

PEST AND DISEASE MANAGEMENT

Integrated Pest Management

No garden, despite the gardener's best efforts, is immune to pests and diseases. Even a well-tended one will have destructive organisms that will fly, crawl, creep, leap, or stroll into the garden from adjacent areas. Some will even ride on the winds and air currents from miles away.

Gardens are microcosms where plants, insects, bacteria, fungi, earthworms and a host of many other organisms live and thrive. The majority of these inhabitants are law-abiding, go about their business and live in harmony with each other. Only a few are troublemakers that cause problems for the rest of the garden community. In most cases, the good guys insure the bad guys do not get out of line to cause problems. Integrated Pest Management (IPM) is an important garden practice. IPM does not eliminate garden pests but endeavors to keep pests under control and reduce their damage to a tolerable level through a variety of methods.

For many years, farmers followed the premise that the only good bug was a dead bug. Hobby gardeners also followed this premise. Many thought the introduction of miracle pesticides and laboratory chemicals, such as DDT in the '40s, was the solution to all pest problems. Armed with an arsenal of chemicals, farmers and gardeners were encouraged to spray or dust at the slightest provocation. In the '60s farmers were spraying more and more with fewer and fewer results. They did not realize that:

- Many insects developed a resistance to the pesticide.
- The creature destroyed could be a beneficial organism that attacked the pests.
- The misuse of the chemical products would cause environmental harm.

IPM is an integrated program that relies on alternative techniques for pest control and prevention of garden problems. These include: biological controls, resistant varieties, traps, barriers, crop rotation, mulch, solarization, tilling techniques, irrigation methods, pruning techniques, proper garden clean up and the limited use of pesticides when appropriate.

Pest problems, of course, will vary with region, climate, crop variety, soil type and general gardening practices. IPM is an important method of pest control in school gardens.

In the schoolyard where children are present, chemical pesticides usually cannot be used. When there is an extremely serious problem and chemical pesticides are necessary, the school pest control department must be contacted for assistance. They have trained personnel available or under contract who will inspect the problem and apply the correct product when children are not present.

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Least toxic pesticides commonly available include: insecticidal soap, Neem spray and Bt (*Bacillus thuringiensis*). Any pesticide product used in the garden must list the crop plant to be treated and the pest being controlled.

The most important step of IPM is going out to the garden on a regular basis and systematically checking the plants for pests and symptoms of damage.



Examine the plants at least once or twice a week during the growing season

Walk through the garden turning over leaves to check for signs of insects or disease. Equipment for the monitoring program should include a notebook for keeping records, a ten power magnifying lens for viewing small insects and small plastic bags or jars for collecting samples to be identified later. This is an excellent student activity to develop observation skills and to learn how to identify insects.

1. Identify the problem

When a problem is discovered in the garden, the first step to finding a solution is to identify the nature of the problem.

What is causing the problem? Is it an insect, a soil-borne pathogen, too much or too little water, sun scald, gophers, rabbits, snails or slugs, birds or has a child stepped on the plants or pulled the plant apart?

Is the problem in one part of the garden isolated on one type of plant (e.g., cabbages) or is it also in another part of the garden (e.g., peas)?

It would be unwise to treat the whole garden for a highly localized problem. Use the notebook to record these facts. Have students go into the garden to make notes on problems they find. [Click here to go to the sample IPM form that can be used to assist in collecting the evidence discovered and record the findings in a notebook.](#)

Once the pest information is collected, have the students use several sources to research and identify the problem and learn effective methods to control it. Sources include library reference books, such as insect field guides or gardening books. Three excellent publications are:

Pests of the Garden and Small Farm, A Grower's Guide to Using Less Pesticide by The University of California, Division of Agriculture and Natural Resources, publication number 3332.

A Citizen's Guide to Pest Control and Pesticide Safety by the United States Environmental Protection Agency, publication number EPA 730-K-95-001

University of California Guide to Solving Garden and Landscape Problems on CD, publication number 4300.

In San Diego County, you may call the University of California County Cooperative Extension, Master Gardener Information Hot Line (858) 694-2860 for free advice on gardening problems. Local garden centers are also good sources for solutions to gardening problems. However, they may recommend chemicals they sell.

2. Decide how much pest control is necessary

When you find and identify a problem, select the best solution to solve it. The best solution may be washing the plant with a strong water spray from the garden hose, changing the watering schedule, spraying the plant with insecticidal soap or a botanical pesticide such as *Bacillus thuringiensis*, commonly known as Bt, or doing nothing. Ask yourself these questions:

- Does the garden really need to be insect free? Can you tolerate some blemished plants or fruits in your garden?
- Are beneficial insects present in the garden?
- Can you replace the plants with hardier disease resistant varieties?

3. Choose an effective option

With the information on your IPM record form gathered in Step 1 and the answers to your questions considered in step 2, determine which option you wish to choose. If you are still uncertain, research additional references or get advice from gardening professional.

4. Evaluate the results

Once a pest control method has been chosen and implemented, always allow time for it to work and then evaluate its effectiveness. Compare pre-treatment and post-treatment conditions. Is there evidence of a reduction in the number of pests?

If steps are taken to prevent pests in the first place you may not have to control them later. Garden pests seek places to live that satisfy their basic needs for moisture, food and shelter. If these conditions are reduced the pests may move on to other areas.

To make your garden less attractive to pests, take the following preventative actions:

- Have the soil tested before planting to determine if you need to adjust the pH. Most plants grow best with a pH between 6.0 and 7.5.
- Make sure your garden has good drainage. Raised beds will improve drainage especially in heavy clay soils. Add organic material (compost) to the soil before planting if the soil needs amendments.
- Select healthy plants, seedlings and seeds that are known to resist diseases and are well suited to the climate. Fertilize them well. Strong plants are more likely to survive attacks by pests.
- Plant alternate rows of different kinds of plants. Pests that prefer one type of vegetable may not move to the next row if other kinds of plants are planted in neighboring rows.
- Do not plant the same crop in the same place year after year.
- Mulch the garden with leaves, straw, grass clippings, shredded or chipped bark to keep down weeds. A weed-free garden will reduce the pest population.
- Beneficial organisms help control pests. Birds, ladybugs, spiders, green lacewings, dragonflies, centipedes, praying mantis all eat aphids, mealy bugs, whiteflies and mites.
- Traps may be used to control mice, rats, gophers and squirrels. Fencing the garden with poultry wire is an effective method of keeping out rabbits.
- Compost garden waste and dead vegetation.

You may choose from many different methods as you plan your strategy for controlling garden pests. Sometimes a non-chemical method is as effective and convenient as many chemical alternatives. For many pests, total elimination is almost impossible, but it is possible to control them.

Knowing your IPM options is the key to good pest control.

Again the UC IPM website is an excellent source of information for pest identification and control utilizing Integrated Pest Management (IPM). Click this link <http://www.ipm.ucdavis.edu/PMG/selectnewpest.landscape.html> to go to the UC IPM Pest Index.