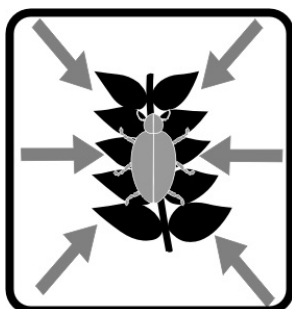


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## Section 2

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# 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.

**Integrated Pest Management (IPM) is the process of planning and taking steps that will prevent or control pests.** Farmers who practice IPM monitor their crops for pests and use a variety of control methods when they are needed.

IPM programs can help you to:

- ▶ recognize conditions that could lead to pest problems
- ▶ prevent pest problems from starting
- ▶ control pest problems when they do happen and prevent them from happening again
- ▶ reduce pesticide use
- ▶ reduce environmental and health risks
- ▶ prevent pests from becoming resistant to pesticides
- ▶ produce long-term solutions to pest problems.

**Prevention is an important part of IPM.** Many of the crop management decisions you make can help to prevent or reduce pest problems. Think about how you can prevent pest problems when you are making crop management decisions about:

- ▶ 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.

A complete crop management program that considers all aspects of production is often called Integrated Crop Management (ICM).

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 may be able to target your control methods and reduce your use of pesticides. You will reduce the risks to the environment and save yourself some money.

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.)

## **Five Components of IPM**

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 how to control the pest, if necessary. A control method may not be necessary if certain beneficial species are present. Knowing how quickly beneficial species reproduce helps you decide whether pest controls 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. You may also submit a sample to the Pest Diagnostic Clinic at the University of Guelph. You can find information about taking and submitting samples at [www.labservices.uoguelph.ca/units/pdc/](http://www.labservices.uoguelph.ca/units/pdc/)

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 (treatments). 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 for the pest. 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 determined by research carried out by experts in pest management. You can find the most recent information on a particular pest from the Ontario Ministry of Agriculture, Food and Rural Affairs. For information, check the web site at:

**[www.omafra.gov.on.ca/english/crops/insects/ipm.html](http://www.omafra.gov.on.ca/english/crops/insects/ipm.html)**

The **Action Threshold** is the point in time at which the pest needs to be controlled to prevent the pest from causing unacceptable damage. Each pest has its own Action Threshold, depending on its biology, the environmental conditions that are present, such as leaf wetness and temperature and the type of controls that will be used. Once you know the Action Threshold, you can monitor the pest population and the environmental conditions to know when to start controlling the pest.

Some thresholds are set at the **Economic Injury Level**. 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.

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 prevent the pest from causing unacceptable loss.

## Methods of Control (Treatments)

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) methods** involve 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** include practices common to good land management that give crops the best growing conditions and can prevent pests from developing or spreading. Cultural pest control includes crop rotation, planting certified seed which is low in weed seeds and disease and using pest resistant varieties.

**Biological methods** use living organisms to control or kill the pest. These methods include releasing sterile insects to stop the pest from reproducing, or releasing beneficial parasites, predators or microorganisms to attack the pest. One example is releasing 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 pest control include using genetically engineered crops such as Bt-corn, or selecting disease resistant plant varieties.

**Chemical methods** of pest 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 IPM Results

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 the **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.

**IPM is complex because pests are able to change and adapt.**

**Modify your IPM plan as needed.** Keep yourself up to date about integrated pest management. Gather information from government and business publications, magazines, crop management advisers and specialists, local colleges and universities. Visit the Ontario Ministry of Agriculture, Food and Rural Affairs web site for information at [www.omafra.gov.on.ca/IPM/english/index.html](http://www.omafra.gov.on.ca/IPM/english/index.html)

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.

## **IPM Specialists**

The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) have staff that are specialists in Integrated Pest Management for the crops grown in Ontario.

Your first point of contact to the crop specialists of the Ontario Ministry of Agriculture, Food and Rural Affairs is the:

- ▶ Agricultural Information Contact Centre: 1-877-424-1300
- ▶ Northern Regional Office: 1-800-461-6132, or
- ▶ web site at **[www.omafra.gov.on.ca](http://www.omafra.gov.on.ca)**.

OMAFRA newsletters are available by e-mail. You can subscribe to the newsletters on the OMAFRA web site at **[www.omafra.gov.on.ca/english/subscribe/index.html](http://www.omafra.gov.on.ca/english/subscribe/index.html)**

You may also subscribe to Agriphone Messages and Podcasts at **[www.omafra.gov.on.ca/english/subscribe/podcast.htm#cropline](http://www.omafra.gov.on.ca/english/subscribe/podcast.htm#cropline)**

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## Review Questions

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

TRUE

FALSE

2. Define Action Threshold.

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

1.

2.

3.

4.