WASHINGTON STATE UNIVERSITY
KING COUNTY EXTENSION

Community Horticulture Fact Sheet #13

Organic Pest Control in the Vegetable Garden

Gardeners practice organic pest control for a variety of reasons. Those reasons can range from strictly practical ones (e.g. personal health concerns) to philosophical ones (e.g. increasing biodiversity in their landscapes). Whatever your reasons for using organic pest control in the vegetable garden, it's important to remember the following points:

- By sticking to the label directions you maximize the effect. Applying material at the wrong time, or applying too much material, even if it's organic, will not give you a better result.
- Being mindful of any unwanted effects on beneficial insects or animals living and visiting your yard needs to be a priority.
- Choose wisely: anything that washes off your garden will ultimately end up in Puget Sound, or in the groundwater supply that generates our drinking water.

New gardeners often ask "*Is it possible to grow vegetables without using synthetic pesticides? Or, might we be able to reduce their use and still have acceptable results?*" The answer is "yes" to both of these questions. However, there are several mindsets you will need to adopt in addition to choosing different chemicals.

Perfect vegetables are not a realistic expectation. You may need to accept a certain amount of pest damage to the plants or the fruit or vegetable you harvest. You will definitely need to spend time observing what's going on in your garden and learning more about its pests to better learn how to manage them. Finally, you must be prepared to work a bit harder to control them.

Common Pests in Home Vegetable Gardens

Carrot Rust Fly
These are maggots (fly larvae) that make brown tunnels in carrot roots.

Cabbage Root Maggot
Fly larvae make radishes and turnips "wormy" and eat so many roots of your cabbage, broccoli, and other cole crops that they get stunted, yellow, and may die.

Beetle Leaf Miner
These little larvae dig into the leaves of beets, spinach and chard and eat up all the green tissue between the upper and lower leaf surface, causing tan blotches on the leaves.

Flea Beetles
Flea beetles are tiny, shiny black beetles that hop quickly off a plant when you examine it. They are responsible for holes in the leaves that make the plant look like it was hit with buckshot. They feast on a variety of crops but especially like potatoes, mustards, radishes, and tomatoes.

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Cabbage Worms
These are actually a collection of moth and butterfly larvae that eat big holes in cabbage crop leaves. The two most common are the green inchworm caterpillar of the geometrid moth and the velvety green caterpillar of the cabbage white butterfly.

Aphids
Aphids are small sucking insects that come in many colors with a taste for many different crops. The grayish, waxy cole-family aphids and the big black bean aphids are the two that seem most troublesome.

Cutworms
Cutworms are hairless moth caterpillars that sneak out at night to feast on seedlings, leaves, and sometimes fruit, such as tomatoes.

Slugs
Slugs also come out at night and on overcast/rainy days. They eat just about anything. If you can't tell what's eating your plants, look for slime trails, a sure sign you have slugs.

Of course, there are many other pests that occasionally cause problems, but these are the most important.

Chemical-Free Control Methods

Screening out insects is an old method that is now much easier due to the use of floating row covers (FRC). FRCs, sold under a number of different trade names, are indispensable tools for the vegetable gardener wishing to avoid the use of chemicals. **See Fact Sheet #19 Row Covers for Vegetable Gardens.**

Crop Rotation is one of the oldest and most effective cultural control methods of pest control. Some insects and diseases are host specific and allowing the same plant material to remain planted in the same place provides the pest or disease with more and more host material to infect. The problem becomes more and more serious. **See Fact Sheet #20 Vegetable Garden Evaluation and Planning Ahead** for an explanation on how to practice crop rotation.

Hand Picking is a labor-intensive but effective way to control insects large enough to be seen. Cabbage worms can often be spotted, and many caterpillars are easy to grab. You will need to be able to identify which caterpillars are truly harmful to plants. All caterpillars eat plant material, but some eat only a little. Make certain that what you are destroying is a pest. Cutworms and slugs can be captured at night, if you patrol your plants with a flashlight. Hand picking will cause you to look at plants closely and will soon make you familiar with all the insects in your garden, bad ones and good ones.

Trapping works as well. Lay a board or an overturned cantaloupe skin in the garden and check it each morning and evening for slugs. Rolled-up newspaper or folded paper towels stuffed into a

cardboard toilet tissue tube makes an excellent earwig trap. A bucket of sudsy water will drown trapped or hand-picked pests.

Sanitation is an important pest-control technique. Eliminate weeds in and near your garden. Get rid of "volunteers," those potato, tomato, squash, and other seedlings that come up from last year's planting. Clean up and compost crop residues as soon as the crop is harvested. Don't leave old pots, stakes, bags, etc. in the garden to serve as hiding places for unwanted guests.

Organic Chemical Control

Pesticides are any substance or mixture of substances that kill pests. That definition includes both organic and conventional pesticides. If your focus is organic gardening, make sure every material you choose is an organically approved one. Materials that have organic certification usually have a specific logo or identifier on the label. The most easily identifiable logo belongs to OMRI (the Organic Materials Review Institute).

There are a number of natural materials available. Some work quite well. In general, non-synthetic substances don't have much residual activity and may need to be used more frequently than synthetic pesticides. Individual product labels will tell you how often to apply the material in your garden.

Bacillus thuringiensis, a naturally occurring bacterial organism, is packaged under a variety of trade names, such as Thurcide, Dipel, and Bt. When sprayed on plants the organism makes caterpillars sick, thereby protecting the plants from further damage. Although this organism makes caterpillars deathly sick, it has no effect on pets, birds and wildlife, or beneficial insects, such as honey bees and ladybugs. Tent caterpillars, cabbage worms, cutworms, leaf rollers, and any moth or butterfly larvae that eat plants can be controlled. This was the weapon that the State Department of Agriculture used to prevent the gypsy moth from becoming established in the Seattle area a number of years ago. *Bacillus thuringiensis* must be ingested to work so it is most effective on hungry young caterpillars. Older caterpillars that have stopped feeding and are seeking a place to pupate will not be affected.

Insecticidal soaps have proven to be quite effective in the war on garden pests. Insecticidal soaps for sale in the garden section of nurseries or home and garden centers do a fine job of controlling aphids and many other sucking insects, as well as some other pests. **Avoid using homemade soap sprays, particularly those with household detergents. These soaps have either not been tested or found to contain ingredients that actually harm plants.**

Botanicals are insecticides derived from plants. They can be extremely effective if used properly. **Pyrethrins**, from dried chrysanthemum-type flowers, work well against many insects, especially the soft-bodied types. **Rotenone**, from the roots of several tropical plants, is probably the most effective general-purpose natural garden insecticide. Used as a spray or a dust, it kills a wide range of insects, such as caterpillars, aphids, and a number of beetles. Rotenone is sometimes combined with a pyrethrin under different trade names, and the two of them together are very effective.

Remember, “organic” and “natural” do not mean “non-toxic” or “harmless.” Several botanicals are extremely toxic to fish, so be careful not to use them where they might get into water.

Horticultural oils have been widely used on tree fruits and berries during the dormant season to control overwintering leaf rollers, mites, scales, and aphids. Highly refined oils are also now being used during the summer to kill soft-bodied insects without harming the plant or beneficial insects.

Powdered sulfur is used to control fungal diseases of plants, but it can also be effective against mites. All food crops may be dusted or sprayed with sulfur without any harm being caused to humans consuming them, if label directions are followed, however sulfur should never be used on vegetables or fruit just prior to harvest if you are planning to can them. In a jar, sulfur produces sulfur dioxide, which might cause the containers to explode.

Lime-sulfur is sulfur mixed with calcium. It is used both as an insecticide and a fungicide. As a dormant spray, it can help control many diseases, mites, and some insects overwintering on various plants. It can also be used during the growing season to deal with scab on pears and apples.

Finally, our policy is that we don’t recommend home remedies. Our criteria for recommendations rests on material that has been scientifically demonstrated (under controlled, replicated trials) to kill, repel or mitigate pests. The material described in this fact sheet was selected using both that criterion and by having organic certification.

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