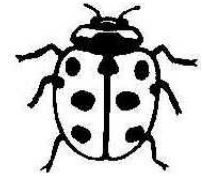


INTEGRATED PEST MANAGEMENT



Tips for the Home Gardener

Integrated Pest Management (IPM) combines cultural practices, biological controls, and reduced-risk chemicals to manage pests in the garden. Increased levels of environmental awareness and concern have led many professional horticulturalists as well as amateur gardeners to discard heavy chemical spray programs. Using IPM in your home garden instead of traditional chemical-based approaches is beneficial for the environment, your garden landscape, and also your health.

Evaluate Your Pest Control Needs

The first step to implementing a successful IPM program in your home garden involves monitoring (examining) your plants to evaluate your pest management needs.

- ☞ Familiarize yourself with the potential pest problems specific to your selection of plants. Cucumber plants, for instance, commonly have a problem with striped-cucumber beetles feasting on leaves. Whiteflies enjoy feeding on *Lantana* spp. and *Salvia* spp. and purchased plants may already have them.
- ☞ Monitor your plants as much as possible throughout the growing season and note any changes that occur (i.e. distortion or chewing of leaves). Examine the whole plant—leaves, stems, flowers, and fruits—for signs of pests and disease.
- ☞ When you encounter a pest problem, learn about the extent of damage it can cause and continue to monitor it closely. Consider which plants are affected, what exactly is causing the problem, how extensive the pest problem is, and what will happen to the plant with/without treatment.

Compensate and Tolerate

Once you have identified the pest problem, decide what level of plant damage you can tolerate in your garden. A home gardener may be able to tolerate more imperfections than a farmer or professional grower. Some damage may be cosmetic and not affect the yield/quality of your crops or flowers. For instance, if you are growing tomatoes and there are imperfections on the skin due to insects, you do not necessarily need to use chemicals on the plant. With some problems, extra plants can be added initially to ensure adequate yields.

Integrated Pest Management Methods

If you determine that pest control action is necessary, try to find the least toxic yet most effective way to deal with the problem. Following, you will find information about various IPM methods for controlling intolerable pests. Contact your county extension agent for more specific advice about pest and disease control.

IPM CULTURAL PRACTICES

Many IPM programs use preventative cultural practices as an initial line of defense against damaging pests. If you learn about and strive to meet each plant's cultural requirements, you will reduce the stress on the plant and thus reduce its susceptibility to pests, diseases, and fungi. The following are examples of cultural practices that can be used to reduce the need for chemical sprays.

- ☞ Choose disease- and pest-resistant cultivars for your garden. Certain cultivars of plants may be available that are less susceptible to the diseases that commonly infect their species. For example, the *Platanus × hispanica* (sycamore) cultivars 'Bloodgood' and 'Liberty' are less likely to have problems with the fungal disease anthracnose than other sycamores.
- ☞ Educate yourself about pest problems common in specific plants and what cultural practices can be used to avoid infestation. For instance, to reduce black spot, a fungal disease that attacks roses, cultural practices include removing dead plant material, limiting leaf wetness from overhead watering, and spacing the plants to promote good air flow.
- ☞ Try removing the pest-infected area by pruning or blasting the plants with a strong stream of water to wash off pests like aphids and mites. Pick off and destroy any pest insects you see.
- ☞ Keep planting beds clean of any infected plant material. Discard any diseased or pest-ridden material. When using containers for seed-starting or planting, make sure they have been well cleaned.
- ☞ Rotate your annual crops and flowers. Soil-borne diseases and soil-dwelling pests may live in the soil for a long time. Move plants to different areas of the garden to prevent a build-up of these problems.

IPM BIOLOGICAL CONTROLS: BENEFICIAL INSECTS

A natural way to combat harmful insects is to draw upon their natural enemies. Many organisms feed on harmful insects, minimizing damage to plants and reducing the amount of chemicals needed to control pests in your garden. Conserve and attract beneficial insects by maintaining a diverse garden with lots of material for foraging and shelter and by avoiding broad spectrum pesticide use. Lady beetles (ladybugs), lacewings, hover flies, spiders, and parasitic mini-wasps are just a few insects that prey on damaging pests.

To attract beneficial insects to your garden, plant a variety of flowers that provide pollen and nectar sources. Some good plant choices include fern-leaf yarrow (*Achillea filipendulina*), common yarrow (*Achillea millefolium*), tansy (*Tanacetum vulgare*), dill (*Anethum graveolens*), cosmos (*Cosmos* spp.), fennel (*Foeniculum vulgare*), buckwheat (*Fagopyrum esculentum*), and zinnias (*Zinnia* spp.). In general, plants in the carrot family (*Apiaceae*), the mint family (*Lamiaceae*), and the composite family (*Asteraceae*) have proven effective in attracting the natural enemies of garden pests.

IPM REDUCED-RISK CHEMICAL APPLICATIONS

If chemical control is the only solution for your pest problems, spray with the least toxic, most effective, and most pest-specific chemical available. Read the following tips for using reduced-risk chemicals in your garden.

- ☞ Try less persistent products such as horticultural oils, insecticidal soaps, and Neem-based or other naturally-derived pesticides before using stronger products.
- ☞ Always read pesticide labels carefully before making any purchasing decisions and applications. For example, an insecticidal soap can be very effective on many insects and mites but many soaps are not specifically formulated for use on plants. Home remedies like dish soaps and shampoos can harm plants even more than the pests themselves.

- ☞ Avoid using broad-spectrum pesticides. When broad-spectrum pesticides are used, they destroy both harmful and beneficial insects. Pests re-establish themselves faster than beneficial insects. Use chemicals that are specific to the pest you are trying to control.
- ☞ Time it right. Timing of chemical applications is critical to effective pest control. Carefully read the manufacturer's instructions about how to use the product and how often you should spray.

Integrated Pest Management at Longwood Gardens

Longwood's IPM program emphasizes low-risk and environmentally sound methods throughout the Gardens to manage pests and protect plants from intolerable damage. Below, you will find a few examples of how Longwood employs the principles of IPM in its horticultural displays. Visit Longwood Gardens to see the successful results of these low-impact practices.

MONITORING AND CONTROL OF SCALE INSECTS

Armored scale insects present a difficult control problem. The maturing scale insects attach themselves firmly to plant foliage and stems and secrete a protective waxy coating. Underneath this "waxy armor" they can feed extensively on plant juices undisturbed by almost all control measures. As their populations increase, their feeding eventually leads to the decline and death of the host plants.

Scale insect control relies on monitoring for the only mobile life stage of the scale insect, called the "crawler phase." This takes place immediately after the insect's eggs hatch and immature insects search for a feeding site. Unlike the adults, these juvenile crawlers have no waxy protection and are very susceptible to horticultural oil or insecticidal soap. Longwood times insecticide applications to coincide with this crawler phase to help break the cycle of scale infestations.

CULTURAL PRACTICES: PLANT SELECTION

One way Longwood employs cultural IPM practices is by selecting for plant species or cultivars that have proven resistant to pests and disease. For instance, the native dogwood *Cornus florida* is susceptible to dogwood anthracnose, a devastating fungal disease. On the northeast side of the Cow Lot, Longwood has planted the Japanese dogwood, *Cornus kousa*. This plant has showy flowers like the native species, but has proven resistant to anthracnose.

Longwood has been researching the Chinese hemlock, *Tsuga chinensis* as a landscape alternative to Canada hemlock, *Tsuga canadensis*. Canada hemlock populations in the northeastern United States have been largely affected by the hemlock woolly adelgid, a chewing insect that defoliates and eventually kills its host. Long-term trials are being conducted to evaluate the Chinese hemlock's ornamental value as well as its resistance to the woolly adelgid and other damaging pests.

BIOLOGICAL CONTROLS IN THE OUTDOOR DISPLAYS

Longwood's best success with beneficial insects can be found in the outdoor displays, where insecticides other than horticultural oils are rarely used. Beneficial insects are actively conserved by monitoring their lifecycles for proper timing of insecticide applications.



Wildlife such as mice and geese are also considered garden pests due to feeding and nesting activities that can impact planting beds. Cats are employed in the gardens to maintain vigorous rodent patrol in return for food, shelter, and routine medical care. Specially trained work dogs make their rounds in the eastern portion of the gardens to encourage geese to seek outlying natural areas for feeding and nesting rather than Longwood's horticultural displays.

LOW-RISK CHEMICAL CONTROLS IN THE DWARF FRUIT TREE DISPLAY (IDEA GARDEN)

In the Dwarf Fruit Tree display, you might see a white resin covering the trunks of the trees. This white resin is kaolin clay (or kaolinite), part of an organic-based pest and disease control program for the orchard. First, Longwood staff apply kaolin throughout the spring and early summer, creating a physical barrier against many common fruit tree pests. Sulfur sprays may be applied to suppress diseases. Low-impact, naturally-derived pesticides such as pyrethrins are used to manage pests not targeted by the clay or sulfur. This program's goal is to effectively manage pests using products listed as suitable for organic fruit production yet are available to the general public.

Another example of low-risk chemical controls in the Idea Garden involves attaching treated twist-ties to the dwarf fruit trees to control fruit moths, whose larvae destroy the fruit. The twist-ties contain pheromones (a chemical scent) designed to interrupt the mating cycle of the codling moth and the Oriental fruit moth. The chemicals confuse the moths' scent receptors and prevent them from mating, which results in fewer fruit-damaging larvae. Many commercial orchards also use this technique to reduce pesticide applications.