



QUESTIONS AND ANSWERS ABOUT INTEGRATED PEST MANAGEMENT (IPM)

Kelvin T. Sewake, Cooperative Extension Service
Arnold H. Hara, Beaumont Agricultural Research Center
Wayne T. Nishijima, Cooperative Extension Service
Brian C. Bushe, Beaumont Agricultural Research Center

What Is Integrated Pest Management (IPM)?

IPM is "a systems approach to reduce pest damage to tolerable levels through a variety of techniques, including natural predators and parasites, genetically resistant hosts, environmental modifications and, when necessary and appropriate, chemical pesticides. IPM strategies generally rely first upon biological defenses against pests before chemically altering the environment" (President Carter's Environmental Message, 1979).

IPM is a holistic approach to pest control that is ecologically sound, economically favorable, and safe for humans and the environment. IPM manages all pests and diseases affecting a crop, maximizing the use of nonchemical control tactics and minimizing the use of toxic pesticides. Nonchemical control tactics include cultural control (resistant varieties, sanitation, pruning), mechanical control (exclusion by barriers, trapping), environmental control (heat, cold), biological control (parasites, predators), and regulatory control (quarantines).

Why Should I Use IPM?

Farmers using IPM generally reduce their pest control costs and receive greater profits per unit of crop. Also, because fewer pesticides are used, worker exposure to chemicals is decreased and the surrounding environment is less affected. Consequently, public attitudes toward agriculture are more favorable.

How Does IPM Cut Down on Spray Time and Cost?

With IPM, chemical pesticides are applied only as needed. Because fewer spray applications are needed, less employee time is required and the amount of pesticide to be purchased is reduced, thus increasing worker time and grower profit. Just as a weed is a "plant out of place," a pesticide sometimes can be a "tool out of place."

Is IPM "Organic" Control?

No. IPM is an *integrated* control system that uses a variety of techniques to reduce pest damage. Controls include such tactics as insect predators and parasites, field sanitation, cultural practices, resistant varieties, and applying chemical pesticides only when needed. The best combination of control tactics is the safest, most efficient, and most cost-effective for the grower.

What Kind of Pests Does IPM Manage?

IPM, as a management tool, can be used to control living (biotic) plant pests such as fungi, bacteria, insects, weeds, mites, birds, and other animals. It can also solve problems such as pesticide phytotoxicity, sunburn, and other physiological, environmental, or cultural problems.

Isn't IPM More Trouble?

IPM requires regular observations in the field, checking on plant growth and health, and monitoring pest damage levels to the plant. By being more aware of the vigor of the plant, growers can detect early signs of trouble in the field and take necessary precautions before the problem becomes serious. Farm workers should be trained to detect early signs and symptoms of the most common problems. Early detection is the key to a successful IPM program.

Do I Have to Keep Records?

Yes, records are a necessary part of farm life. By knowing the patterns of damage over a number of years, growers can determine trends that will help them prepare for similar problems in the future. For example, anthracnose is more common during certain times of the year. Knowing those danger periods can alert the grower to the times when he or she must spray.

How Can I Know IPM Is Working?

IPM is a long-term solution to pest control problems. Although changing cultural practices may not be as psychologically satisfying as spraying a chemical pesticide, the long-term advantages have been worth it. In IPM projects on crops such as anthurium, watermelon, and tomato, IPM has been shown to be a viable and cost-effective answer when compared with pest control methods that use only chemical pesticides.

How Do I Know When to Spray?

Sprays may be warranted when no other available controls are feasible and when the pest population passes the predetermined economic injury level for the crop.

What Is the Economic Injury Level?

The economic injury level is the level of pest damage at which a pesticide application is economically justified. This injury level is based on cost (employee, equipment, etc.), risk (employee, environment, etc.), and projected damage levels (determined through monitoring the field).

What Is a Primary Pest?

A primary pest is the major causal agent of pest damage to the crop. When spraying is directed toward a primary pest such as thrips, a secondary pest such as aphids may go unnoticed until it becomes a primary pest.

What Are the Main IPM Control Methods?

The major IPM control methods are these:

Physical & Mechanical

1. Environment
2. Traps

Chemical

1. Pesticides
2. Disinfectants

Biological

1. Predators
2. Parasites
3. Pathogens

Cultural

1. Rotation
2. Fertilization
3. Weed control
4. Sanitation

Host/Plant Resistance

1. Resistance

2. Tolerance

Miscellaneous

1. Autocidal
2. Pheromones
3. Growth regulators
4. Attractants

What Are Physical and Mechanical Controls?

Physical and mechanical controls make the environment unsuitable for the entrance or dispersal of the pest. Bird damage in shade-houses can often be prevented by screening, a type of mechanical control.

The environment also plays an active role in either causing or preventing pest outbreaks. During periods of low rainfall and high temperature, as in the summer, thrips damage can be severe. During periods of high rainfall and low temperature, as in the winter, thrips damage is minimal. To the extent that the environment can be controlled, pest outbreaks may be prevented.

What Is Chemical Control?

Chemical control is the use of a chemical biocide to control a pest. Herbicides, insecticides, miticides, nematocides, bactericides, avicides, and fungicides are examples of chemical biocides. They also include disinfectants, which can be used to clean cutting tools.

Chemical control is a valuable tool for the grower; short-term pest control is normally quick and effective, and it is psychologically satisfying for the grower to see dead pests. Unfortunately, for all their popularity, pesticides have numerous drawbacks. The cost of pesticides and thus the cost of production is high. Pests can become resistant to pesticides, and natural control agents are disrupted because the pesticide makes no distinction between the damaging pest and beneficial organisms. Pesticides are poisons and present many hazards to human health, especially if they are improperly used or disposed of. Misused pesticides may cause contamination of soil and groundwater, sickness of the applicator and those in the spray area, mutagenic effects in unborn children, and the possibility of fines and lawsuits.

What Is Biological Control?

Biological control is the use of natural enemies to control plant pests. Parasites such as tiny wasps on caterpillars, predators such as ladybird beetles on aphids, and insect pathogens such as viruses, bacteria, fungi, or nematodes contribute to reducing the number of destructive

plant pests. Often the application of a broad-spectrum chemical pesticide kills both plant pests and beneficial organisms, and is counter-productive in the long run.

What Is Cultural Control?

Cultural control is the use of cultural practices that discourage or reduce pest populations. Examples are fertilizing and watering practices, fallowing beds between plantings, rotating plants or varieties, selectively harvesting flowers to prevent spread of disease, weed control, and sanitation of diseased plants, all of which reduce the pest population.

What Is Host/Plant Resistance?

Host resistance or tolerance is the ability of the plant to resist or tolerate some degree of pest infestation without reducing production. An-

thuriums resistant to anthracnose do not get the disease; another anthurium may be less susceptible to insect injury because of the plant's genetic makeup.

What Are the Other Forms of Control?

There are several types of insect control that do not fit into the other categories. Some of the more common ones are autocidal control, pheromones, and growth regulators. Autocidal control involves releasing sterilized male insects to mate with female insects and eventually reduce the pest population. Pheromones or sex attractants can be used to disturb the natural mating process or behavior of an insect. Attractants can be used to trap insects, while insect growth regulators (IGR) inhibit the insects' development.