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What you should know about pest control

What is a pest?

A pest may be defined as an unwanted, troublesome or destructive animal or plant. A pest in one location may not be a pest somewhere else. Spiders, bumblebees, bats and snakes are pests in the home, but out-of-doors they perform a useful function.

Canadian farmers, gardeners and ranchers are increasingly aware that, each year, tremendous losses are caused by weeds, insects and diseases. Canadians have at their disposal a formidable array of means to combat all kinds of pests. Such was not the case a century ago. In those days, numerous crops and animals were ruined or lost as the result of pests. Modern, highly-specialized agricultural production techniques and food storing and processing methods make pest control an absolute necessity.

Kinds of pests

There are a great many destructive and troublesome pests in both the plant and animal kingdoms.

Plant Pests. An unwanted or troublesome plant growing in a field crop or garden may be classed as a plant pest. It competes with the cultivated crop for available light, moisture and nutrients. Some can be poisonous to livestock or irritating to humans. Notable examples of plant pests are dandelions in lawns, and wild oats, sow thistle and wild mustard in grain crops.

Another group of important plant pests are plant diseases and parasites. Examples of these are bacterial ring rot of potatoes and bacterial wilt of cucumbers; fungus diseases such as rusts and smuts of grain crops and mildew on garden peas and roses; virus diseases such as tobacco mosaic and aster yellows of carrots and lettuce.

Animal Pests. Animal pests are very numerous, troublesome and destructive. Large animals like wolves, coyotes and bears, may present a hazard to cattle and sheep ranchers, whereas smaller animals, such as rats, mice and moles, may be troublesome to farmers and ranchers alike. However, the largest group of animal pests are not warm-blooded, four-legged creatures but rather small six-legged animals (often winged) called insects. Since insects are the largest group of pests, in numbers and variety, pest control has become almost synonymous with insect control. Examples of insect pests are mosquitoes, grasshoppers, caterpillars, ants, fleas, moths, aphids, flies and potato beetles. Closely

associated with these insects are the eight-legged pests called spiders and mites, the latter being most troublesome to plants and animals. Lastly, there are the legless animals, the nematodes (microscopic worm-like creatures) and worms. They are serious pests of numerous plants and animals. Examples of these are the golden nematode of potatoes and roundworms of pigs and other animals.

Since man's survival is dependent upon his success in controlling plant and animal pests, proper identification is essential. Also, he must know the life history and habitat of each pest to determine the stage at which it is most easily destroyed. Finally, he must know how to kill pests without injuring other plants and animals.

Biological control of pests

All animals and plants have natural enemies. These may be predators, parasites or diseases. There are many common, everyday examples of biological control occurring in nature:

- Rodents may be kept in check by foxes and coyotes assisted by owls and hawks. The farmer may have a cat or two about the farmstead to help in the control of rats and mice. These predators, assisted by diseases and parasites, are often effective in limiting rodent population in an area.
- Insect pests may be controlled by birds, (e.g., robins); other insects, (e.g., dragonflies); diseases (bacteria, fungi and viruses); and numerous small animals such as bats and frogs.
- Weed pests may be partially controlled by insects feeding on plants, (e.g., cutworms and caterpillars); or on plant seeds, (e.g. the granary weevil). Diseases also control plant pests, especially at the seedling stage, (e.g., damping-off).
- Bird pests may be controlled by parasites and by animals, including other birds feeding upon their eggs or fledglings.

A newly introduced pest may easily and quickly take over an area where it has no natural enemies. It has been estimated that a single pair of houseflies will produce, during one summer season, sufficient numbers to cover the earth to a depth of 14 m if all were to live. Fortunately, flies are short-lived and there are numerous predators, parasites and diseases that exert a biological "brake" over this pest.

Sometimes it is possible to reduce pest numbers by artificially increasing their natural enemies. For example, the production of bacteria, fungi or viruses to control the larvae of insects that attack crops and lawn grasses. At other times,

the introduction or importation of new enemies may assist in the control of native (or imported) pests. A classic example was the accidental importation of cottony-cushion scale which threatened the California citrus industry in the nineteenth century. The lady beetle (*Vedalia*), imported from Australia, helped in the effective control of this pest.

Great care must be taken in introducing a new predator or parasite as it may stray from its intended purpose and do more harm than good. Agriculture Canada is actively investigating many possibilities for biological control of weeds and insect pests.

The aim of biological control is to reduce a pest population to a point where it will do little or no damage. Chemical control will still be used as an inexpensive method of controlling pest populations in localized areas. Chemical control is fast and dramatic, but the results may have far-reaching consequences.

Chemical control of pests

There are hundreds of chemicals and compounds for the control of pests. These chemicals may originate from:

- Inorganic elements; for example, lead, sulphur, copper, borates.
- Natural occurring materials; for example, nicotine, rotenone, pyrethrins.
- Synthetic compounds; for example, carbaryl, malathion.

The carriers or diluents for a chemical may be water, oil, emulsions, inert powders, or propellents such as freon.

Each chemical or compound has its specific purpose in pest control. Each should be used according to directions and only on a certain pest or related species. An insect population may become resistant to a pesticide if exposed too often, especially at low concentrations. Also, when an insecticide is used improperly, predators or parasites may be killed, releasing insect pests from natural controls.

Honey bees, which perform a valuable pollination service, can be casualties of unwise chemical use.

To facilitate the classification of chemicals, they are grouped as to their general use:

- Herbicides (weed killers), such as 2,4-D, atrazine, dalapon.
- Insecticides (insect killers), such as propoxur, diazinon.
- Fungicides, such as captan, thiram for seed treatment.
- Repellents, such as paradichlorobenzene for clothes moth, diethyl toluamide for mosquitoes.
- Systemic insecticides. Coumaphos is used on cattle for grub control, and dimethoate on plants for aphid or plant bug control. These chemicals are slightly toxic or non-toxic to host plants or animals but deadly to their parasites.

There are several ways to apply a chemical:

- Bait - warfarin and calciferol for rodent control.
- Dust - carbaryl for insect control, captan for scab and mildew control in fruits and vegetables.



SAW-TOOTHED
GRAIN BEETLE



GRASSHOPPER



POTATO BEETLE

- Sprays - TCA for grass control, malathion for stable fly control.

- Pressurized sprays - synergized pyrethrins and pyrethroids for control of household insects.

- Fumigants - methyl bromide for stored grain insect control.

Hazards of chemical pest control and precautionary measures

All pesticides for sale in Canada must be registered with Agriculture Canada under the Pest Control Products Act.

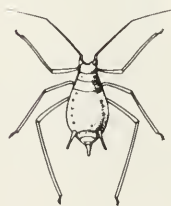
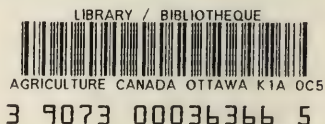
Pesticides used in the right place, in the right quantity and at the right time are essential to the farmer; but some herbicides, many fungicides and most insecticides are poisonous to man, pets and livestock. Accidental poisoning may occur when people or animals are exposed to dusts, sprays or vapors for extended periods.

The following precautionary measures are important:

- Always read the labels on containers and follow directions.
- When recommended, wear protective clothing, coveralls, rubber boots, gloves, goggles and respirator.
- Always wash hands and face with soap and water immediately after using a chemical compound. Change clothing also.
- Keep all pesticides in original containers, with their proper labels, and always under lock and key.
- Take care not to contaminate the feed and water of livestock and pets.
- Do not contaminate water. Pesticides frequently kill fish.
- Do not burn or carelessly discard empty containers. Puncture, crush and bury them.

When a chemical is used for the control of a pest it is essential that it be used strictly in accordance with the latest recommendations. Since these may change from time to time, consult your local agricultural representative or university or Agriculture Canada.

A pesticide that is improperly timed or used in an inaccurate dosage or concentration may be either useless or wasteful, and it may be hazardous to other plants and animals.



APHID



GRAIN MITE



PLANT BUG

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