

ORGANIC PEST CONTROL IN THE VEGETABLE GARDEN

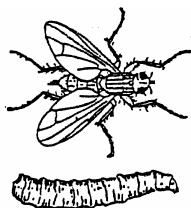
The recent media attention to various agricultural chemicals has probably caused many of us to think about our own use of chemicals in the garden. In addition, there has been such a growing concern about Puget Sound and ground water quality that we should look carefully at non-chemical garden pest control.

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 to these questions is yes, but with several qualifications. You may need to accept a certain amount of pest damage, you must spend some time learning about pests and observing what's going on in your garden, and you must be prepared to work a bit harder to control them.

Let's start with a review of some of the most common and troublesome pests in local vegetable gardens.

PESTS

Carrot rust fly - maggots (fly larvae) that make brown tunnels in carrot's roots.



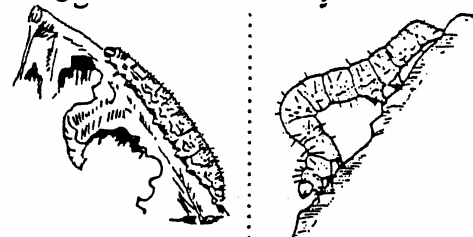
Cabbage root maggot – fly larvae make radishes and turnips “wormy” and eat so many roots of your cabbage, broccoli or other cole crops that they get stunted, yellow and may die.

Beetleaf minor – 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.

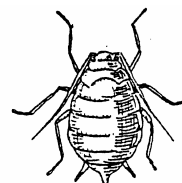


Flea beetles – tiny, shiny, black beetles that hop quickly off a plant when you examine it, but are responsible for holes in the leaves that make the plant look like it was hit with buckshot. Likes a variety of crops but especially potatoes, mustards, radishes, and tomatoes.

Cabbage worms – 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 a geometrid moth and the velvety green caterpillar of the cabbage white butterfly.



Aphids – small sucking insects that come in many colors and 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 – hairless moth caterpillars that sneak out at night to feast on seedlings, leaves and sometimes fruit like tomatoes.



Slugs – another beast that works at night or on overcast/rainy days and eats just about anything. If you can't tell whether you have slugs or caterpillars look for slime trails, a sure sign of slugs, or frass. Caterpillar frass (a polite word for poop) is blocky, squarish pellets and slug frass is a squiggly pile. Honest!



There are many other pests that occasionally cause problems but these are the biggies. Now let's move on to look at some of the methods of organic pest control.

ORGANIC METHODS

Screening out insects is an old method but it just got a lot easier now that floating row covers have eliminated the need for constructing frames. Floating row covers (FRC) sold under a number of different trade names, like Reemay and Agronet, are indispensable tools for the vegetable gardener wishing to avoid or to cut back on the use of pesticides. These extremely light-weight materials are laid right over the rows leaving enough slack in them so the crop pushes the row cover up as it grows.

The light and water can get through the FRC's fine, so you only have to remove them occasionally to weed, thin and check for slugs. FRC's can prevent most of the common vegetable pests but are used most often on crops favored by

cabbage maggot, carrot rust fly and beet leaf-miner. The material works by excluding the adult female fly and preventing her from laying eggs on or near the crop. You can imagine, therefore, how important it is to do crop rotations along with FRC's. Without rotations the adult flies will emerge from the soil under the FRC with the seedlings or transplants, trapped in with the very crop you wished to protect from them, and you will have a worse problem than ever.

Rotations alone can be an important organic pest control technique. It is of most help with soil-borne disease but, to a lesser extent, insect populations can build up as well if the same crop is planted in the same area season after season.

Hand-picking is a labor-intensive but effective way to control insects large enough to be seen as destroyed. Cabbage worms can often be spotted and wandering tent caterpillars are easy to grab. Cutworms and slugs can be captured at night, if you patrol your plants with a flashlight. Hand-picking will make you look at plants up close and will soon make you familiar with all the bugs in your garden: bad ones and good guys.

Trapping is kind of a variation on hand-picking. Lay a board or an overturned cantaloupe skin in the garden and then check it each morning and evening for slugs. Rolled up newspaper or folded paper towels stuffed into a cardboard toilet tissue tube make an excellent earwig trap. (A bucket of sudsy water will drown trapped or hand-picked insects easily, if you are wondering how to dispatch them.)

Sanitation may seem like a funny thing to include here but it is an important pest control technique. Eliminate weeds in and near your garden. I know it's hard, but get rid of "volunteers" – those potatoes, tomatoes, squash, etc. that came up from last year. Clean up and compost crop

residues as soon as the crop is harvested. Don't leave old pots, stakes, bags, etc., in the garden.

Pesticides are literally anything that kills pests and there are a number of natural materials that work quite well. Besides being non-chemical in nature, they differ from synthetic chemical materials in that they will probably need to be used more frequently, since they don't have much residual activity.

Bacillus thuringiensis, a naturally occurring bacterial disease organism, is packaged under a variety of trade names such as Attack, Thuricide, Dipel and B.t. This stuff, when sprayed on host plants, will protect



against any kind of caterpillar. Tent caterpillars, cabbage worms, cutworms, leaf rollers, and any moth or butterfly larvae that eat plants can be killed. This was the weapon that the State Agriculture Department used to prevent the gypsy moth from becoming established in the Seattle area several years ago. Although this stuff makes caterpillars deathly sick, it has no effect on your pets; birds and wildlife; or even other insects like honey bees and ladybugs.

Bt must be eaten to work. It is very effective on hungry young caterpillars; older caterpillars that have stopped feeding and are looking for a place to pupate will not be affected at all.

*Insecticidal soaps have been developed over the last few years which have proven quite effective in the war on garden pests. There are a number of

soaps which do a fine job of controlling aphids and most other sucking insects as well as some others. (Indeed, there are even soaps out now which do a pretty potent job of controlling moss and algae on roofs, patios, decks and lawns.)

Recipes for homemade soap sprays abound using household detergents. Because these are not tested and labeled as a pesticide, it is technically illegal to use them in this manner. I do not recommend them because they may not be effective or may contain additives that could be phytotoxic (hurt plants).

*Botanicals, insecticides derived from plants, 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 around. As a spray or dust it kills a wide range of insects such as caterpillars, aphids and a number of beetles. Rotenone can sometimes be found combined with Pyrethrin under different trade names and the two together are very effective. Nicotine has long been used as an insecticide on soft-bodies, sucking insects, thrips and a few kinds of caterpillars. This stuff is so poisonous that it is required to have a skull and crossbones on the label! If you use it, do so carefully and store it where there is NO chance of children getting to it. Remember "organic" and "natural" do not always mean "non-toxic" or "harmless." Several botanicals are extremely toxic to fish, so be especially 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 in the summer, since they can kill soft-

bodied insects without hurting the plant or beneficial insects.

*Powdered sulfur, a naturally occurring mineral, is used to control fungus diseases of plants, but can also be effective against mites. All food crops can be dusted or sprayed with sulfur right up to harvest without any ill effect being caused to humans consuming them. However, it should never be used on vegetables just prior to harvest if you're planning to can them. In a jar, sulfur produces sulfur dioxide and the containers may explode.

Sulfur is often mixed with another naturally occurring mineral, calcium. This is called lime-sulfur, and has been around a very long time, being used both as an insecticide and fungicide. As a dormant spray it can help control many diseases, mites, and some insects overwintering on various plant hosts. It can also be used during the growing season to deal with scab on pear and apples.

*Diatomaceous earth, which consists of the skeletons of microscopic sea animals, also demonstrates an ability to control some insects and may be available with a little searching around.

*There is no evidence that home brews like garlic and red pepper extract sprayed on plants will really control pests or drive them away. Neither is there scientific evidence that any plant combinations effect any sort of insect control. This is not to say that home remedies and companion planting never have any effect, just that none appear significantly effective under controlled, replicated trials.

Scientists (including those at our University) used to get a lot of funding to try commercial products in large-scale cropping systems. These had limited applications to gardeners, much less

organic gardeners. Fortunately, the tide has turned and interest is growing in organic and low-input farming systems. I expect we will benefit a lot from upcoming research programs, but there is nothing to prevent you from doing a little "research" on your own right now.

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