

INTEGRATED PEST MANAGEMENT FOR THE HOME GARDEN

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Integrated Pest Management (IPM) is a science-based approach to managing pests using a variety of safe, sustainable and effective tactics against common garden pests, which may include insects, weeds, diseases, birds and rodents. This publication will focus on insect pests. IPM takes advantage of a variety of approaches to pest management, often controlling pests through non chemical means. Pesticides, when needed, are selected based on their ability to target problem pests and to minimize impact on beneficial organisms, people and the environment. Focus is on developing an overall management strategy, not just controlling one type of pest. Reduction of pest problems through proper plant selection and placement is a key principle in IPM. This means selecting proper plants for your climate zone and placing them in the appropriate spot in the garden. For example, if a plant is labeled for shade, placing it in a shady location could lead to the prevention of pest problems.

The first step in IPM is scouting for pests. This is a simple and effective technique for detecting pest insects before they get out of hand. It is simply done by walking through your yard or garden and looking for problems. During the growing season this should be done weekly for vegetables, every one to two weeks for flowers and trees and then once a month during dormant periods. While scouting, look for signs of plant stress and damage like wilt, yellow leaves, defoliation or distortion of leaves, chewed holes or leaf edges, webbing, and dead plant material. Examine plants closely for any signs of insect pests on leaves, undersides of leaves, stems or flower buds. Traps can also be helpful in catching and identifying pest problems. These traps include pheromone traps, yellow sticky traps (Figure 1), and pitfall traps. If insects are found during scouting the next step is to figure out what it is.

The most important step in IPM is the correct identification of pests. Sometimes beneficial insects are mistaken as pests. Also, certain pest species may require distinct control measures. Most insects progress through a series of growth stages from egg to immature to adult and not all treatments are successful for all pests or life stages. Identification can be



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Figure 1. Yellow sticky trap used to scout for pest insects.

accomplished in different ways such as using guide books, the internet, Cooperative Extension publications, or taking a live or well preserved specimen to your local extension office for identification by an expert. Once the pest has been correctly identified, learn about the life cycle to determine when is the best time to control the pest. Not all insects are susceptible to control tactics through all of their lifecycle. Many are more susceptible during immature stages such as larvae or caterpillars. Once a pest is detected, treatment is an individual decision; not everyone can tolerate the same amount of injury to plants or insects in their garden. Insects may be present but not causing serious damage to the plant or harvestable portions. Educating yourself is important because many plants



Figure 2. Ladybeetle larvae attacking aphid.

can often tolerate a number of pests. They might even come back stronger and prettier because small amounts of injury can stimulate plant growth.

IPM Control Strategies

There are four general types of approaches that can be used to prevent or control pests:

- Cultural control
- Physical control
- Biological control
- Chemical control

Cultural control measures emphasize modifying the natural environment to reduce the potential for pest problems. One example is keeping your yard sanitary by removing old plant material, infested plants, and weeds that may harbor pests. Optimizing plant health also falls into this category, including proper plant care such as adequate watering, fertilizing and pruning to reduce plant stress. One of the most effective cultural controls when planning a garden is to carefully choose varieties that are resistant to insect damage.

Physical controls are activities that physically remove or block a pest from your plants. It is best to use these controls when pest populations are low. Examples include spraying plants with water to dislodge pests, using barriers such as row covers or nets, insect traps and soil cultivation. Physical control can also be used for pests that build nests or feed in aggregation. For example, pruning out the branches containing tents made by web building caterpillars, or sawflies that feed in groups on isolated branches of a plant can reduce pest populations and damage.

Biological control is the use of beneficial insects, also called *natural enemies*, to reduce insect pest numbers. There are two different kinds of biological control: conservation biological control and augmentative biological control. *Conservation biological control* is the process of attracting and keeping natural enemies in a garden by providing them with needed resources such as nectar and pollen, alternative prey, water, and nesting sites, or refuge with favorable conditions to sustain them.



Figure 3. *Aphidius* wasp hunting for aphids to lay eggs in.



Figure 4. Swollen aphid body after an *Aphidius* wasp has laid an egg in it.

Augmentative biological control occurs when you buy natural enemies and release them into a home garden. For example many people purchase lady beetles for this purpose. While lady beetles are great natural enemies, the adults have the habit of flying away from their intended target when released. Lady beetle larvae (Figure 2), green lace wing larvae and some mite species are better predators that will stay near the release site and prey on insect pests. Parasitic wasps such as *Aphidius* species (Figure 3) are also useful natural enemies. They lay their eggs inside aphids, where the wasp larva develops, killing the aphid and causing the body to swell (Figure 4). When the adult wasp emerges it attacks more aphids and the cycle continues. To encourage future colonization by natural enemies, it is important to avoid using insecticides that may also kill the natural enemies.

Chemical control is used in IPM but other options should be explored before turning to pesticides. Many times, using a pesticide can cause more harm than good. Many pesticides kill natural enemies along with the pest, and pest populations tend

to rebound much more quickly than their natural enemies. This can lead to a “pesticide treadmill” where gardeners are trying to stay one step ahead of the pests. Understanding the pest’s life cycle and knowing where the pest is living and feeding is vital for successful chemical control. Proper placement, timing, and use of effective application methods will save time and money and more effectively control the pest. It is also important to research your pesticide choices and to choose a product that is less persistent in the environment and affects only the targeted insect pest, leaving more natural enemies in place to help control pests. For help with pesticide selection, contact your local Cooperative Extension office. Treatment should not be planned according to a calendar. For example, if you suspect aphids will attack your roses in a certain month because they appeared in the same month last year, make sure they are actually there this year by scouting the area in question before deciding if a treatment is necessary.

Integrated Pest Management is an approach that considers many aspects of plant health, from planning and planting to pest identification and treatment. A range of management tools and tactics (not only pesticides) can be used to control pests while minimizing risks to your plants, to people, pets and the environment. Record keeping is important to record successes and failures. Information that should be recorded are, planting date, bloom time, harvest time (if applicable), pest occurrence and damage, and how pest problems were resolved. Educating yourself about insect pests and keeping current on available management strategies is vital since the specific tools of IPM continuously changing with technology.

IPM References and Pest Identification

IPM in Vegetables Texas A&M University: vegipm.tamu.edu/indexbyname.html

University of California IPM Online: www.ipm.ucdavis.edu/PMG/menu.homegarden.html

IPM Resources

The following companies are sources for IPM products such as pest monitoring traps and natural enemies:

Green Methods—greenmethods.com/site/

Arbico Organics—www.arbico-organics.com

Koppert Biological Systems—www.koppert.com/products/



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This information has been reviewed by University faculty.
cals.arizona.edu/pubs/insects/az1521.pdf

Other titles from Arizona Cooperative Extension can be found at:
cals.arizona.edu/pubs

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