U.S. Environmental Protection Agency
Office of Pesticide Programs (7511P)
EPA 731-F-10-005 February 2010

United States Environmental Protection Agency

Fact Sheet

Integrated Pest Management

What Is Integrated Pest Management?

Pesticides are powerful tools for controlling pests. However, there are also other tools available for use in pest control, many of which pose greatly reduced risk to human health and the environment than do pesticides. Integrated Pest Management (IPM) is an effective and environmentally sensitive approach that makes use of a variety of these tools. The concept—know what the problem is before you apply pesticides—is fundamental to planning a successful IPM program. IPM relies on a combination of common-sense practices and science-based strategies, rather than solely on pesticide spraying.

IPM programs use current, comprehensive information regarding the life cycles of pests—which may include insects, weeds, rodents or other small mammals or wildlife, birds, or other living organisms—and their interaction with the environment. IPM strategies make use of this information in combination with available pest control technologies to manage pests economically, and with the least possible hazard to people, property, and the environment. IPM programs take advantage of all appropriate pest management strategies, including the judicious and careful use of pesticides, when necessary.

Who Can Use IPM?

Anyone with a pest control problem can implement an IPM program—farmers, homeowners, landscape professionals, school administrators, etc. IPM principles can be applied to both agricultural settings (e.g., farms and orchards) and non-agricultural settings (e.g., homes, landscapes, schools, indoor workplaces, and wilderness areas).

IPM is not a single pest control method but, rather, an approach that involves a series of pest management evaluations, decisions, and controls. Consequently, every IPM program is different. Each program is designed around individual pest prevention goals and eradication needs, considered in the context of the environment or setting. Regardless of their differences, successful IPM programs use the same four-tiered approach.

1. Set Action Thresholds

Before taking any pest control actions, IPM users first set an action threshold—a point at which pest populations or environmental conditions indicate that pest control action must be taken. This threshold is often the level at which pests will become a health hazard or an economic threat. Finding a single pest does not always mean pest control is needed—a predetermined threshold is critical to guiding pest control decisions.

2. Monitor and Identify Pests

Not all pests require control. Many pests are not harmful, and some are even beneficial. IPM programs work to monitor for and accurately identify pests so appropriate suppression decisions can be made in conjunction with action thresholds. Information gathered from pests monitoring and identification can help users take appropriate preventative measures and reduce the possibility that pesticides will be used unnecessarily or incorrectly.

3. Prevent

Prevention—removing conditions that attract pests—is an IPM program's first line of defense. Prevention includes taking steps to ensure that pest populations cannot increase to unacceptable levels. To prevent pests from becoming a threat, IPM programs work to manage crops, landscapes, or indoor spaces—creating

Recycled/Recyclable—Printed with Vegetable Oil Based Inks on 100% Process Chlorine Free Recycled Paper.

an unfavorable environment for pests to colonize, grow, and reproduce.

- For an agricultural crop, prevention might include using cultural methods, such as rotating between different crops, selecting pest-resistant varieties, and planting pest-free rootstock. It also can include mechanical methods, such as cultivating weeds and regularly aerating soils.
- In a non-agricultural setting, prevention might include reducing clutter, sealing areas where pests enter the building, keeping premises free of trash and overgrown vegetation, and diverting water away from a building or field to avoid standing water.

4. Control

If monitoring, identification, and action thresholds indicate that pest control is required, and preventive methods are no longer effective or available, control methods can be employed. Control methods are evaluated on effectiveness and relative risk. Those methods found to be both most effective and pose the lowest risk are selected first. In addition to preventative measures, IPM combines two central methods for reduced-risk pest control:

- Biologically-Based Pest Control
  These methods usually do not have toxic effects on animals or people and do not leave toxic or persistent chemical residues in the environment. These pesticides are derived from plants, animals, fungi, bacteria, some minerals, or other non-man-made synthesis. In addition, certain microorganisms—bacteria, fungi, viruses, and protozoa—can effectively control target pests. Examples of biological pesticides (also known as "biopesticides") include:
  - Using targeted, biological pesticides (e.g., insect pheromones) to disrupt a pest's mating cycle, and
  - Using naturally-occurring insects and competitors to help control pest populations; an example of a beneficial insect is the ladybug.

- Chemically-Based Pest Control
  These are reduced-risk chemically-based pesticides such as herbicides, insecticides, and fungicides. They are often synthetic materials that directly kill or inactivate the pest. This pest control method is often used simultaneously with other lower-risk methods. When using chemically-based treatments, it is important to use a pesticide that only affects the targeted pest.

IPM vs. Organic

IPM takes advantage of all appropriate pest management options, including, but not limited to, the judicious use of pesticides. In contrast, organic food production applies many of the same concepts as IPM, but limits the use of pesticides to those that are produced from natural sources, as opposed to those produced from synthetic chemicals. In most cases, food grown using IPM is not identified in the marketplace as is organic food. Many individual commodity growers are working to define what IPM means for their crop and region, and IPM-labeled foods are available in some stores. With definitions, growers could begin to market more of their products as "IPM-Grown", giving consumers another choice in their food purchases.

If further monitoring and identification indicate that reduced-risk pest controls are ineffective, then use additional controls such as the targeted spraying of a pesticide.

Where Can I Use IPM?

IPM can be used in a wide variety of situations. The following are just a few examples of situations where the use of IPM is a practical option:

- If a garden is infested by flies, use biological controls. Introduce the pest's natural enemy, such as parasitic wasps, to reduce and control the population.
- If ants and cockroaches enter a school through a hole in rotting wood, replace the rotting wood and seal any other openings into the building.
- If the major crop on a farm is being destroyed by wilt virus, use seasonal climate to determine the best time to harvest the crop. Maintain soil and seedlings well by using netting to cover seedlings as they grow and aerating the soil between plantings.

For More Information...

EPA's IPM Principles Fact Sheet
www.epa.gov/pesticides/factsheets/ipm.htm

IPM Institute's Frequently Asked Questions
www.ipminstitute.org/faq.htm