

Fruit and Vegetable Production

Lesson 4: Integrated Pest Management

The same factors that make a site desirable for planting a crop—fertile soil, adequate moisture, and a hospitable climate—also make it susceptible to many pests and diseases. To have a profitable yield and a healthy crop, producers must have a system of preventing pest infestation and protecting crops that can be utilized throughout the entire production process.

Pest Control Basics

Pests are plants, animals, or other organisms that occur where they are not wanted or where they can cause damage. Common types of pests include weeds, insects, and bacteria. A pest control program should protect crops from pests, increase plant resistance to pests, and reduce or eliminate pest populations. There are four basic methods of pest control: biological, chemical, cultural, and physical and mechanical.

Biological Pest Management

Biological pest management is the use of living organisms to control pests. Trap plants may be used to lure pests away from crops. Natural predators and parasites can be used to reduce pest populations. Biological pest management is usually done in one or more of three ways:

- Conserving or encouraging species in the area that control the pests
- Supplementing existing predator populations with additional members of the same species
- Introducing new species to the environment specifically to control pests

Biological methods tend to take longer than other management methods and do not completely eliminate pests.

Chemical Pest Management

The use of chemicals to protect and treat plants and to repel or destroy pests is called chemical pest management. The most common type of chemical pest management is the use of pesticides. There are many different types of pesticides. Table 4.1 shows some common types of pesticides and the pests they treat.

Table 4.1 – Pesticides for Specific Pests

Type of Pesticide	Pests Treated
Bactericide	Bacteria
Fungicide	Fungi
Herbicide	Plants
Insecticide	Insects
Miticide	Mites, ticks
Molluscide	Snails, slugs
Nematicide	Nematodes

Pesticides can be a very useful tool in managing pest populations, but they do pose potential risks. Pesticides are specifically designed to adversely affect or kill the pests they target. If mishandled, they can present health risks to humans and cause damage to the environment. Pesticide use is monitored and regulated by various local, state, and federal agencies, including the U. S. Environmental Protection Agency (EPA). The EPA evaluates new pesticides and reviews old ones to determine that they can be used safely and without causing an unreasonable threat to the environment. Growers should follow all directions and regulations regarding the proper use, handling, and storage of any pesticides they use.

Pests can develop resistance to chemicals over time, so using pesticides alone should not be the only method for treating pests. Pesticides should be used only when necessary and at the lowest rate of application that will effectively control the pests. This reduces expense, helps prevent pests from becoming resistant, and lowers health and environmental risks.

Cultural Pest Management

Cultural pest management is controlling pests through the use of proper planting and growing techniques. Good cultural pest management begins by choosing varieties that are suited to the area and planting them so that growing conditions are optimized and stress on crops is reduced. Providing adequate water and nutrients helps ensure strong plants, which are more resistant to pests and diseases and more able to outgrow weeds. Crop rotation, proper disposal of plant residue, and planting and harvesting to avoid coinciding with pests are also examples of cultural management strategies.

Cultural pest management works by optimizing conditions for crops while minimizing opportunities for pests. Cultural management strategies have the advantage that many of them can be implemented before pests appear.

Physical and Mechanical Pest Management

Physical and mechanical pest management strategies use physical barriers and labor to prevent or limit pest damage. Examples of physical pest management would include using fencing, traps, row covers, and trenches to keep pests off crops. Mowing, plowing, and hand-picking insects off plants are examples of manual operations that can be used to control pests. Holding produce in cold storage to kill pests or slow or stop their development is also a type of physical pest management.

Some physical and mechanical strategies, such as removing insects by hand, can require too much time and labor to be practical for larger operations. The size of the operation and the availability of a labor force should be considered before using physical and mechanical management strategies.

Integrated Pest Management

Integrated pest management (IPM) combines biological, chemical, cultural, and physical and mechanical strategies into a comprehensive system of pest control. Integrated pest management programs have the following goals:

- Limit pests to acceptable levels
- Promote healthy crops and good land management
- Reduce reliance on pesticides
- Promote long-term management strategies
- Improve health and safety for farm workers and consumers
- Limit damage to the environment

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It is important to realize that IPM does not attempt to eliminate all pests. Some pests are acceptable, because limited pest populations help maintain the predator and parasite populations that are utilized for biological control. The key to IPM is knowing when the pest population passes the acceptable level—the point at which the cost of damage is greater than the cost of controlling the pests. This point is called the action threshold or economic threshold, and it is when the producer must take steps beyond any preventive measures already in place. Table 4.2 shows the general steps of an integrated pest management strategy.

Table 4.2 – Steps of Integrated Pest Management

Six Steps of IPM
1. Implement preventive strategies.
2. Scout plants for symptoms or presence of pests.
3. Identify pests and scope of damage.
4. Determine when action must be taken.
5. Implement management strategies.
6. Evaluate results.

There are a number of factors that should be considered when determining the action threshold, such as the level of damage and infestation, market price, stage of crop growth, and cost of pesticides.

A successful IPM strategy requires a thorough understanding of the crops, the potential pests and their enemies, and the surrounding environment. The producer must know how these elements interact, and monitoring the site for pest activity is critical.

There are many advantages to an integrated pest management system. Utilizing a variety of controls reduces the likelihood that pests will adapt to one particular strategy. A number of IPM strategies are simply good planting and management strategies, and therefore cost little or nothing extra to implement. Integrated pest management also reduces dependence on pesticides and helps promote healthy produce and a healthy environment. A healthy environment can support a balance between agricultural production, native plants and animals, and human inhabitants. An environment in which the natural resources have been depleted or misused cannot. Integrated pest management offers affordable, workable solutions that can benefit consumers and producers.

Summary

Protecting crops from pest damage is an essential part of raising a healthy, productive crop. The four types of pest management are biological, chemical, cultural, and physical and mechanical. Integrated pest management incorporates techniques from all four strategies into a comprehensive system of pest control.

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