Bacillus thuringiensis*). It must be applied when the caterpillars are feeding because it only works if it is eaten. Proper timing helps to minimize the amount which is used. This is critical because B.t. is toxic to all caterpillars, including many which may not be pests. B.t. is a serious threat to butterflies, however, so use it only when necessary.

■ Least-Toxic Chemicals

The least toxic chemical for many garden insects is a soap mixture. Safer, Inc., makes special formulations for different pests, including aphids, mites, and whiteflies. If you purchase these products, read and follow label directions and use only if your pest is listed on the label.

Some people prefer to mix their own liquid soap and water. I use about 1 teaspoon of soap in a gallon of water. Test a small area of your plant first to be sure the soap won't harm the plant. Garlic or crushed hot peppers can be added and may make the mixture more effective, although scientific data is lacking. Organic insecticides based on garlic and hot peppers are available. Soap is a contact insecticide, so you must wet the pest for it to be effective. Don't forget the undersides of leaves—this is where most of the insects are.

Pyrethrum is an effective, short-lived, naturally-derived insecticide. It is toxic to all insects—including beneficial ones—and to birds and mammals as well, so it should be considered a last resort for ornamentals and is not recommended on food crops. Pyrethrum is usually formulated with a synergist called piperonyl butoxide, which increases its potency. Some of the Safer™ Brand insecticides do not contain piperonyl butoxide. ■

The Washington Toxics Coalition is a non-profit organization dedicated to protecting public health and the environment by preventing pollution. Please write or phone for information: WTC, 4649 Sunnyside Ave N, Suite 540, Seattle, WA 98103. Phone: 206-632-1545. Visit our Internet Web site at www.watoxics.org.

The Washington Toxics Coalition assumes no responsibility for any injury or damage resulting from the use or effect of any product or information specified in this publication. Mention of particular products by name does not constitute an official endorsement.

Sources

Soil amendments, beneficial predators, traps and lures, and least-toxic pest controls.

Gardens Alive!, 5100 Schenley Place, Lawrenceburg, IN 47025. (513) 354-1483. www.gardensalive.com

Integrated Fertility Management, 1422 N Miller St, Wenatchee, WA 98801. (800) 332-3179. www.agecology.com

Territorial Seed company, P. O. Box 158, Cottage Grove, OR 97424. (541) 942-9547. www.territorial-seed.com

Seeds

(Seeds from the following companies are generally available at most stores where seeds are sold in the Pacific Northwest. The catalogue from Territorial Seed Company is an excellent reference book.)

Territorial Seed Company (see address above)
Ed Hume Seeds, Inc.
Lilly Miller Seeds
Solly's Choice, Puget Sound Seed Company

Disposal of Pesticides

Insecticides, such as those used to control aphids and other household insect pests, are pesticides and if no longer wanted should be disposed of at a household hazardous waste collection site. Contact your local solid waste or public health agency for more information. In the Seattle/King County area, call the Hazards Line at 206-296-4692.