
Section 2

Integrated Pest Management

A pest is any harmful or troublesome organism. Pests include weeds, insects, diseases, fungi, nematodes or animals such as rodents, deer or skunks.

The process of planning and taking steps to control pests or prevent them from becoming problems is called Integrated Pest Management (IPM). Farmers who practice IPM monitor their crops for pests and use a variety of control methods when they are needed. Good planning allows these farmers to reduce the cost of pest control and get the most benefit from their efforts.

IPM programs aim to:

- < get rid of pest problems and prevent them from recurring
- < reduce pesticide use
- < reduce environmental and health risks
- < help prevent pests from becoming resistant to pesticides
- < help you recognize conditions that could lead to pest problems.

IPM does not rely on chemical pesticides alone. This chapter describes five control methods that can be used alone or in combination –

1. physical or mechanical methods (such as removing the pests)
2. cultural practices (such as crop rotation)
3. biological methods (such as insects or other predators)
4. genetic methods (such as disease resistant crops)
5. chemical methods (such as pesticides)

**Here's an example of how IPM could help you
reduce the cost of pest control.**

Many farmers apply pesticides according to a spray schedule or at a certain time of year to prevent pests from appearing. This practice is expensive and may not be needed. By checking the crops for early signs of pests, you can target your control methods and reduce your use of pesticide. You will reduce the risks to the environment and save yourself some money.

Everybody wins with IPM!

Before you decide on a pest management program, consider the following questions:

- < Are pests present in the crop?
- < What types of pests (insects, weeds, diseases, animals)?
- < How many pests are there per plant/area?
- < How much damage is being done?
- < Are conditions suitable for the pest to continue to grow?
- < Is the pest at a stage where it can be effectively controlled? (To answer this you must understand the life cycle and habits of the pest as well as its host)

The five basic components of IPM are:

- < **identification**
- < **monitoring**
- < **thresholds**
- < **methods of control**
- < **evaluation.**

Identification

Correct identification of the pest and beneficial organisms is the key to effective pest management. You must first identify the pest and beneficial organisms in order to find out about their biology, life cycle, preferred habitat and other characteristics. When you have this information, you can plan what to do to control the pest, if necessary. A treatment method may not be necessary if certain beneficial species are present. Knowing how quickly beneficial species reproduce helps you decide whether treatments may be required. You can also reduce the chances of damaging the environment and other organisms by choosing the proper pest control.

Pests and beneficial organisms may be identified by:

- < physical appearance
- < damage caused
- < life cycle
- < habits
- < host plant or animal

If you need help to identify a pest or beneficial organism, contact:

- < a pest management representative from business or government
- < a pesticide vendor
- < a university or college.

Whenever possible, supply the resource person with a sample of the pest or damaged plant or animal. Government and business factsheets and publications also provide useful information.

Once you know what the pest is, you must also find out the best stage and time to control it. A pest is usually more susceptible during one particular stage of its development. For example, annual weeds are easiest to control with a herbicide application when they are young seedlings, but perennial weeds can be controlled during the flowering period. To obtain the best control, you need to know:

- < what the pest is
- < when the pest can best be controlled
- < which control method, if any, will control the pest.

Monitoring

Monitoring is the regular inspection and sampling you do to get an estimate of the size, extent and location of pest populations. Monitoring allows you to see how your crops are being affected by different conditions. You might need to monitor for the presence of beneficial insects and mites (such as predator mites in orchards) or monitor for weather conditions that lead to disease outbreaks.

Monitoring is most often used to determine whether pests will reach a level that justifies control measures. To make this decision, you will need to keep accurate records of the information related to the pest population and the amount of damage that occurs.

Methods you can use to monitor pests include:

- < collecting insects in traps
- < counting the number of pests in a certain area
- < recording temperature, humidity, rainfall and leaf wetness that could encourage certain diseases to spread
- < scouting the area often to note any increase or change in the pest population or damage

How often you need to monitor depends on the situation. For example, a grower may need to monitor for pests in a horticultural crop once or twice a week, but less often in a field crop.

Compare the monitoring information to the Thresholds shown below. With this information you can decide if and when the pests need to be controlled, and what methods to use.

Thresholds

Thresholds help you decide whether pest controls are necessary and, if necessary, when to begin and time the controls. Thresholds are guidelines only and may be adjusted depending upon local conditions and market demands.

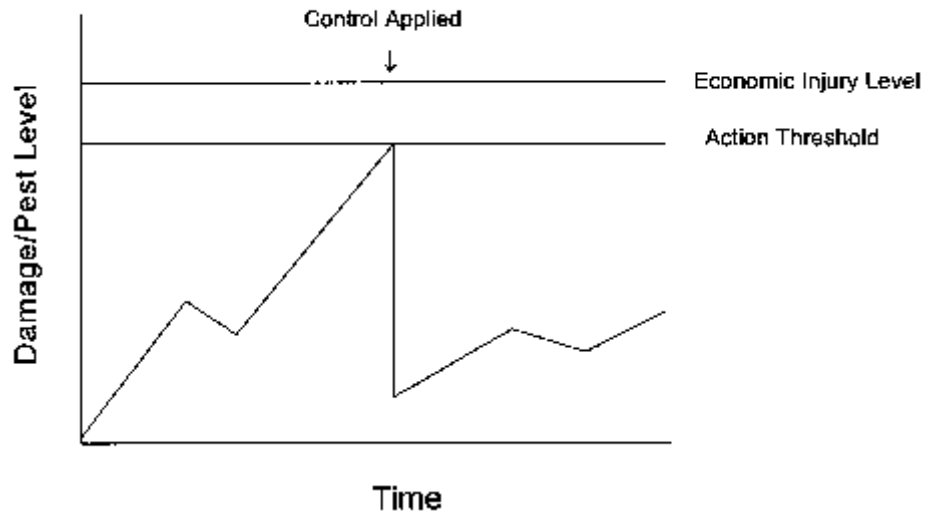
Remember, control does not necessarily mean total elimination of the pest. A certain amount of damage is usually expected and tolerable. Your goal is to keep the pest population at a level that does not cause any economic loss.

The diagram below shows when a control would be applied to avoid economic loss. When the number of pests is relatively low, the cost of applying the control is greater than the damage. However, as the number of pests increase, the damage also increases.

The **Action Threshold** is the point at which the pest needs to be controlled in order to avoid economic loss. Each pest has its own Action Threshold, depending on its biology and the type of controls that will be used. Once you know the Action Threshold, you can monitor the pest population to know when to start controlling the pest.

The **Economic Injury Level** occurs when the amount of damage caused by the pest is equal to the cost of controlling the pest. Damage may include losses in yield or quality, as well as the cost of labour and pest control. In the case of weeds, factors such as the type of weed, its height, or other physical characteristics may affect development of the crop.

Timing of Pest Control



Methods of Control

Integrated Pest Management includes using many different types of controls, alone or in combination. A chemical control is not always necessary or economical. Consider using some of the other methods of pest control outlined below for safe and effective treatments.

Physical (mechanical) control of pests involves removing the pest from the crop or preventing the pest from entering the crop by using manual labour or equipment. Common examples of physical control include using screens to keep out insects, mulches to keep weeds down and cultivating fields to control weed populations.

Cultural methods of pest control include practices common to good land management and can prevent pests from developing or spreading. Cultural pest control includes crop rotation and planting certified seed (which is low in weed seeds and disease).

Biological methods of pest control use organisms to control or kill the pest. These methods include releasing sterile insects to stop the pest population from reproducing or releasing beneficial parasites, predators or microorganisms to attack pests. (e.g. - parasites to control whitefly in greenhouses). Insect pheromones, chemicals produced by insects, may be used to disrupt insect pest mating or to attract insect pests to a trap.

Genetic methods of control include using genetically engineered crops such as Bt-corn and Bt-potatoes, or selecting disease resistant plant varieties.

Evaluating Pest Management Results

Chemical methods of control use pesticides such as herbicides, insecticides, fungicides, repellents and other registered products to control, suppress or repel pests. When you use a pesticide in your IPM program, it should be compatible with the other components of the program.

Evaluating the effectiveness of an IPM program may be the most important part of the program. Keep detailed records of everything you do to manage pests, and the results you get. (see Keeping Pesticide Records section in this manual). This information will help you to:

- < decide whether the current pest management program is effective
- < review monitoring methods
- < modify the pest management program in future years
- < forecast pest problems
- < defend against liability suits

Remember that Integrated Pest Management is just one part of an overall plan to manage crops. Pest problems can be related to:

- < seed quality and varieties
- < health of the soil
- < plant nutrition
- < the amount of water available and how it is managed
- < effects of the local climate
- < handling and marketing of the harvested crops.

All aspects of production must be considered to develop a complete crop management program - often called Integrated Crop Management (ICM).

Modify your IPM plan as needed. Keep yourself up to date about pest management and Integrated Crop Management. Gather information from government and business publications, magazines, crop management advisers and specialists, local colleges and universities.

Talk to people about your IPM program. When employees understand the principles of IPM, they can see how their actions can help to meet your IPM goals. Knowledge of IPM will also help your customers and the public to appreciate the many benefits that effective IPM programs can offer.

Review Questions

1. Integrated Pest Management is the most economical way to control pests.

TRUE

FALSE

2. Define Economic Injury Level.

3. List 4 methods of pest control that do not involve the use of pesticides. Give an example of each.

1. _____

2. _____

3. _____

4. _____
