NATURAL PEST MANAGEMENT

A Master Gardener Fact Sheet

NATURAL PEST MANAGEMENT

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Using a natural approach to pest management is effective because it is based on the way natural ecosystems work.

Larvae of this hover fly (*Syrphid*) prey on aphids. PHOTO: E. Cronin.

PREVENTION IS KEY

With a little care in design and maintenance of your garden, it is possible to prevent many insect, disease and weed problems. Not only does this give good results, but it is usually less work and less expensive than controlling pests after they become a problem.

Start with Healthy Plants

Healthy plants have an array of natural defences against insects and diseases. These include tough cuticles on the leaves that deter insects or fungal attack, chemical compounds in the foliage that repel insects, and immune systems that recognize and isolate pathogens.

To grow healthy plants:

- Choose plants adapted to the soil and the microclimate in your yard. Don't plant shade-loving plants in full sun, or vice versa.
- Correct any growing conditions that you can control: soil drainage, irrigation, soil pH and nutrients.
- Choose cultivars resistant to diseases. You can buy roses resistant to powdery mildew, black spot and rose rust; apples resistant to apple scab; grapes resistant to powdery mildew, and many other disease-resistant garden plants.
- Manage for an appropriate growth rate. Fast growth is desirable for vegetables, but not for woody plants. Trees that grow too quickly may have soft shoots that are more susceptible to sucking insects and some diseases.

Encourage Beneficial Insects

There are thousands of species of predatory and parasitic insects. To reap the benefits of these free pest control agents in your garden:

- Avoid using insecticides. Even the least toxic insecticides, such as soap, will still kill beneficial insects.

Figure 1. Sweet alyssum flowers attract aphid predators to the rose garden. PHOTO: Linda Gilkeson.

- Attract them to your garden. In most species of beneficial insects, it is only the immature stage that is predatory. You can lure parents of these hungry juveniles into your garden by growing flowers with a rich supply of nectar or pollen. When they have food, they live longer, lay more eggs and stay in your garden to search for aphids, caterpillars and other hosts where they can lay their eggs.

The most attractive plants have small flowers that suit the mouthparts of tiny parasitic wasps, lady beetles, hover flies, etc. There are many useful plants in the carrot, cabbage, aster and mint families. Some of the best plants for beneficial insects are dill, parsley (in flower the second year), yarrow, cilantro, sweet alyssum **(Figure 1)**, candytuft, calendula, thyme, lovage, daisies and goldenrod. Even weeds such as wild carrot, dandelions and chickweed are good insect plants.

Grow a variety of plants so flowers are available from early spring to late summer. Mix them among vegetables, or use them as edging plants or in rock walls.

MAKE SURE PROBLEMS ARE CORRECTLY IDENTIFIED

There is no point in taking action unless you know what the problem is. Plants are more often damaged by poor growing conditions – such as extreme heat or cold, nutrient deficiencies, sunscald or injury – than by pests. Therefore it is essential to identify a problem correctly before you can decide whether or not you need to take action.

Sometimes diagnosing the cause is easy, such as when you find a caterpillar chewing on a leaf **(Figure 2)**. But most of the time you don't see an obvious culprit. There are leaf diseases that look like sucking-insect damage, physical injuries that look like plant diseases, mites so small you can't see them with the naked eye. On top of that, many beneficial insects could be mistaken for pests because they are found on damaged leaves…where they are busy searching for the pests!

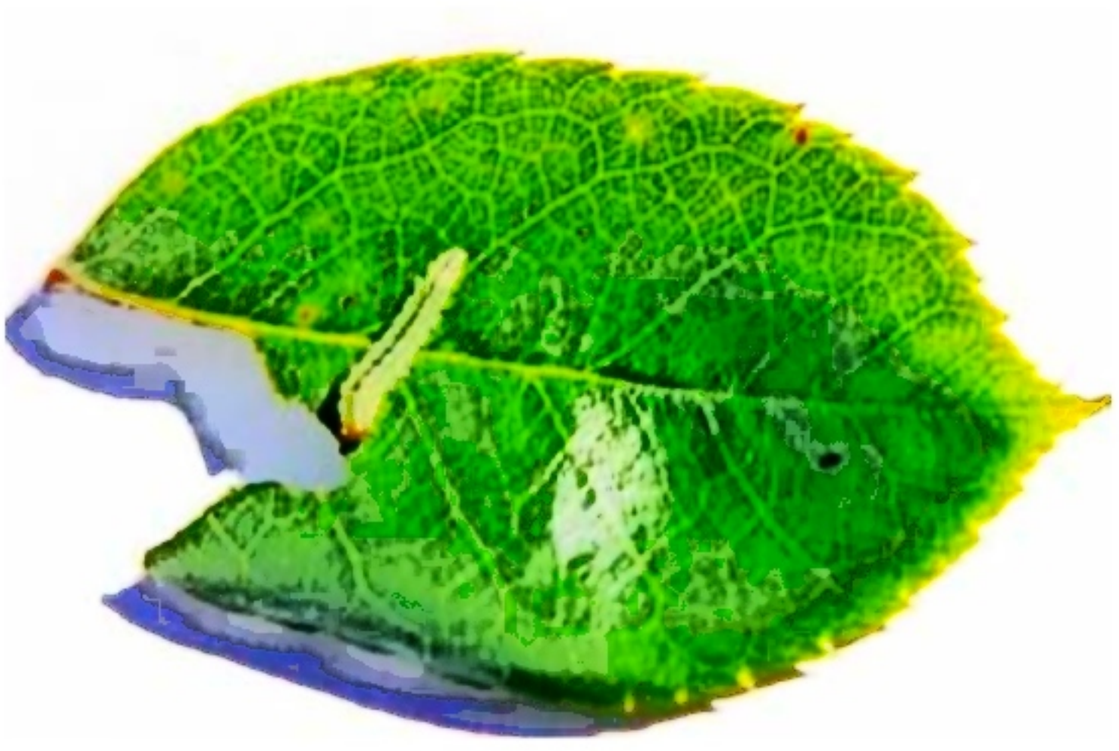

Figure 2. This rose sawfly looks like a caterpillar.
PHOTO: Linda Gilkeson.

Diagnosing Problems

- **Look for the pest.** Using a magnifying glass, inspect the upper and lower surfaces of leaves and nearby shoots and branches. If no suspects are visible, it may be because they hide at night or have finished feeding and crawled away. For general symptoms, such as wilting, check stems and trunks for borer holes and disease cankers.
- **Look for characteristic damage.** Many pests leave behind clues such as excrement pellets (caterpillars), slime trails (slugs) or sawdust (borers).
- **Consider the host plant.** Many insects and disease organisms attack only specific plants. Many common problems can be quickly identified through the host plant and characteristic damage or symptoms.
- **Check growing conditions.** Extreme weather or poor growing conditions can stress plants and cause symptoms that look like pest damage. For example, dead spots on leaves caused by sunscald look like disease, while shoots distorted by frost injury look like aphid attack.

Keep an Eye on the Problem

Get a magnifying glass to help you get a close look. Check regularly and keep notes (or sketches or photos) so that you will know whether damage is continuing or increasing. If damage isn't getting worse, whatever caused the problem may no longer be present. If it is getting worse, your regular check-up will help you decide whether you should take action.

DECIDE WHETHER TREATMENT IS NEEDED

It is important to distinguish between damage that ruins a crop or makes an ornamental plant unsightly, and damage that doesn't really affect the harvest or the appearance of plants. What is considered 'damage' can also be a matter of taste, especially when it comes to tolerating weeds in lawns.

An important consideration is the size of a pest population and whether it is increasing. There is a big difference between a few leaves with holes and a large population of caterpillars defoliating a whole plant. Many potential pests are naturally kept in check by weather conditions, natural enemies and diseases. A small infestation of insects or a few diseased leaves may never expand to damaging proportions—which is why it is a good idea to take time to follow the progress of a problem before you reach for the spray bottle.

USE LEAST-TOXIC AND NON-TOXIC TREATMENTS

When you do need to take action, there are many effective methods for controlling pests that do not involve using pesticides.

Physical and Mechanical Controls

- Use barriers to stop insects from laying their eggs on vegetables. Floating row covers (Figure 3) or window screening can keep carrot rust fly away from carrots and leafminers off spinach and chard.
- Mulch soil to prevent weeds from germinating. Smother germinating weeds with organic mulches, such as leaves or straw, or use black landscape fabric covered with bark mulch or gravel.
- Physically remove and destroy infested plant material. Prune out tent caterpillar nests and diseased or infected branches, pull weeds or

Figure 3. Floating row covers prevent insect attacks. PHOTO: Linda Gilkeson.

USE LEAST-TOXIC AND NON-TOXIC TREATMENTS...continued

cultivate soil to control them. Blast aphids off plants with a strong stream of water.

- Catch some pest insects with traps. Hang yellow sticky traps to catch whiteflies on house plants; band deciduous trees with sticky bands in the fall to catch winter moths before they lay eggs.
- Apply heat to control weeds in hard surfaces. Pour boiling water on weeds in patios and driveways (Figure 4) or make a quick pass with a hand-held flamer.

Biological Controls

Most insect pests have natural enemies, such as other insects, spiders and birds that keep their numbers below damaging levels. As described above, a safe, inviting garden will bring these native species into your yard.

Some species are also reared commercially for sale. Only a few are useful outdoors for gardens: aphid midges (*Aphidoletes aphidimyza*) and insect parasitic nematodes (different species are sold for control of weevils or European chafer in lawns). There are also effective biological controls available for spider mites, greenhouse whitefly, mealybugs and soft brown scale in hobby greenhouses.

Pesticides

Most pesticides are chemicals, but a few are microorganisms (e.g., bacteria, such as *Bacillus thuringiensis* or BTK). Many municipalities have bylaws restricting the use of pesticides on lawns and gardens to low-risk pesticides such as soaps, horticultural oils, acetic acid and botanical extracts.

To use them correctly it is important to understand how these low-risk treatments work. For example, BTK only affects caterpillars, while corn gluten meal prevents weed seeds from germinating, but doesn't kill weeds. Also, if mixed incorrectly, soap and oils can kill plants and any of them can kill beneficial species.

If you need to use a pesticide as a last resort, use the information from your inspections to target the pesticides only where and when needed.

Figure 4. Boiling water kills weed seedlings. PHOTO: Linda Gilkeson.

FOLLOW-UP

Whether or not you applied some kind of control, keep checking on the pest situation and making notes. Those notes will tell you when to expect a problem and how well your treatments worked. This information will help you decide whether you took the right course or whether, next time, you need to try something different.

Above all, use this information to plan for prevention and to be better prepared next year.

REFERENCES

Gilkeson, Linda A. (2006). West Coast Gardening: Natural Insect, Weed and Disease Control. Trafford Press. 154 pp.