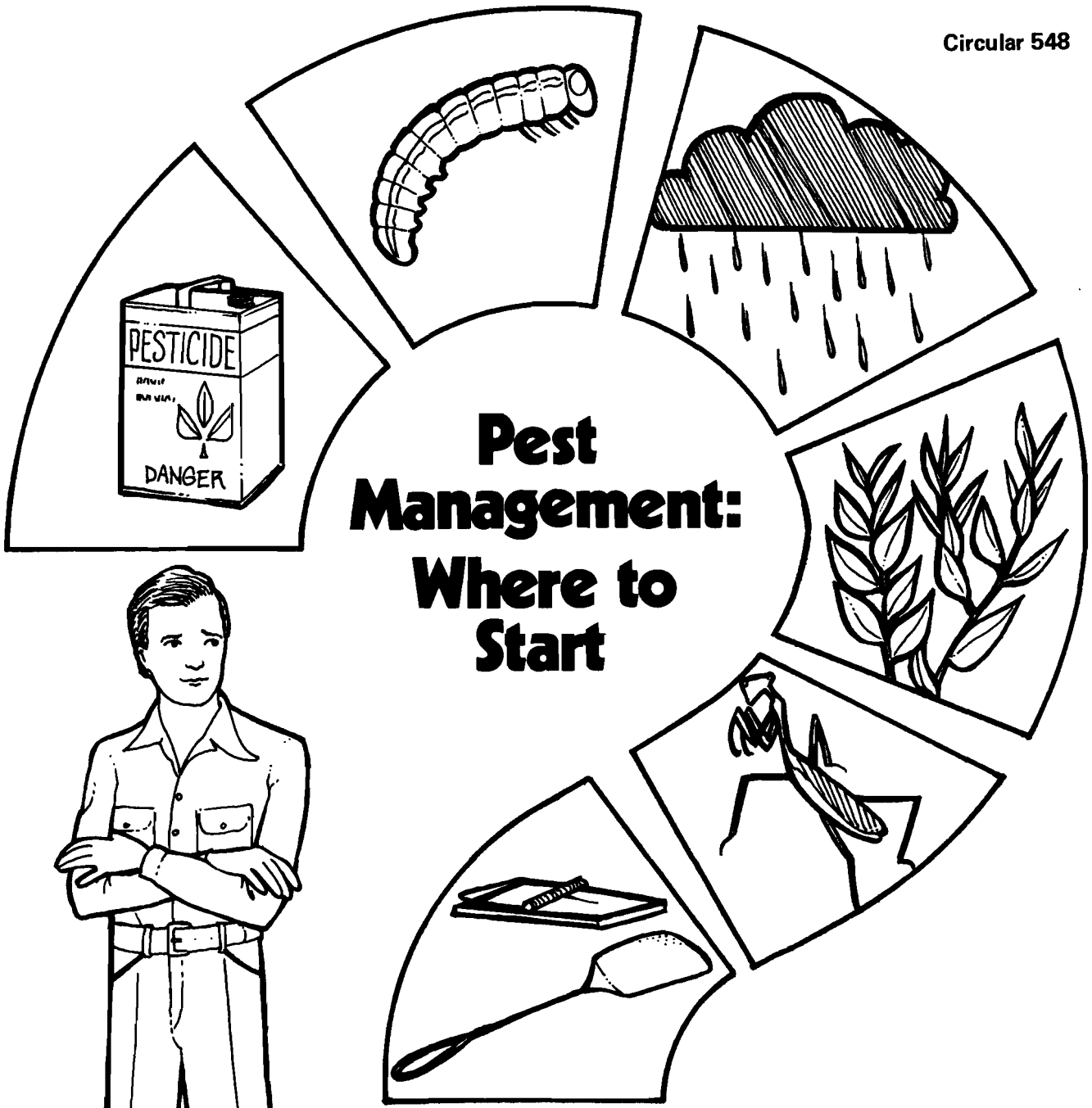
Circular 548



Pest Management: Where to Start

IPM made easy

Florida Cooperative Extension Service
Institute of Food and Agricultural Sciences
University of Florida, Gainesville
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Pest Management: Where to Start

C. A. Boyles

To Help You

As you use this publication, watch for words written in *italics.* Look in the glossary in the back for an explanation of these words.

Statement of Purpose

In the 1960's and 1970's, people began to worry about the harmful effects of *pesticides* and other poisons. Pesticides are needed to manage many pests of man, his crops and animals. To help protect soil, water and air (the *environment*), man no longer uses some pesticides.

Integrated Pest Management (IPM) is an effective, but less harmful way of managing pests of all kinds. An IPM user looks at the whole picture — the *pest,* the *host,* and the environment. Then following IPM methods, the user chooses one or several ways to manage the pest.

Most pesticides are made from the same materials as gas and oil. Gas and oil are also used to apply pesticides. Through IPM, wiser use of pesticides helps to save energy.

The purpose of this book is for you to learn the basic ideas of IPM. You should be able to manage pests safely, with less energy and lower costs.

For more information check these publications available from your County Extension Agent:

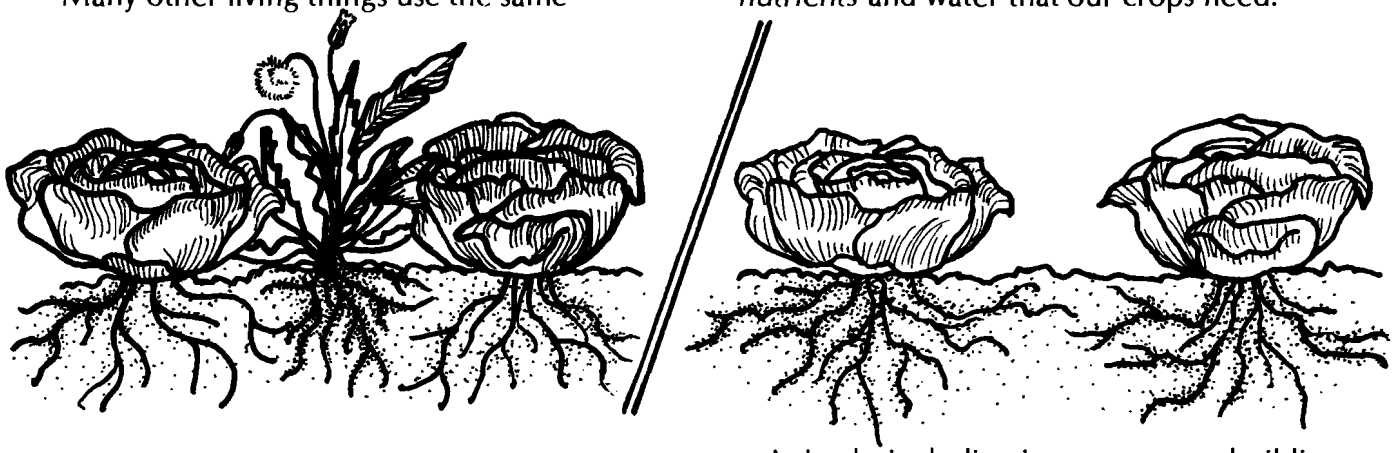
All About Pests — Circular 543
Using Natural Enemies to Manage Pests — Circular 547
Spraying Away Pests — Circular 544
Plants Protected from Pests — Circular 546
The ABC's of IPM — Circular 549

Man and His Resources

To survive, we depend on earth's natural *resources*. These resources include water, air, soil and green plants.

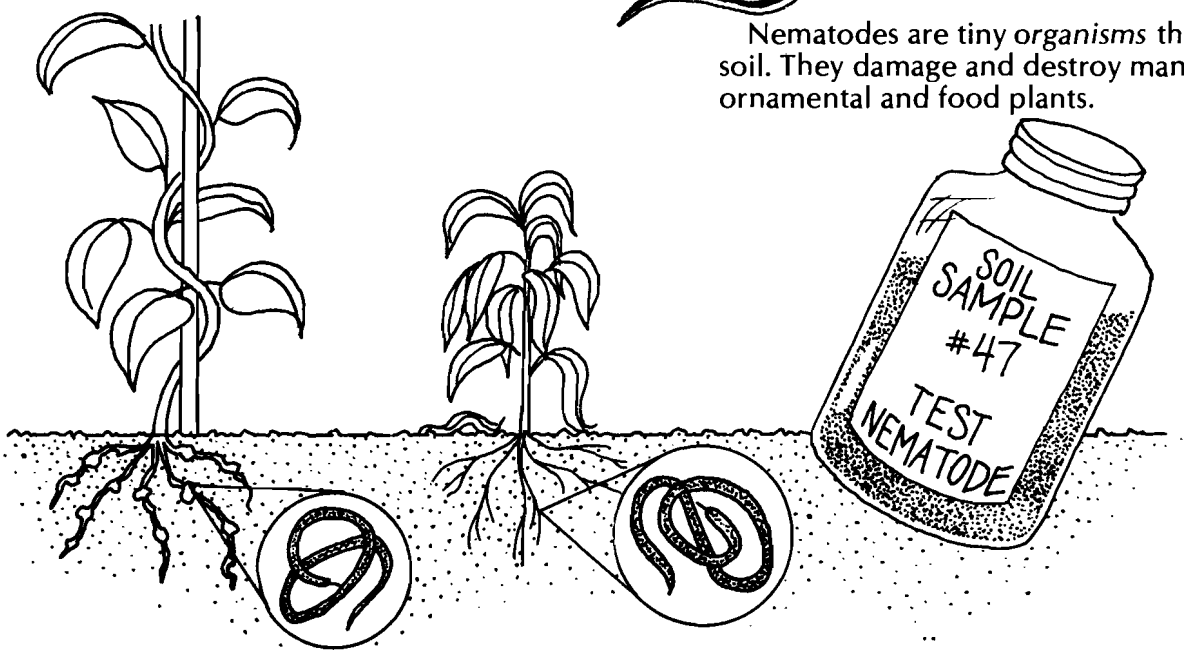
Many other living things use the same resources that we do. They are *competitors* with us and our efforts to grow food.

Weeds are plants growing in the wrong place. They use the same soil, sunlight, *nutrients* and water that our crops need.

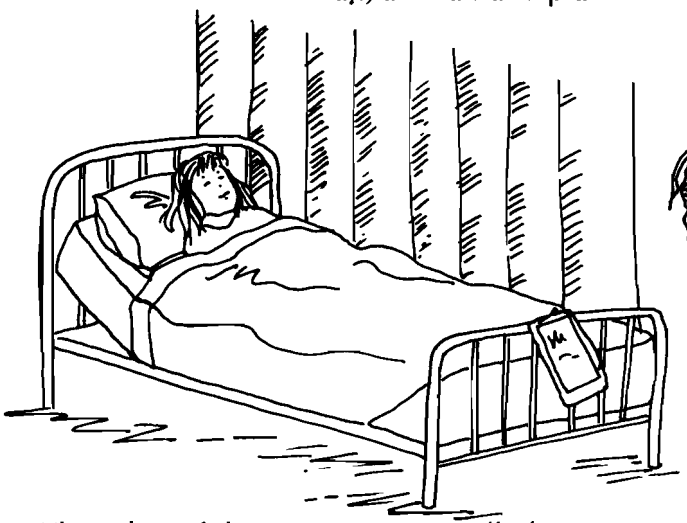


Animals, including insects, eat our buildings, food and clothing.

Nematodes are tiny *organisms* that live in the soil. They damage and destroy many valuable ornamental and food plants.

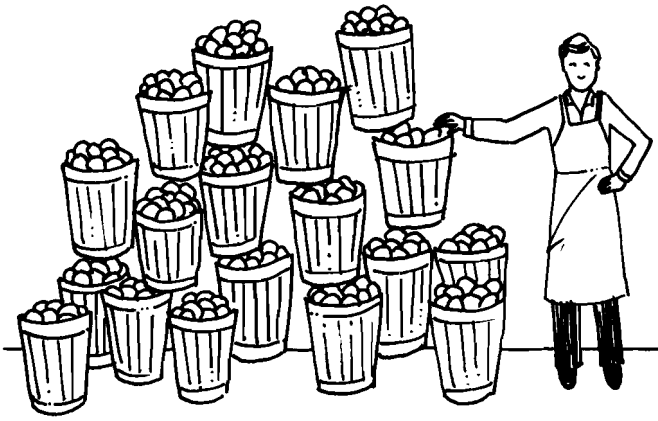


Diseases also harm man, animals and plants.



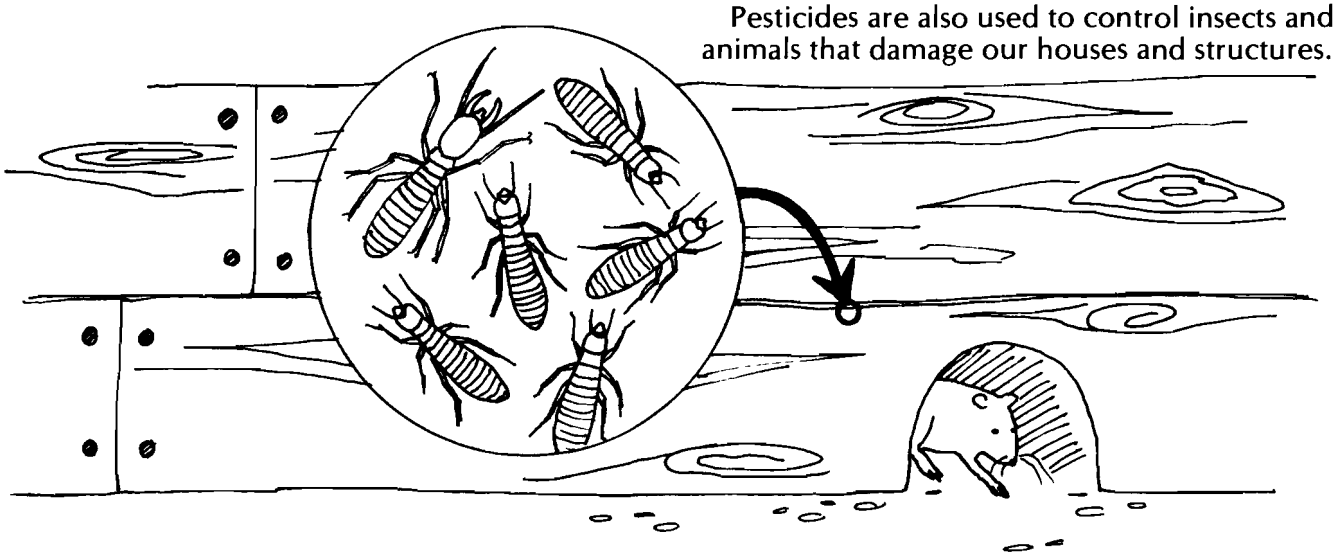
These harmful competitors are called pests. To protect natural resources we must manage pests. Man learned more than 100 years ago that certain chemicals will kill pests. These are called pesticides. Many pesticides have been developed, and they are used in many ways.

They are used on crops. This helps farmers produce more and better crops.

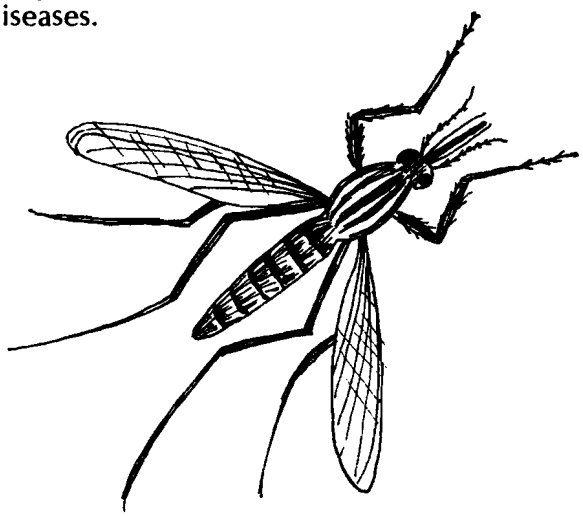


1980's

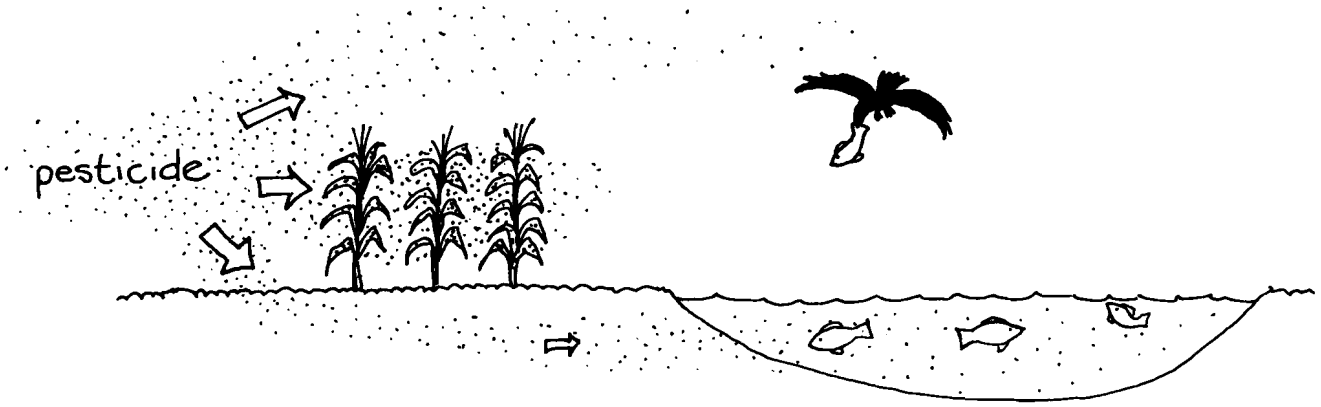
Pesticides are also used to control insects and animals that damage our houses and structures.



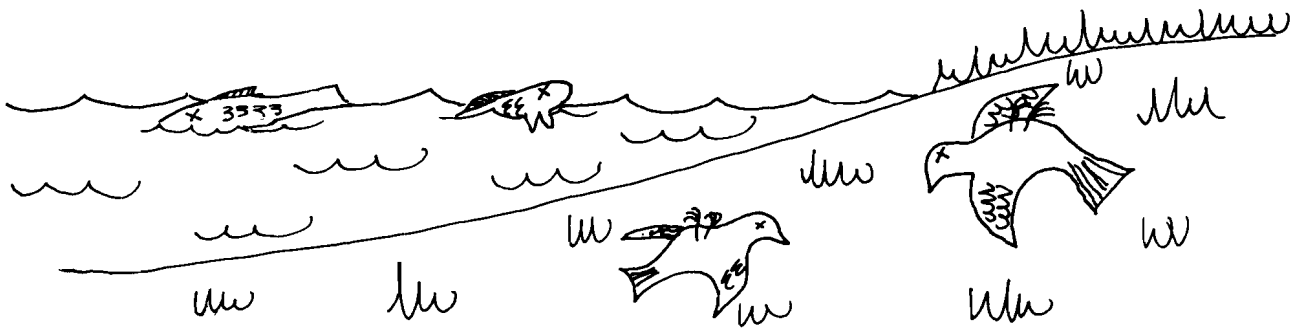
Pesticides are used to kill insects that carry diseases. This helps reduce the number of people who become sick and die from these diseases.



What actually happens when a pesticide is used? Suppose we spray corn with an insecticide. When we do, one of three things might happen. Some of the insecticide will hit the corn. That's what we want. But some will also go into the air. It may then travel for long distances. Pesticides often end up where they are not wanted. Some of the insecticide may also get on the soil. It then gets washed down into the ground by rain. Eventually, it may end up in a lake or stream. It may then be taken in by fish and other life. Other animals then feed on the fish and other life. Sometimes these animals become sick or die from pesticides in their food.



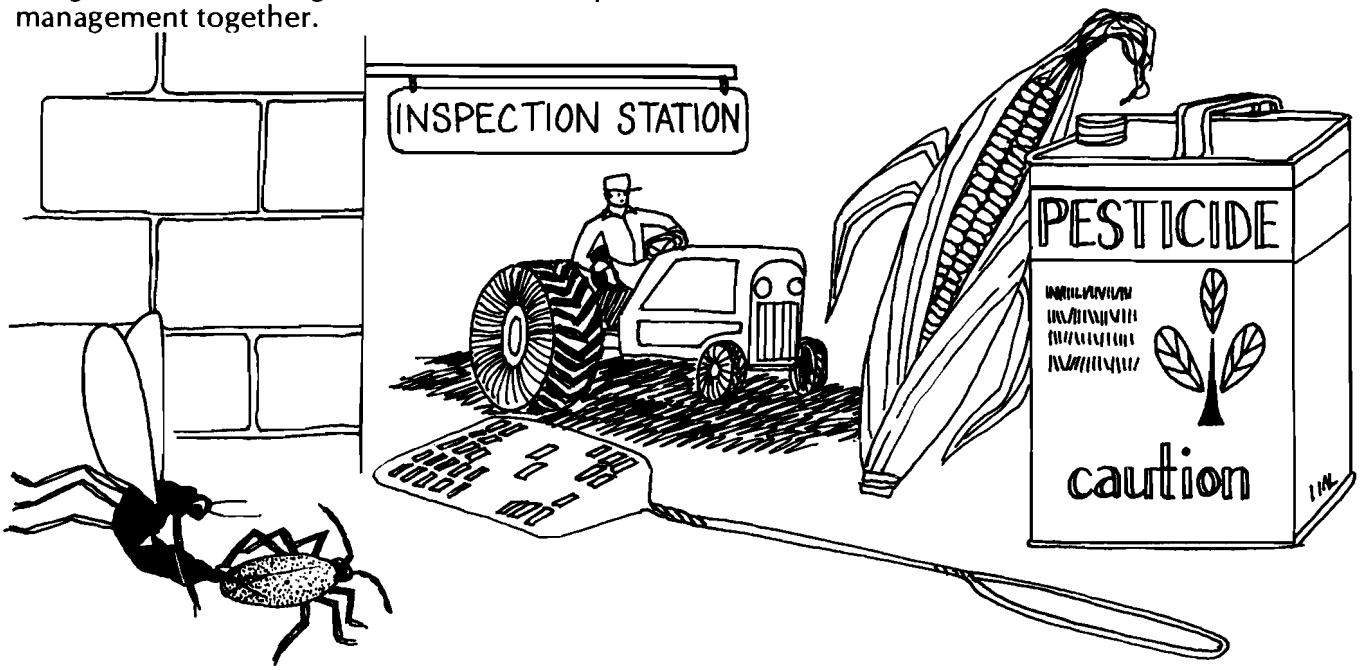
Pesticides are easy to buy. Many are also effective and fast acting. For these reasons pesticides have been used a lot. Also, pesticides have been *misused.* Misuse has caused damage to people, animals and the environment.



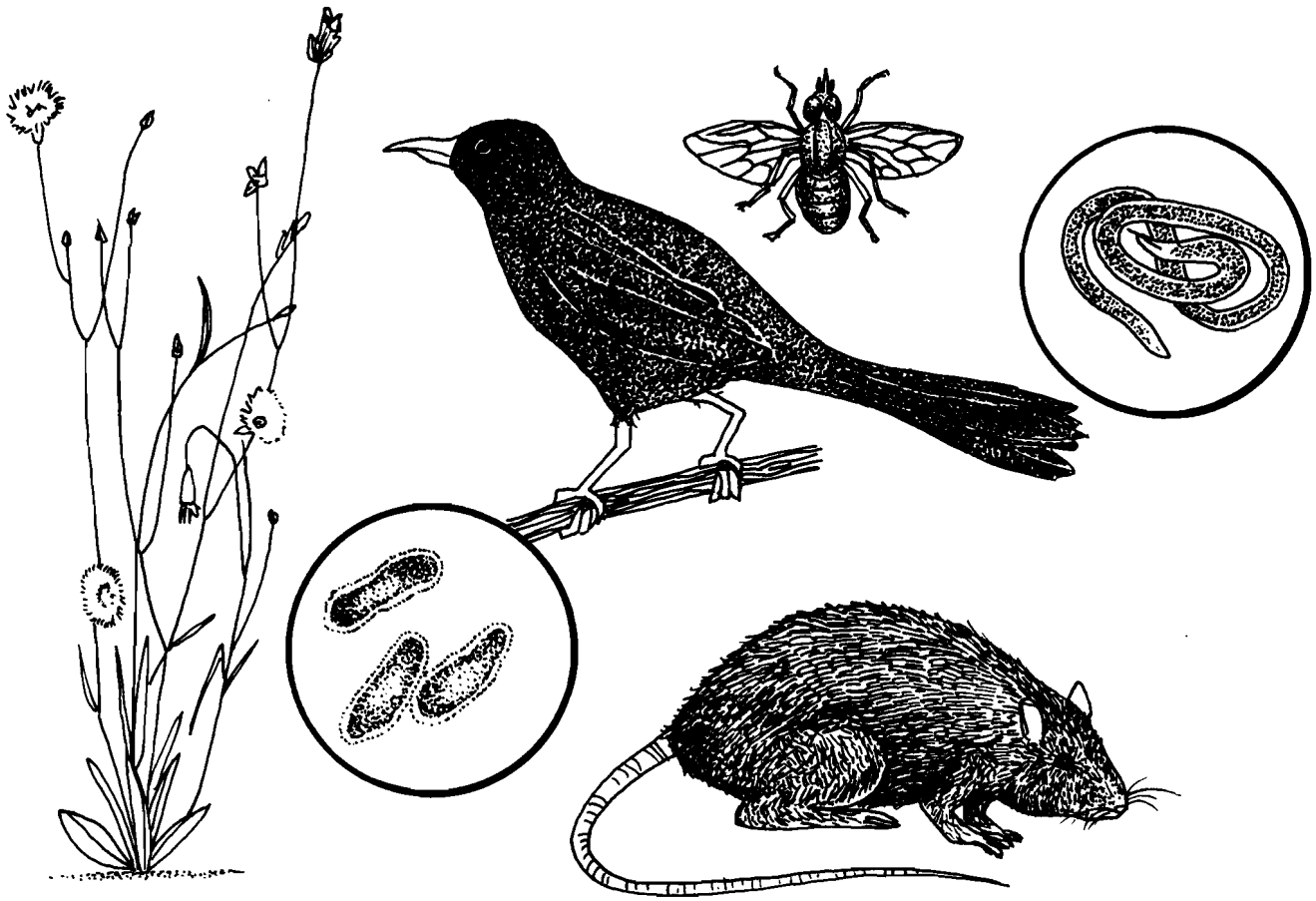
We need to remember that pesticides can be both good and bad. We have received great benefits from their use. But, we have also created some serious problems. Many people have forgotten that there are other ways to manage pests. Let's see how!

A Better Way — IPM

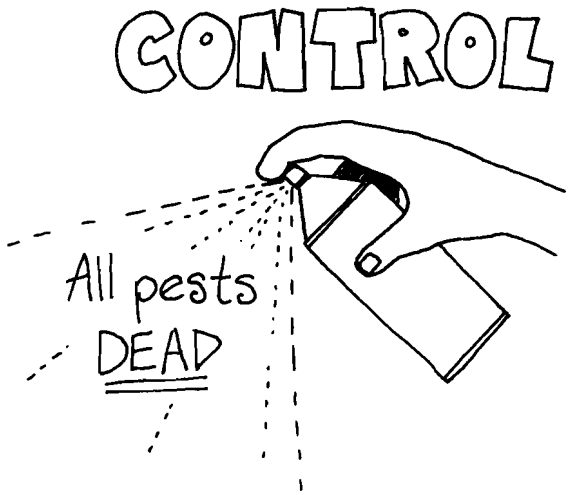
IPM means Integrated Pest Management. Integrated means using several methods of pest management together.

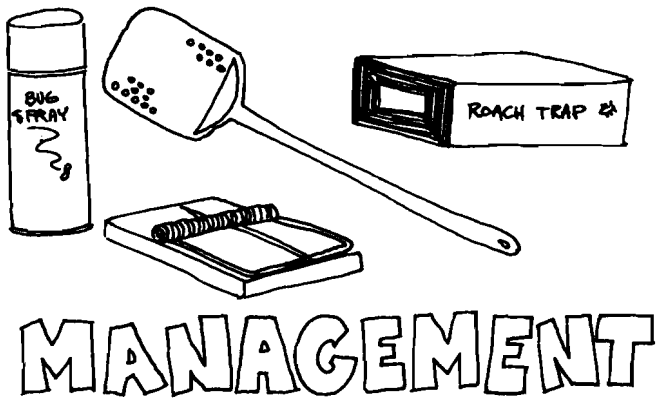


Pest includes any living organism that we regard as harmful, destructive, or annoying. Pests affect us, our plants, our animals, our property, or our environment. Pests may be insects, animals, weeds, *nematodes, pathogens,* or other organisms.



Pest management is different from pest control. Control implies killing all the pests. This can be difficult and costly. Management means limiting the numbers of pests, or limiting the time or ways pests are harmful. Pesticides may be used, but they are not the only tool available to manage pests.





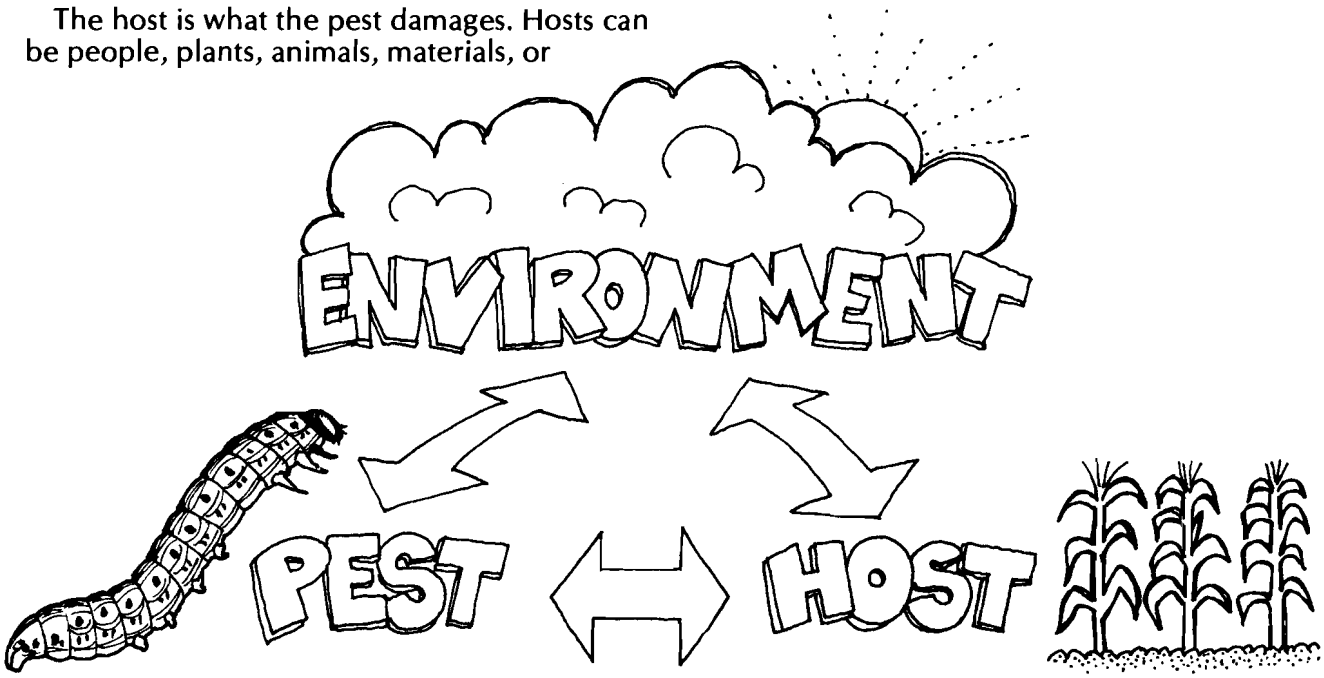
IPM is the best approach to the problem of managing pests. It reduces the possibility of harm to people, animals, and the environment. The idea of IPM is to use many methods to manage pests. Often IPM programs result in the use of less pesticide.

There are three parts in an IPM system. They are:

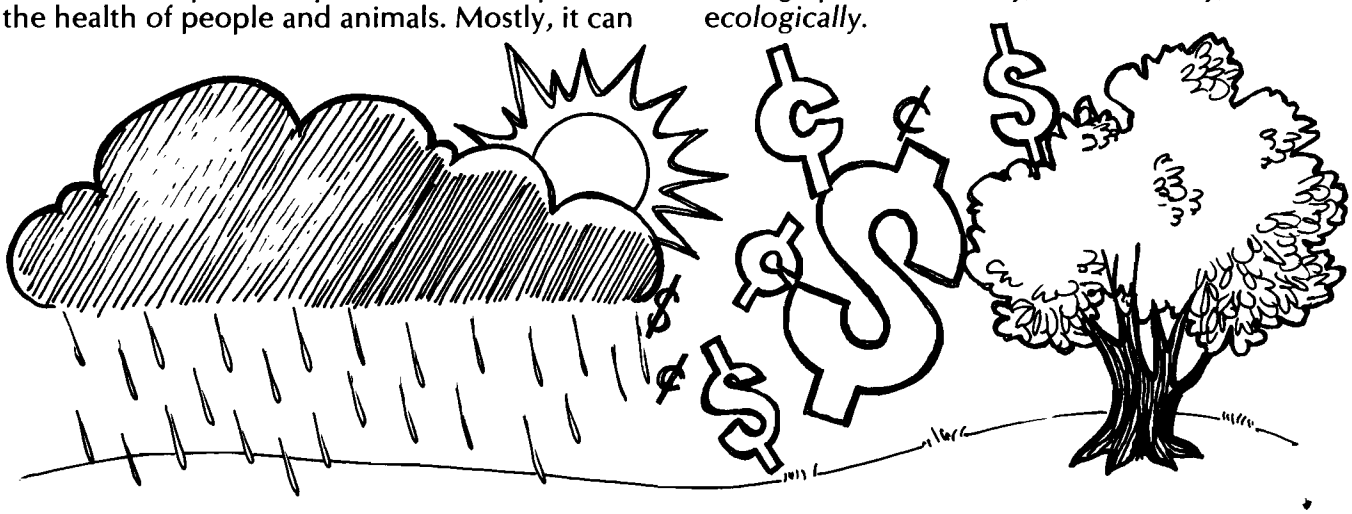
1. The host
2. The pest
3. The environment

The host is what the pest damages. Hosts can be people, plants, animals, materials, or structures. The pests are the organisms causing the damage. The environment is the surroundings of the pests and hosts.

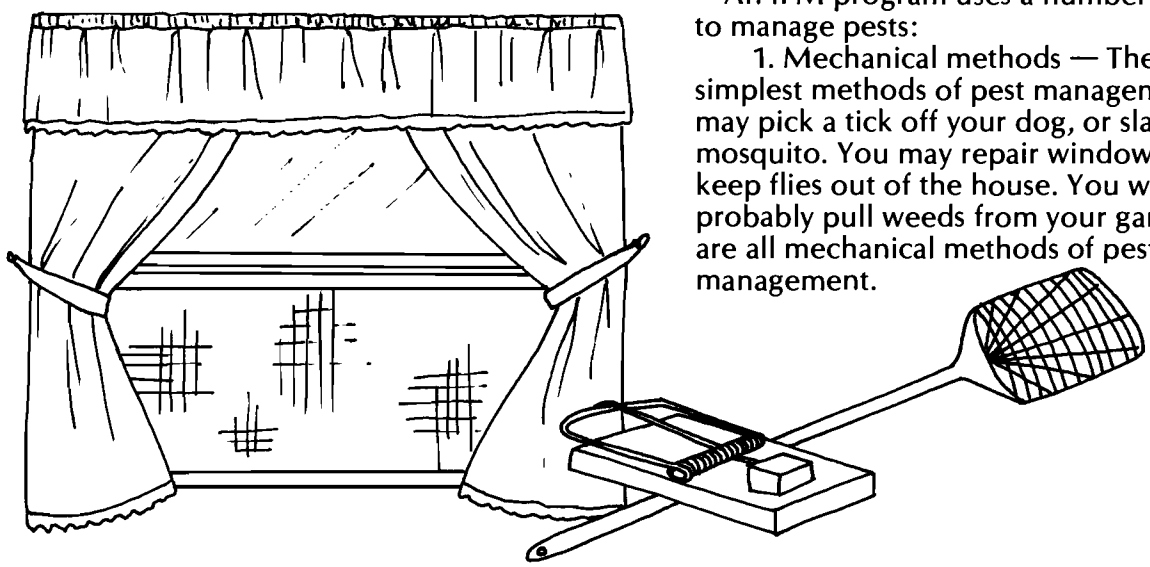
It is important to remember that any changes made to one part can affect the others. For example, the kind of plant (host) you can grow well depends on the kinds of pests in your area and the time of year (the weather). The weather affects how well the plant grows, and the kinds of pests that develop.



IPM can help reduce *pollution.* It can protect the health of people and animals. Mostly, it can manage pests *effectively, economically,* and *ecologically.*



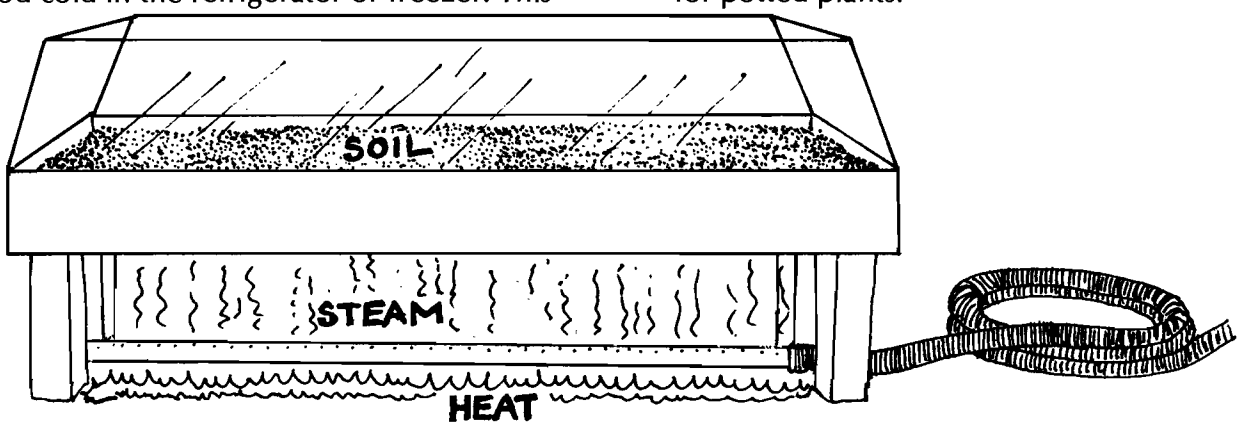
The Tools of IPM



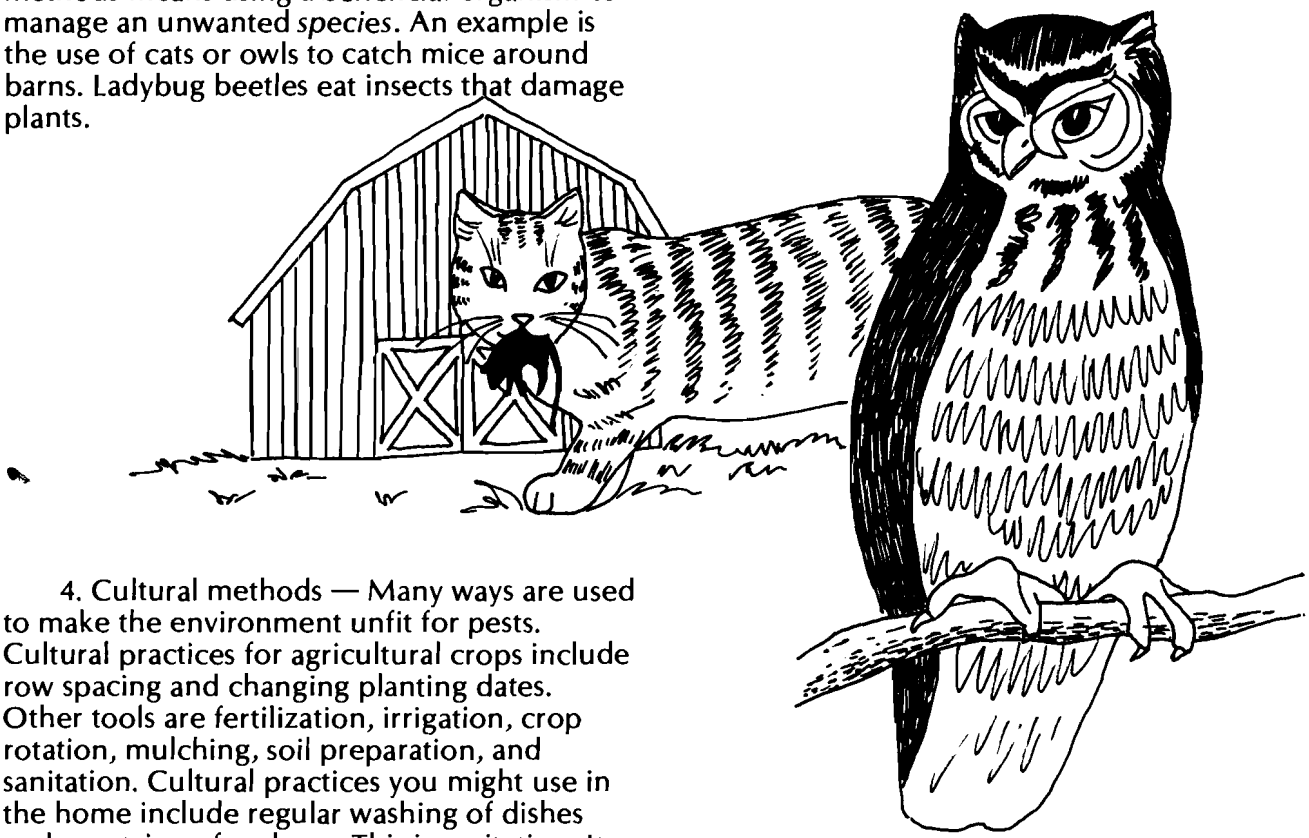
An IPM program uses a number of methods to manage pests:

1. Mechanical methods — These are the simplest methods of pest management. You may pick a tick off your dog, or slap a mosquito. You may repair window screens to keep flies out of the house. You would probably pull weeds from your garden. These are all mechanical methods of pest management.

2. Physical methods — Physical methods include using heat, cold, *humidity,* light or sound to manage pests. For example, you keep food cold in the refrigerator or freezer. This prevents the growth of organisms in the food that can make you sick. You can heat soil to kill pathogens in it. This is done before you use it for potted plants.

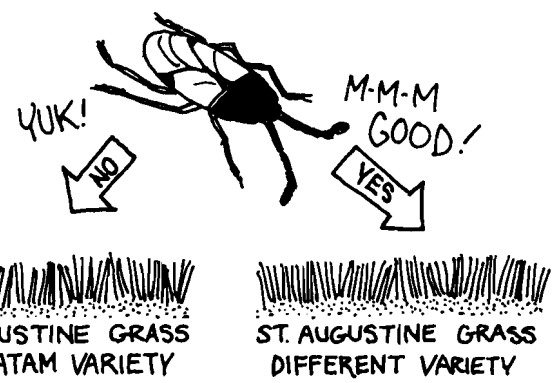


3. Biological methods — Biological methods means using a *beneficial organism* to manage an unwanted *species*. An example is the use of cats or owls to catch mice around barns. Ladybug beetles eat insects that damage plants.

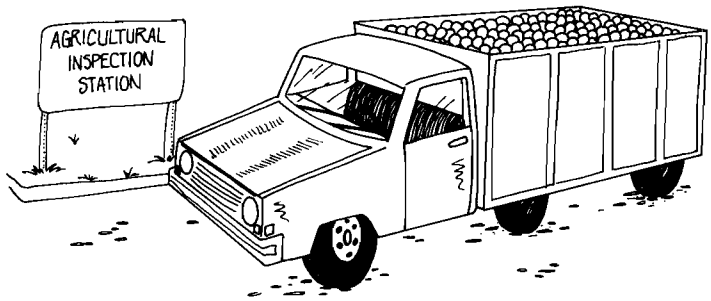


4. Cultural methods — Many ways are used to make the environment unfit for pests. Cultural practices for agricultural crops include row spacing and changing planting dates. Other tools are fertilization, irrigation, crop rotation, mulching, soil preparation, and sanitation. Cultural practices you might use in the home include regular washing of dishes and emptying of garbage. This is *sanitation.* It helps reduce the number of cockroaches in the house.

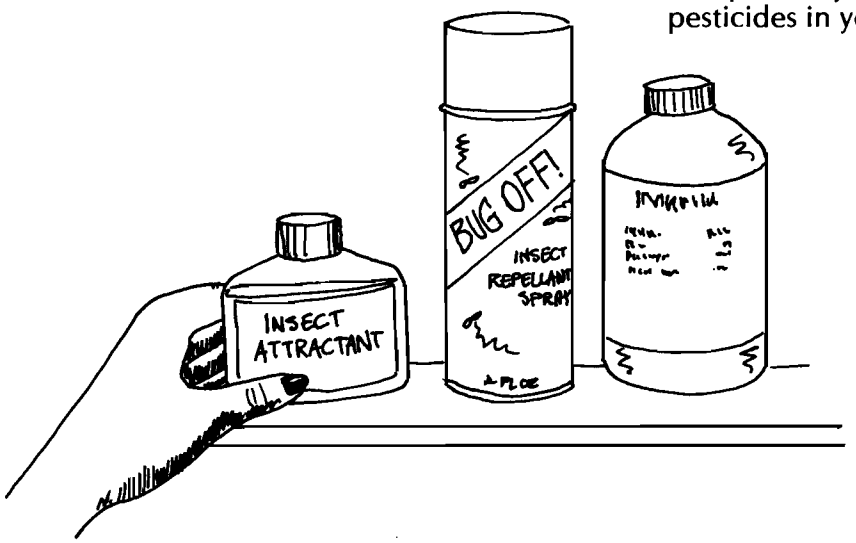
5. Host plant resistance methods — Plant breeders have developed many varieties of plants. Some are *resistant* to damage by some pests.



6. Regulatory methods — Some laws control the movement of plants and animals *infested* with certain pests. This helps to control the spread of pests. Other laws call for programs to e*radicate* certain pests. This helps to keep them from causing problems. Agricultural inspection stations on major highways help to enforce these laws.

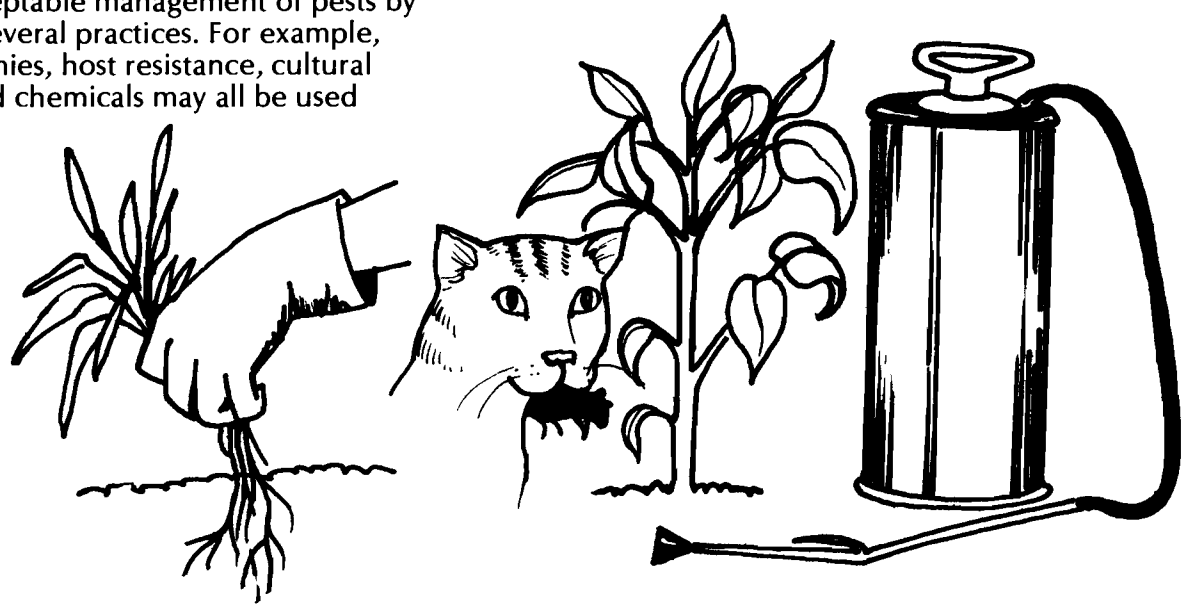


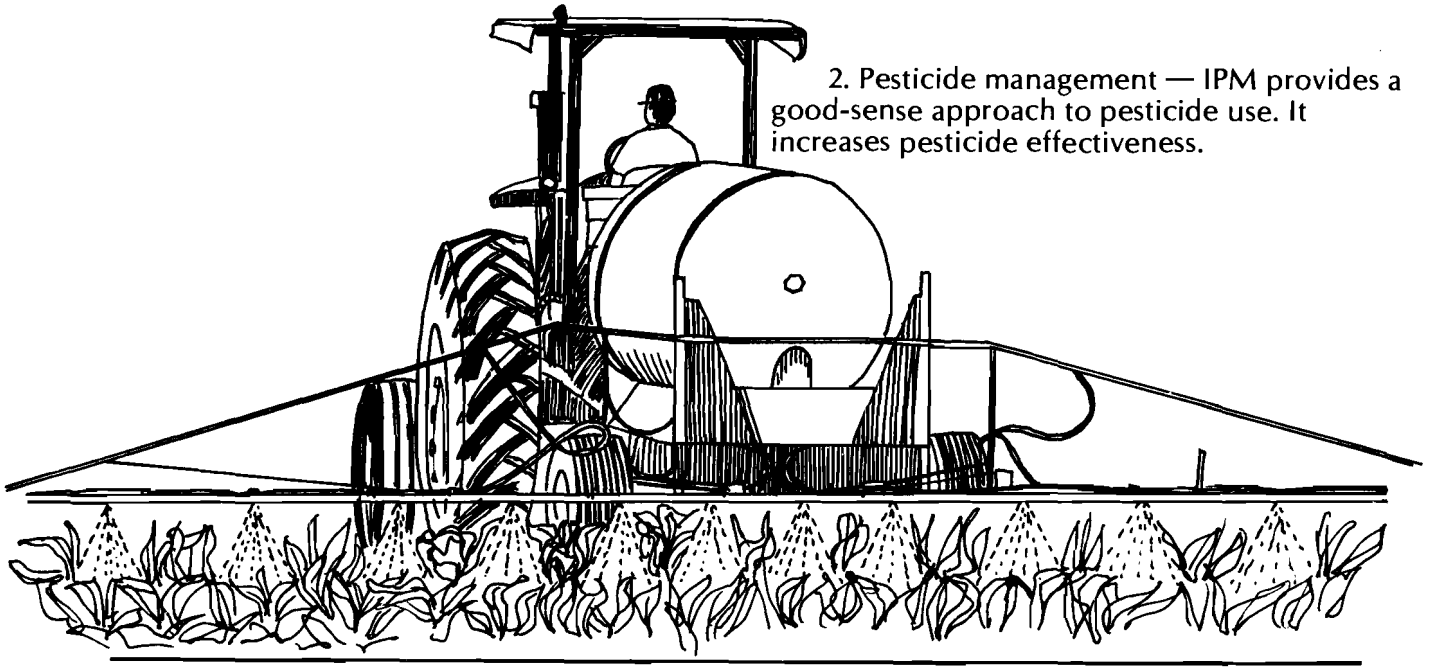
7. Chemical methods — Chemical methods include pesticides, *repellants* and attractants. You probably have several containers of pesticides in your home.



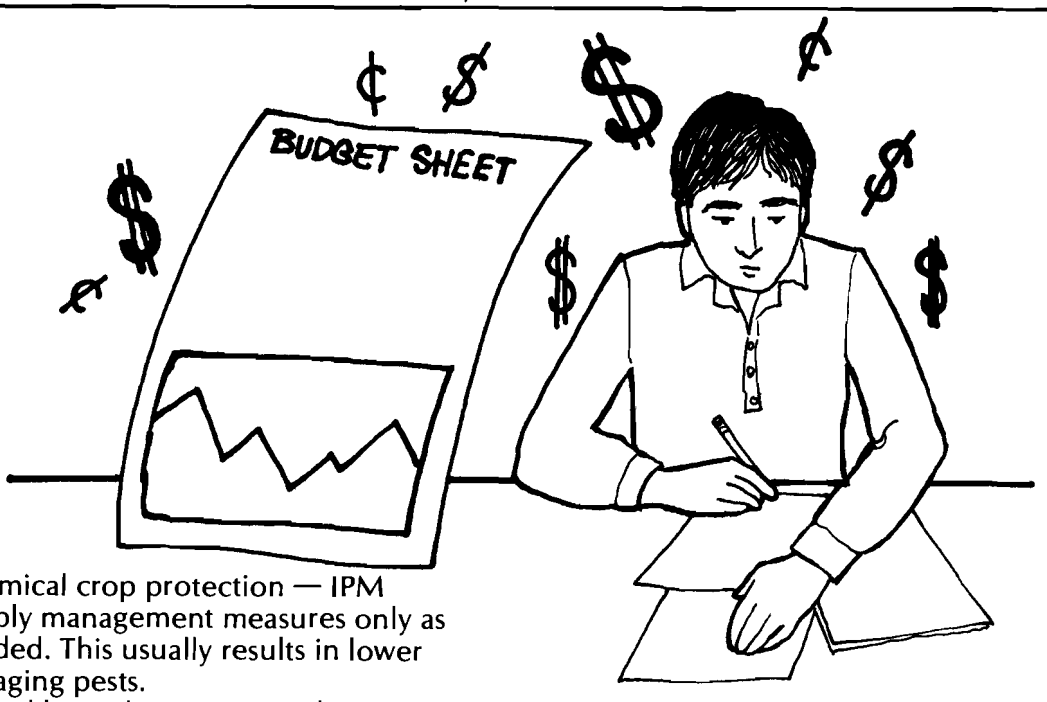
Reasons for Using an IPM Program

1. Acceptable management — IPM can provide acceptable management of pests by relying on several practices. For example, natural enemies, host resistance, cultural methods and chemicals may all be used together.



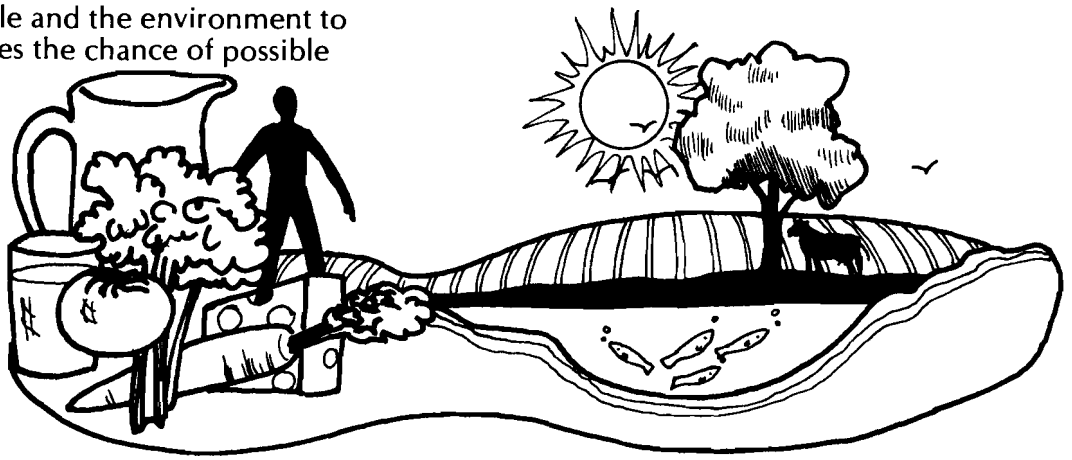


2. Pesticide management — IPM provides a good-sense approach to pesticide use. It increases pesticide effectiveness.



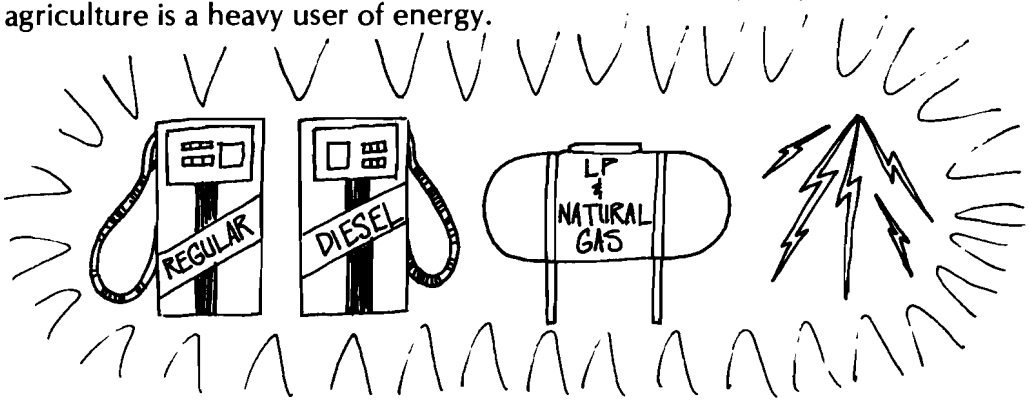
3. Economical crop protection — IPM programs apply management measures only as they are needed. This usually results in lower costs of managing pests.

4. Reduced hazards — IPM can decrease the *exposure* of people and the environment to pesticides. This reduces the chance of possible harmful side effects.

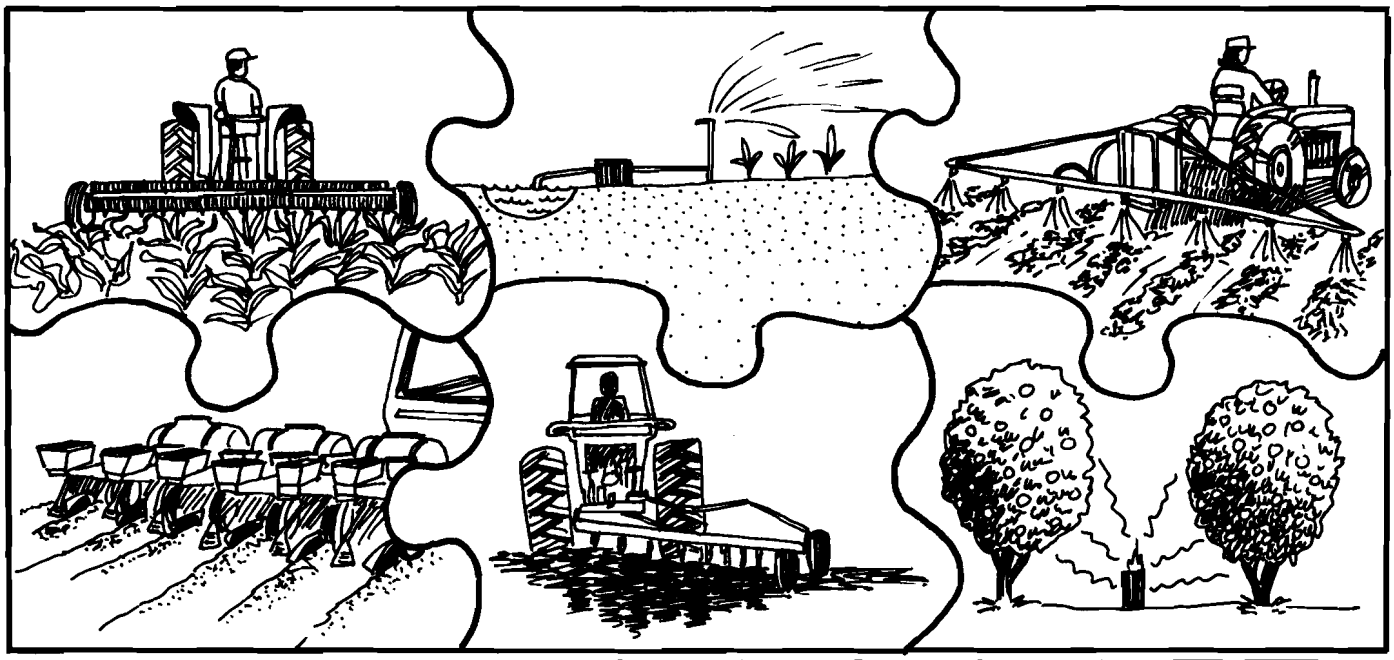


5. Energy conservation — IPM programs can play an important role in conserving energy.

Today's agriculture is a heavy user of energy. This energy comes from the use of fuels such as gasoline and diesel. Also, LP gas, natural gas, and electricity may be used.



Typical farm operations like tillage, pesticide spraying, fertilizing, planting, irrigation, and freeze protection all use energy. Much of the energy is from *fossil fuels.*



Many pesticides and *synthetic* fertilizers are made from *petrochemicals.*

The transportation of agricultural materials, products, and animals uses a lot of natural fossil fuels.

The supplies of these natural fossil fuels are steadily decreasing. The use of synthetic fuels is increasing. This will help the problem, but will not solve it. Synthetic fuels are very expensive to make and use.

We must conserve energy. IPM programs can reduce agricultural energy use by:

1. Using less pesticides (remember, most pesticides are made from petrochemicals).
2. Changing agricultural operations. Less use of tractors and other powered equipment will help conserve energy.

The energy saved can then be used somewhere else to benefit society. Energy problems are likely to get worse in the future. The whole food production system may be altered. High energy use operations will change. IPM can help make this change.

How Does an IPM Program Work?

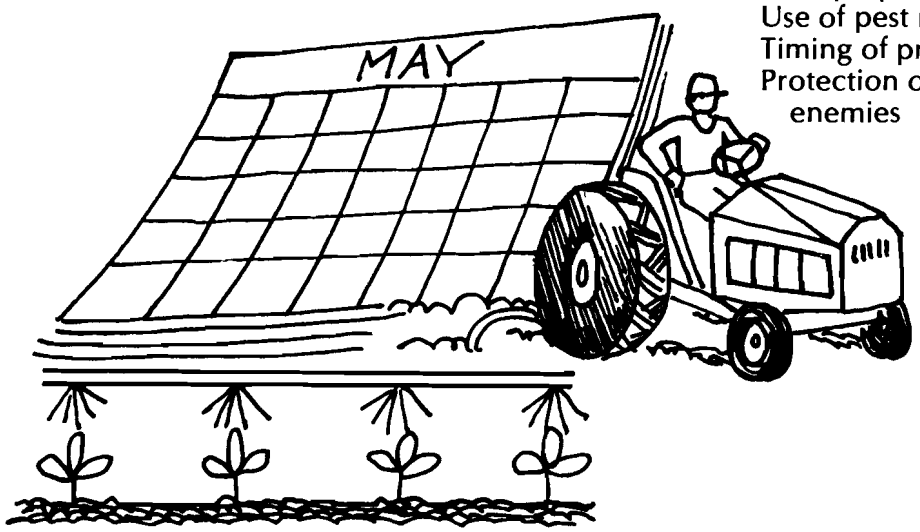
IPM is a six-step process.

Step 1. Identification — Pests and beneficial organisms must be identified before any pest management is started. Other factors that must be identified are:

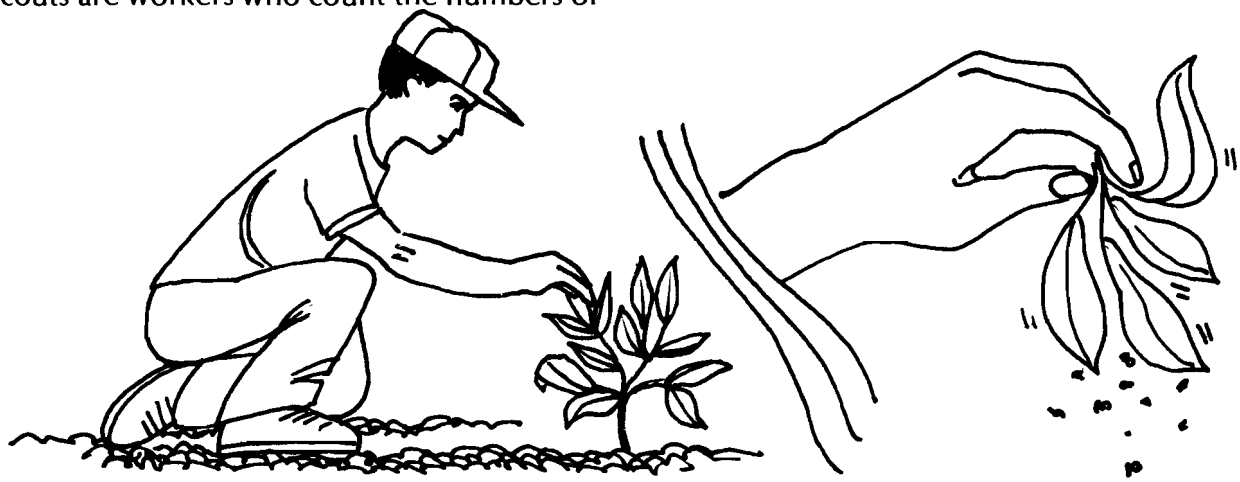
Biological factors — *predators* and *parasites*
Physical factors — soil, slope and water
Environmental factors — rainfall and temperature

Step 2. Prevention — Preventive practices may be used to keep pest *populations* from developing. These practices may include:

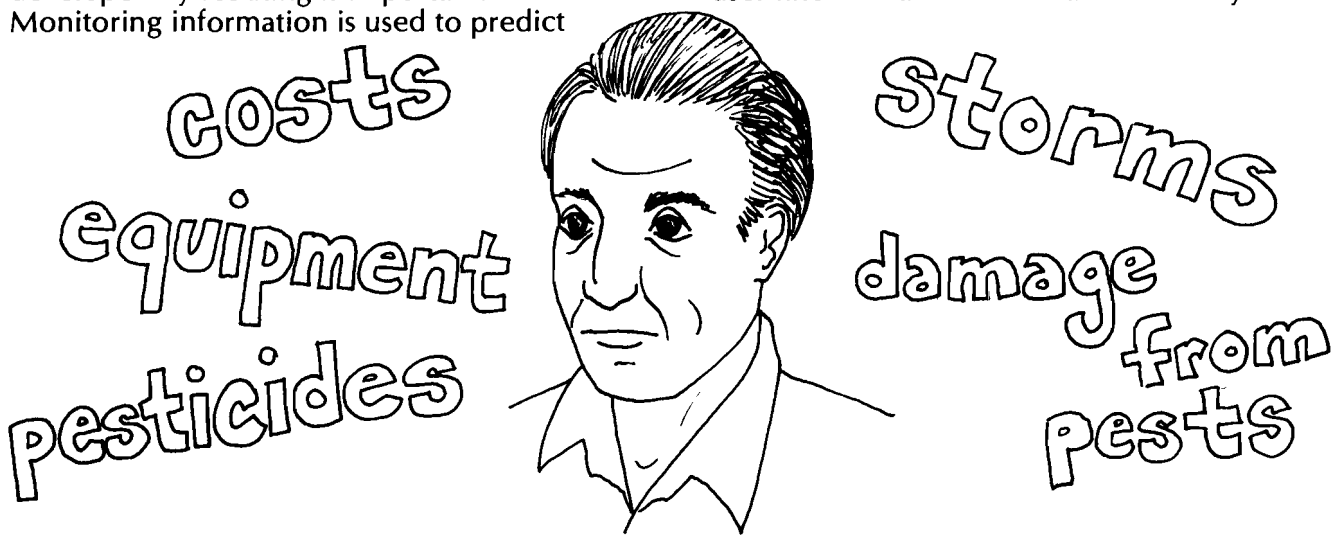
Land preparation
Use of pest resistant species
Timing of preventive methods
Protection of parasites and other natural enemies



Step 3. Monitoring — Pest populations are monitored (counted and watched) by scouts. Scouts are workers who count the numbers of pests in a given area. This monitoring is usually done several times.

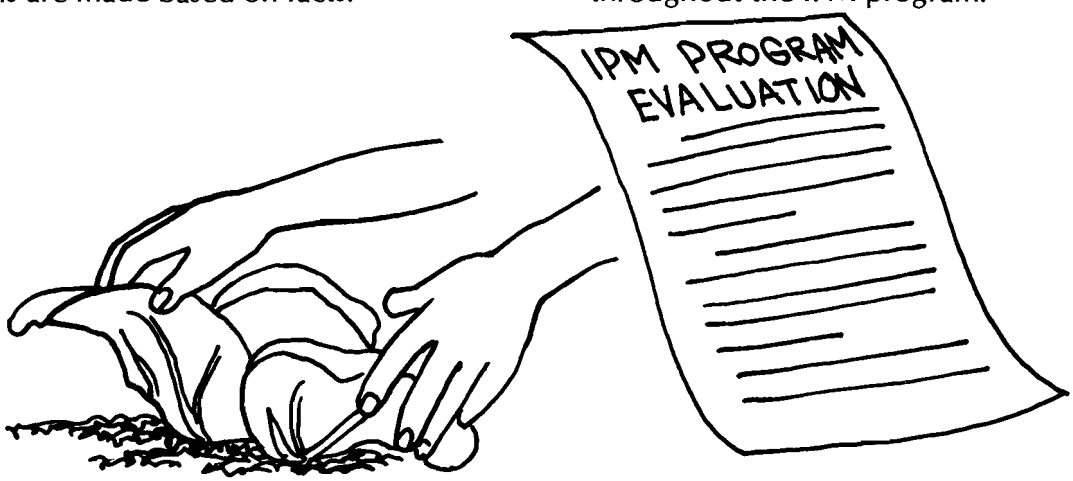


Step 4. Prediction — The information developed by scouting is important. Monitoring information is used to predict damage by pests. This information helps the user know what the losses and risks may be.



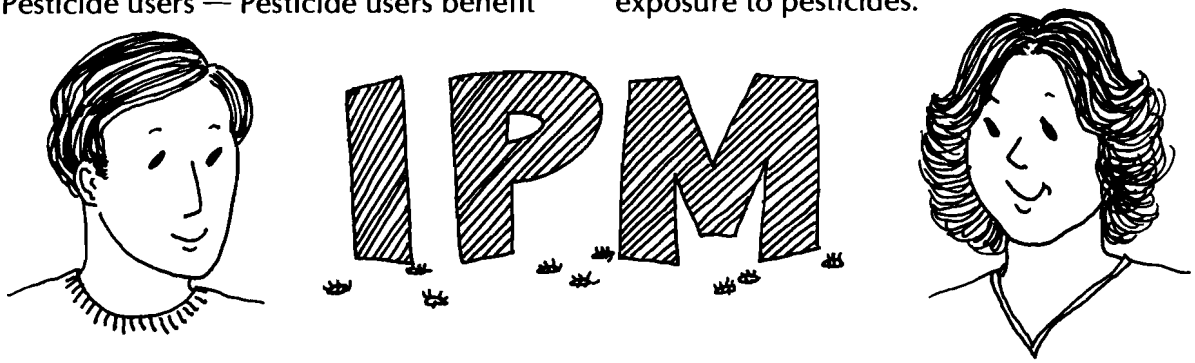
Step 5. Decision — Using facts from the first four steps, a decision may be made to use a management method or continue monitoring. Decisions are made based on facts.

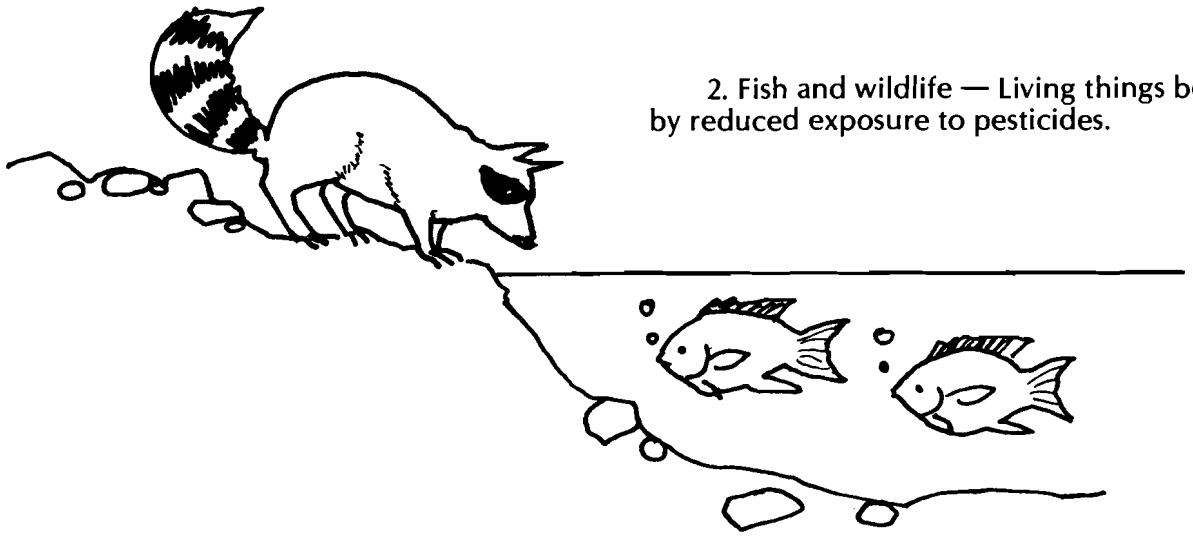
Step 6. Evaluation — Evaluating the IPM program as it is used lets the user see how well the treatment is working. Evaluation continues throughout the IPM program.



Who Benefits from IPM?

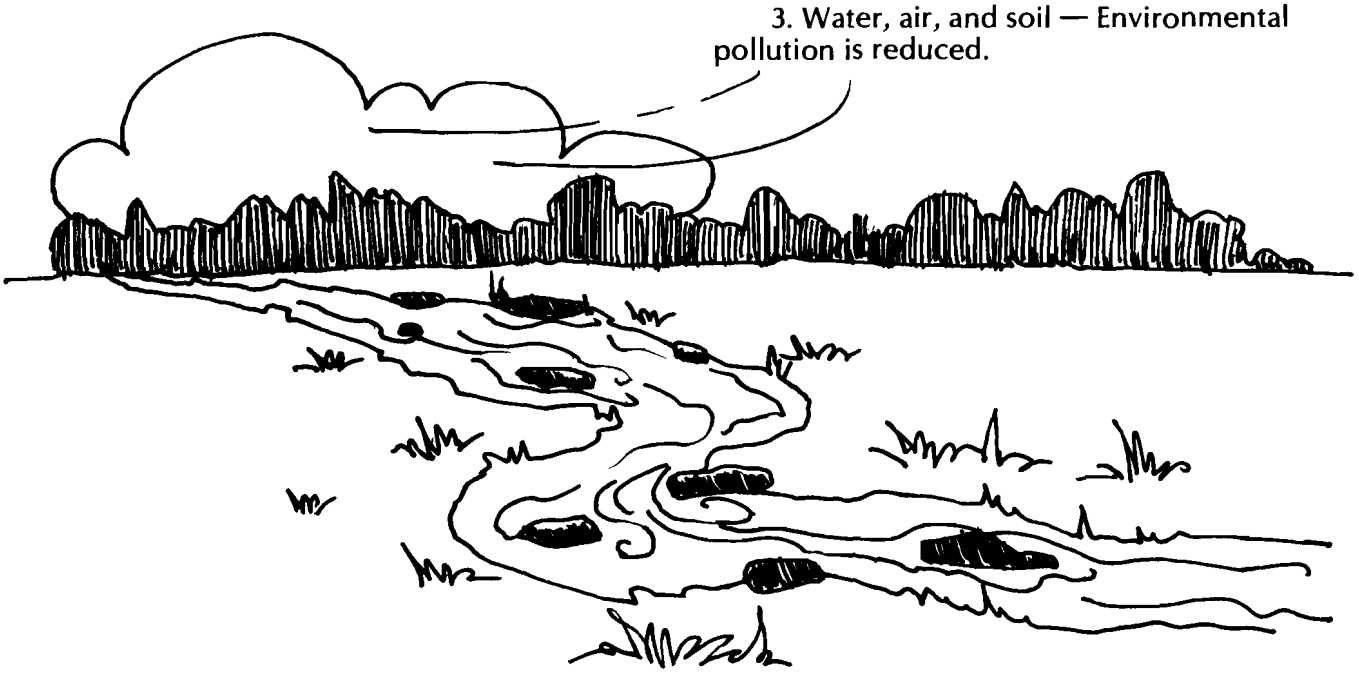
1. Pesticide users — Pesticide users benefit by having a balanced and effective method to manage pests. They also have reduced exposure to pesticides.



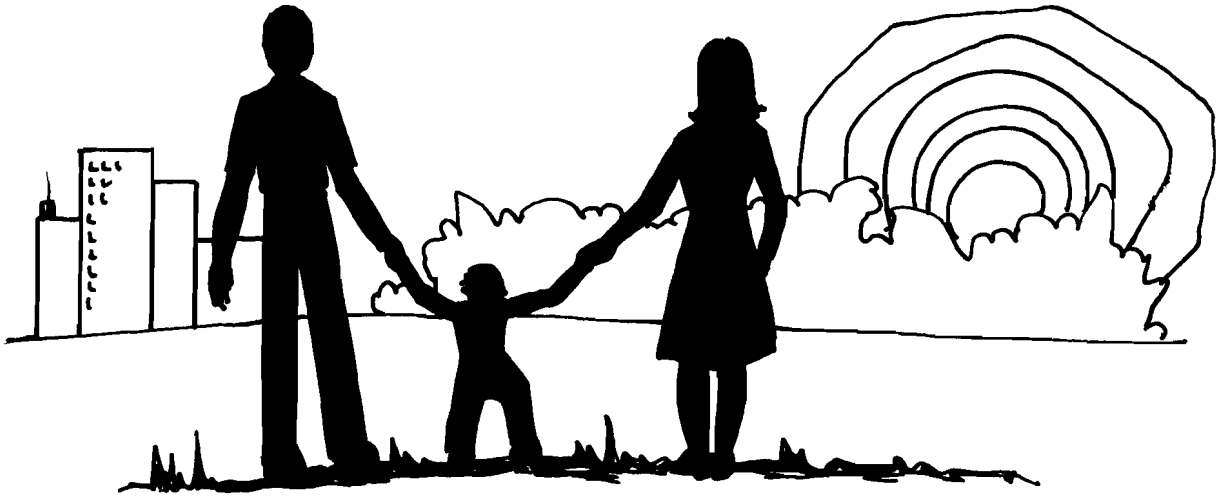


2. Fish and wildlife — Living things benefit by reduced exposure to pesticides.

3. Water, air, and soil — Environmental pollution is reduced.



4. Society — Society as a whole benefits from a cleaner environment.



IPM Already in Use

People have been using some IPM methods for a long time. However, these methods have recently been expanded and refined. Now many crops (such as soybeans and peanuts) are grown using IPM methods. Identification and preventive practices are being followed. Pests are monitored. This and other information helps IPM users make better decisions. The results are good crops and a cleaner environment.

Homeowners also use IPM methods. Suppose you walk out onto your lawn. You find a small mound of ants in a far corner. You then walk the rest of the way around the yard, but don't find any more ants. You decide that these ants won't be a problem for you now. Therefore you won't need to do anything about them — just forget about them.

You have just practiced IPM! Remember the six step process? The first thing that you did was to identify these ants. You also monitored (counted) the ant hills. You probably thought about the possible risks. Finally, you made the decision that no action was necessary now. But you may have to keep your eye on them.

As you can see, IPM is being used. It is easy and natural for the homeowner. In farm situations, IPM can be very difficult and time consuming. But overall, IPM is still the best approach. It makes it possible to manage pests, and help avoid serious environmental problems.

Glossary

1. Beneficial Organism — A plant or animal that helps control a pest species, or helps plants or animals in some way.
2. Compete, competitors — Two or more plants or animals trying to use the same resource. Each one reduces the amount of the resource that the other one can use.
3. Ecological, ecologically — All relations between organisms and their environment. Ecology —The study of animals and plants, and the way they interact with the environment.
4. Economical, economically — Avoiding waste; thrifty; money-saving.
5. Effective, effectiveness, effectively — Producing the results wanted; working properly.
6. Environment — Surroundings, including anything that affects man, other animals or plants.
7. Eradicate — To abolish or completely get rid of; to destroy.
8. Exposure — Coming in contact with.

9. Fossil fuels — Naturally occurring fuels such as crude oil or natural gas. They were formed from the fossil remains of prehistoric plants and animals. They are refined into gasoline, diesel and kerosene.
10. Host — Any plant or animal that shelters or gives a home to a parasite or other natural enemy.
11. Humidity — The moisture in the air.
12. Infested — Overrun with pests.
13. Misused — Used wrongly or improperly.
14. Nematode — A tiny worm-like organism that lives in the soil and damages the roots of plants. Other kinds of nematodes may live in water, in animals, or in plants.
15. Nutrients — Food; substances that promote growth and development in plants and animals.
16. Organisms — Living things, includes all animals and plants.
17. Parasite — An animal or plant that lives on or in another organism from which it gets food and shelter. In IPM, a natural enemy that kills pests. Parasites are usually smaller than the pests. Example: fly maggots eating large caterpillars.
18. Pathogen — Very tiny organism that causes a disease. The three types of pathogens are fungi, bacteria, and viruses.
19. Pest — An organism that hurts something or is bad for something that belongs to man. A pest may be an insect, a plant, an animal, a disease, or any other kind of organism.
20. Pesticides — Poisons that are used to kill organisms that man regards as pests. Insecticides kill insects. Herbicides kill plants. Fungicides kill fungi.
21. Pollute, Pollution — Similar to contamination, but the term pollution refers mainly to the environment.
22. Population — A group of organisms, all of the same species, that lives in an area. They are capable of reproducing.
23. Predators — Natural enemies that kill and eat pests. Predators are usually larger than pests. Example: cat = predator, mouse = pest.
24. Repellant — A chemical that an organism does not like, and that drives the organism away.
25. Resistant — Withstanding attack; offering opposition to pests. Able to withstand infection or contamination. Resistance — the ability of a pest population to stay alive after it has been treated with a pesticide.
26. Resources — Something that a plant or animal needs. Resources include water, food, oxygen (for animals), carbon dioxide (for plants), and many other things.
27. Sanitation — Keeping clean. Removing unhealthy or dirty materials.
28. Species — One kind of plant or animal; a group of plants or animals that are alike. Man is one species. Dogs are one species. One species may have different varieties. For instance, German Shepherd and Doberman are varieties of dogs.
29. Synthetic — Artificially produced by man. Man-made. Example: alcohol for gasohol is produced from corn. Nitrogen fertilizer can be man-made from chemicals.
30. Weed — A plant that is growing in the wrong place. To a farmer, a flower in the middle of a cornfield may be a weed. To a home gardener, the same flower may not be a weed at all, but a very desirable plant.

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