



# NOVA SCOTIA

## ENVIRONMENT

### CLASS I(B) DOMESTIC VENDOR

### PESTICIDE CERTIFICATION TRAINING MANUAL

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## **DISCLAIMER**

The information in this manual is supplied with the understanding that no discrimination is intended and that listing of pesticide products implies no endorsement by the authors or the Nova Scotia Department of Environment.

This manual provides information on the safe use of pesticides. It does not provide information and advice on how to comply with all of the provisions of the *Environmental Act* and *Pesticides Regulations* or *Non-essential Pesticides Control Act* and the *Exceptions to Prohibitions on Non-essential Pesticides Regulations* or the *Occupational Health and Safety Act* and regulations which may apply to pesticide use and application. This manual is not intended to replace reading all of the appropriate legislation, or seeking advice from the appropriate authorities. Examples given and interpretations placed on sections of various acts and regulations are not binding on the Crown or Queen. Due to changes to the legislation that occur over time, the Nova Scotia Department of Environment assumes no liability for the suggested use of pesticides contained herein.

## Acknowledgements

The content of this manual was adapted from the Nova Scotia Domestic Pesticide Safety Manual (2001).

The Class I(B) Domestic Vendor Pesticide Certification Training Manual has been developed to meet the needs of domestic vendors who require certification for the sale of excepted use/controlled purchase domestic class pesticides. Nova Scotia Environment would like to acknowledge the contribution of the Standing Sub-committee on Pesticide Education, Certification and Training in the development of the National Standards from which this manual evolved.

The editor gratefully acknowledges the contribution of Lynda Rankin for the development of the 2001 version of this manual.

## Notice

Vendors of domestic class pesticides sell products to customers for use in their own homes, yards and ornamental gardens. Often these customers do not know how to identify and manage pests, what control choices are available or how to select and safely use pesticides when they are purchased. Whether the retail outlet is a greenhouse, garden centre or hardware store, customers expect the sales staff to be able to provide reliable, accurate information about the pest control products that they sell.

This manual has been developed to provide vendors of domestic class pesticides with the basic knowledge required to work safely around pesticides. It has also been designed to assist vendors to answer common customer questions and concerns about pest management, interpreting and understanding pesticide labels and the general safety precautions to follow when using pesticides.

The manual is divided into ten chapters. Each chapter begins with a set of learning objectives which have been developed to assist the reader to recognize the most important points of the chapter. Questions for self study are included at the end of each chapter to assist in the review of the information. In addition, there are a number of pesticide tips throughout the manual that identify common questions and misconceptions the public has in relation to the use of pesticides and managing pests.

It is very important that you read and understand the Non-essential pesticides legislation and consult the Nova Scotia Environment web page for information that is current. This website is as follows: <http://gov.ns.ca/nse/pests/non-essential.pesticides.asp>.

Once you have completed this manual you should now have the level of information that allows you to complete the Class I(B) Domestic Vendor certification exam.

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# 1

## General Information

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### Learning Objectives for Chapter 1:

- **Become familiar with the different types of pesticides.**
- **Understand how common pesticides work.**
- **Become familiar with the different types of pesticide formulations.**

### Learning Objectives

### Introduction

Pesticides can be important tools to manage pest problems in and around the home, yard and garden. Pesticides, when not used correctly, can harm people, contaminate water or soil and harm beneficial or non-target organisms in the environment.

To help protect the safety of employees, customers and the environment, pesticide vendors must be able to:

- store, handle and sell pesticides in a legal and safe manner, and
- advise the customer and assist them to interpret label information to ensure an appropriate product is selected and used properly.

### **SOURCES OF INFORMATION ABOUT PESTICIDE SAFETY**

The label is the most important source of pesticide safety information for the vendor and the consumer. The information on the label is developed from extensive field and laboratory data, which is assessed and approved during the federal registration process.

There are a number of sources of information on the safe

### **Sources of Information about Pesticide Safety**

handling and effective use of pesticides. These include Material Safety Data Sheets (MSDS), federal and provincial government publications, government extension personnel, suppliers and manufacturers. For reliable information on identifying and managing common pest problems it is best to use local sources such as your provincial Department of Environment and your local garden centre or retailer.

## **TYPES OF PESTICIDES**

## **Types of Pesticides**

By definition, a pesticide is any product, device, organism, substance or thing that is manufactured, represented, sold or used as a means for directly or indirectly controlling, preventing, destroying, mitigating, attracting or repelling any pest. The pests may be insects, plant disease causing organisms (e.g., fungi), weeds, snails, slugs, rodents, etc. Therefore, insecticides, fungicides, herbicides and rodenticides are all types of pesticides. Pesticides are grouped according to the pests they control, their chemical structure, or how they work and affect the target pest.

Pesticides kill or control pests in a number of different ways. Some pesticides must only contact (touch) the pest to be effective. Others (e.g., stomach poisons) must be swallowed to be effective.

Systemic pesticides are absorbed into the tissue and move within the plant or animal after they are applied. Another group of pesticides, called repellants, do not kill pests but rather work by keeping them away from the area. Repellants, such as personal insect repellants, are registered in the same way other pesticides are, and must also be used according to their label directions.

The following are common types of pesticides:

### **Insecticides**

### **Insecticides**

Insecticides are chemicals used to control insects. The word “insecticide” is often confused with the word “pesticide”, but they are just one of many types of pesticides. Some types of insecticides kill the insect by contact while others must be ingested (swallowed) to be effective.

**Broad spectrum** insecticides kill a wide range of different insects.

They are often used when several different kinds of insects are a problem. Broad spectrum insecticides should be used with care as they can also kill beneficial insects.

**Narrow spectrum** is quite selective and kills only a few types of insects. Where a choice exists between a narrow and a broad spectrum insecticide, customers should be encouraged to properly identify the pest and select the more specific product.

**Insect growth regulators (IGRs) interfere** with an insect's development and prevent immature insects from maturing into normal, reproductive adults. Some flea control products are IGR's.

Insecticides also vary in how long they are effective. Some break down almost immediately into nontoxic by-products. These "**short term**" insecticides are used in situations where the insects are not likely to return or in homes and dwellings where people and pets might be exposed. **Residual insecticides** remain active for a longer period of time. These insecticides are used in areas where insects may be an ongoing problem, and where the insecticide will pose a low level of environmental and/or health hazard. For example, residual insecticides are used in wall voids and wooden structures for carpenter ant control.

## **Fungicides**

## **Fungicides**

Fungicides are pesticides used to control the fungi that cause molds, rots, and plant diseases. All fungicides work by coming in contact with the fungus. Most fungicides are applied to the plant surface. After they are applied, some fungicides stay on the plant surface while others move into the plant (systemic fungicides). There are two main types of fungicides, namely: protectant fungicides and eradicant fungicides.

**Protectant fungicides** are applied to the plant surface before the disease symptoms are seen. This type of fungicide may be useful when a particular disease or group of diseases is likely to attack a plant year after year (e.g., home garden fruit crops). Most protectant fungicides only inhibit fungal growth. This protective effect breaks down over time and protectant fungicides may have to be applied at regular intervals to continue the protection against infection.

**Eradicant fungicides** kill the fungus after it appears on (or in) the plant. Eradicants are applied when a disease appears unexpectedly on a plant or in an area.

## **Herbicides**

Herbicides are pesticides used to control unwanted vegetation. Some herbicides kill every plant they contact (non-selective herbicides), while others kill only certain types of plants (selective herbicides).

**Non-selective herbicides** are toxic to all plants. These are used when plants are not wanted in an area (e.g., on a patio, walkway or driveway).

**Selective herbicides** kill some plants but cause little or no injury to other plants. Usually selective types will kill either broad-leaved plants or grassy plants. These are used in areas where one type of plant is wanted but another is not (e.g., to control broadleaf weeds in lawns).

## **Rodenticides**

Rodenticides are pesticides used to control rats, mice and other rodents. Most rodenticides are stomach poisons and are often applied as baits. They are usually applied to specific areas such as rodent runways or known feeding places.

## **Molluscicides**

Molluscicides are pesticides used to control snails and slugs. The pesticide must be eaten by the pest to work. Most molluscicides are applied as baits to areas of the garden where snails and slugs are not wanted.

## **PESTICIDE NAMES**

An individual pesticide usually has three different names; the product name, the common name and the chemical name.

Product Name: The name a manufacturer gives their particular

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## **Herbicides**

## **Rodenticides**

## **Molluscicides**

## **Pesticide Names**

pesticide product. This can be likened to the brand name on other household products (e.g., household chlorine bleach is sold under a number of different product names). The product name is prominently displayed on the product label.

Common Name: The name of the active ingredient in the pesticide. Common names appear on the pesticide label next to the word GUARANTEE. Many pesticides with different sounding product names may actually contain the same active ingredient.

Chemical Name: The name given to the chemical structure of the active ingredient in the pesticide. This name does not usually appear on the pesticide label but it can be found on the Material Safety Data Sheet.

## **PESTICIDE FORMULATIONS**

## **Pesticide Formulations**

The principle component of a pesticide that controls the target pest is called the **active ingredient**. To create a pesticide, the manufacturer mixes the active ingredient with liquid or dry formulates to create a pesticide formulation. These formulants are added for a number of reasons; they may make the active ingredient easier to apply; make it more suitable for storage; or in some cases, make it more attractive to the pest. Many pesticides come in more than one formulation.

## **TYPES OF PESTICIDE FORMULATIONS**

## **Types of Pesticide Formulations**

A single pesticide is often sold in several different formulations (e.g., concentrated liquid, ready-to-use liquid, granular or aerosol). Vendors should be familiar with the advantages, disadvantages and principle uses of the common types of formulations listed below.

The following should also be considered when assisting customers to select an appropriate formulation:

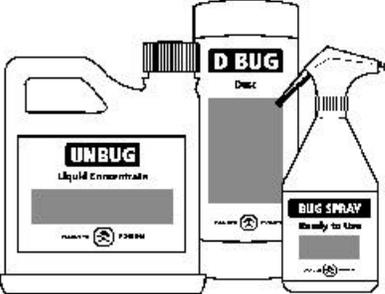
- effectiveness against the pest,
- habits of the pest,
- the size and type of areas to be treated,
- the type of application equipment the customer will be using,
- the danger of drift and runoff.

Abbreviations are often used on the pesticide label to identify the

type of formulation. Some of the common ones are:

- A** Aerosols
- D** Dust
- DF** Dry Flowable
- EC** Emulsifiable concentrate
- F** Flowable
- G** Granular
- P** Pellet
- S** Solution
- SP** Soluble Powder
- WDG** Water Dispersable Granules
- WP** Wettable Powder

**Customer Service Tip:**



A single pesticide is often sold in several different formulations. When asked, vendors should be able to assist customers to select a formulation that is appropriate for their needs.

The advantages and disadvantages of a number of the most common pesticide formulations used in the home and garden are described below:

## **READY-TO-USE FORMULATIONS**

## **Ready-to-use Formulations**

### **Aerosols (A)**

### **Aerosols (A)**

Aerosols are pressurized cans that contain a liquid pesticide and a propellant gas. When the nozzle is triggered, the pesticide is driven through a fine opening by the propellant. Aerosols are usually sold in small containers, weighing approximately half a kilogram.

Advantages: Aerosols are always ready to use. They are also a convenient way to buy small quantities of a pesticide. They are easily stored and the pesticides do not lose their strength (potency) while in the can.

Disadvantages: Aerosols are only practical for use in treating small areas. There is only a small quantity of pesticide in the container so this is an expensive way to buy pesticides.

Principal Uses: Aerosols are most often used to treat insects in a home, backyard and other small areas.

## **Dusts (D)**

## **Dusts (D)**

A prepared dust is composed of a finely ground, dry mixture of the pesticide active ingredient combined with a carrier such as talc, clay, or volcanic ash. There is a wide range in the size of the dust particles in any one formulation.

Advantages: Dusts are ready to use as purchased. They can be applied with simple, lightweight equipment.

Disadvantages: Because dust particles are finely ground, they may drift long distances from the treated area and may contaminate off-target areas. When used outside, they are easily dislodged from the treated surface by wind and rain and soon become inactive. Never apply dust formulations on a windy day.

Principal Uses: Dusts are used principally for spot treatments in home gardens. They work best when applied to dewy surfaces in the early morning. They are also used in cracks, crevices and wall voids for control of carpenter ants and other structure invading insects.

## **Poisonous Baits**

## **Poisonous Baits**

A bait formulation is composed of an active ingredient mixed with an edible substance or other material to make it attractive to the

pest. When the pest eats the bait it also consumes the pesticide. Baits are useful for controlling pests such as ants, rodents etc. that range over a large area.

Advantages: Usually only small amounts of pesticide are used in comparison to the total area treated, so potential environmental pollution is minimized.

Disadvantages: Within the home, baits are often attractive and dangerous to children or pets and therefore must be used with care. Outside, they may kill or injure domestic animals and wildlife as well as the pest. Whenever baits are used, they must be carefully placed in homes and gardens so that they do not contaminate food or feed. Baits must be protected from tampering by children, pets or non-target wildlife. When using baits it is important to ensure that they remain in the area where they are originally placed. During feeding, pests will occasionally move the bait from an area of low risk to an area where it can be accessed by domestic pets and children.

Principal Uses: Baits are most often used inside buildings for control of pests such as ants, cockroaches, rats and mice, etc.

### **Granular Formulations (G)**

### **Granular Formulations (G)**

Granular formulations are dry, ready-to-use materials usually containing from 5 to 20 percent active ingredient. Most granules are formulated by applying a liquid active ingredient to a coarse, solid carrier material such as clay or ground corn cobs.

Advantages: Granular pesticides are ready to use as purchased. Because the particles are large, heavy, and basically the same size, granular formulations drift less than most other formulations. They can be applied with simple, multi-purpose, equipment such as fertilizer spreaders. Granular formulations have the ability to fall through dense foliage to a target underneath.

Disadvantages: With a few exceptions, granular formulations are not suitable for treating foliage because they will not stick to it. Granular pesticides that are applied to soil need to be incorporated into the soil to protect non-target animals, especially birds, from consuming the pesticide.

Principal Uses: Granular pesticides are often used for soil treatments to control pests living at ground level or in the soil.

Some granular pesticides have systemic activity, meaning that once they are applied to the soil they are absorbed into the plant through the roots and carried throughout the plant.

### **Granular Pesticide/Fertilizer Combination Products**

As of April 1, 2011 products containing a combination of fertilizer and chemical herbicide will no longer be allowed in Nova Scotia. These products contained the active ingredient 2, 4-D and were often know as weed and feed products.

## **Ready-to-use Liquid Sprays (RTU)**

Ready-to-use sprays are pre-mixed liquid pesticides that are ready to use directly from the container. They are usually solutions in highly refined oils that contain low concentrations of the pesticide.

Advantages: Low concentrate solutions are designed to be sprayed as purchased. Household formulations generally have no unpleasant odours. The liquid carrier usually evaporates quickly and does not stain fabrics, furniture, etc. RTU sprays are useful for small or infrequent treatments. As no dilution is required, there is a reduced risk that the customer will mix or use the product incorrectly. This type of formulation also helps reduce the need for the customer to store concentrated pesticides.

Disadvantages: Low concentrate formulations are usually fairly expensive for the amount of actual pesticide bought. Ready to use sprays are only available for a limited number of uses. Care must be taken to avoid wind drift when using RTUs.

Principal Uses: Low concentrate solutions may be used in the household for flying or crawling insects and for moth proofing clothes. Some herbicides are also packaged as ready to use sprays.

## **Ready-to-use Liquid Sprays (RTU)**

## **FORMULATIONS THAT MUST BE MIXED WITH WATER BEFORE USE**

### **Emulsifiable Concentrates (EC)**

Emulsifiable concentrates are liquid formulations with the active ingredient dissolved in one or more petroleum-based solvents. An emulsifier, added during formulation, causes the pesticide to form tiny globules that mix readily with water. When added to water, EC formulations usually form a milky-white emulsion.

Advantages: These formulations contain a high concentration of pesticide. Only moderate agitation is required in the tank. EC's are especially suitable for small, low-pressure garden sprayers.

Disadvantages: Mixtures of emulsifiable concentrates may be phytotoxic (cause injury to plants), especially when temperatures are high. EC formulations can be easily absorbed through the skin.

Principal Uses: Many uses on fruit, vegetables, landscape plants.

### **Wettable Powders (WP)**

Wettable powders and soluble powders are dry preparations containing a relatively high concentration of pesticides. Wettable powders are mixed with water to form suspensions. In a suspension, the powder does not dissolve but remains suspended.

Advantages: The pesticides in wettable powders are relatively low in cost and easy to store, transport, and handle. Wettable powders are generally safer to use on tender foliage than are other formulations. Also, WPs do not absorb through the skin as rapidly as liquid concentrates.

Disadvantages: Wettable powders may be hazardous to the applicator if the concentrated dust is inhaled while mixing. WPs require good agitation (usually mechanical) in the sprayer tank and will settle quickly if the sprayer is turned off. They cause some pumps to wear out quickly.

## **Formulations that are mixed with Water**

### **Emulsifiable Concentrates (EC)**

### **Wettable Powders (WP)**

Principle Uses: Many uses on fruit, vegetables, landscape plants. Common formulation used for home garden fungicides and some insecticides.

### **QUESTIONS FOR SELF STUDY**

### **Questions for Self Study**

1. What is a pesticide?
2. Is insecticide another word for pesticide?
3. Would you advise a customer to choose a selective or non-selective herbicide to control weeds in their lawn?
4. How do granular pesticides differ from dusts?
5. Name two types of formulations that must be mixed with water before use?

## **Answers**

1. A pesticide is any thing that is intended to prevent, destroy, repel, attract or manage a pest.
2. No. An insecticide specifically kills insects. It is just one of many types of pesticides.
3. A selective herbicide.
4. Granular pesticides are made up of large, heavy particles. Dusts are made up of finely ground material.
5. Emulsifiable concentrate and wettable powder.

## Regulations

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### Learning Objectives for Chapter 2:

- **Become familiar with federal and provincial pesticide legislation.**

Pesticide laws are designed to protect the vendor, the consumer, the bystander and the environment. They are based on current scientific knowledge. In Nova Scotia, pesticides are regulated by federal and provincial levels of government. It is your responsibility to read and understand the Non-essential legislation. This legislation is available at the end of this manual.

### FEDERAL LEGISLATION

#### Pest Control Products (PCP) Act and Regulations

The major federal piece of legislation regulating pesticides in Canada is the Pest Control Products Act (PCP Act) and Regulations. This legislation focuses on human health, environmental protection, and pesticide performance. The main purposes of the PCP Act and Regulations are to ensure that:

1. No person shall manufacture, store, display, distribute or use any pest control product under unsafe conditions.
2. No person shall package, label or advertise any pest control product in a manner that is false, misleading or deceptive, or is likely to create a false impression about the pest control product.

### Learning Objectives

#### Introduction

#### Federal Legislation

#### PCP Act and Regulations

3. No person shall sell in or import into Canada a pest control product unless it is registered in Canada.

### **Registration Process**

All pesticides must be registered by Health Canada's Pest Management Regulatory Agency (PMRA) before they can be used, imported or sold in Canada. The PMRA conducts science-based health, environmental and value (including efficacy) assessments of each pesticide before deciding if it should be approved for use in Canada. Once a pesticide is registered it is given a PCP Act registration number.

Before a pesticide can be registered in Canada the manufacturer must conduct extensive scientific studies on the pesticide to document its effects on human health and the environment. These include long and short-term health effects of the user, exposure to the bystanders, residues in food, groundwater contamination, effects on wildlife and environmental fate. The data package from these studies is then submitted to Health Canada with an application for registration. The Pest Management Regulatory Agency then performs a scientific evaluation of the data. This evaluation may take years to complete. Following evaluation, the pesticide will be granted registration only if it's safety, merit and value for the proposed use are found to be acceptable. If problems with the product are identified, registration will not be granted. Once registered, all products are subject to re-evaluation and the registration may be suspended or cancelled if necessary.

If the pesticide is approved for registration, the manufacturer will receive a PCP Act registration number. This number must be displayed on the product label.

### **Pesticide Registration Categories**

Under the Pest Control Products Act there are four categories in which a pesticide may be registered depending on the toxicity and intended use. These are Domestic, Commercial, Restricted, or Manufacturing.

**Domestic** pesticides are intended for use in or around the home. They are designed to have low toxicity and to pose a minimum risk to people and the environment when used properly.

### **Registration Process**

### **Pesticide Registration Categories**

#### **Domestic**

Accidental over-exposure is not likely to cause severe poisoning. Providing label directions are followed, they can be safely handled without special protective clothing and equipment (except in the case of a spill). Domestic pesticides are generally available in small packages. The acute toxicity of domestic class pesticides is listed below. (See Chapter 4 of this manual for an explanation of LD<sub>50</sub>).

- Acute oral LD<sub>50</sub> is over 50 mg/kg.
- Acute dermal LD<sub>50</sub> is over 1000 mg/kg.

**In Nova Scotia, domestic class pesticides that are considered excepted use/controlled purchase can only be sold by certified domestic vendors.**

**Commercial** pesticides are for use in agriculture, forestry, industry and other commercial operations. They are not for use by the homeowner. They may be categorized as Agricultural or Industrial. Applicators of commercial pesticides need more knowledge on safe handling procedures and require personal protective equipment. More toxic pesticides that may have environmental concerns may be in this category. The acute toxicity of commercial class pesticides is listed below.

**Commercial**

- Acute oral LD<sub>50</sub> is over 50mg/kg.
- Acute dermal LD<sub>50</sub> is over 100 mg/kg.

**Restricted** pesticides are commercial type pesticides with certain additional limitations on the label. These restrictions are usually due to the toxicity of the pesticide or to environmental risks related to the use of the product. The limitations can involve display, storage, distribution, use or qualifications of users. Many of the control products used in aquatic and forestry operations fall into this category. The acute toxicity of commercial class pesticides is listed below.

**Restricted**

- Acute oral LD<sub>50</sub> is less than 50 mg/kg.
- Acute dermal LD<sub>50</sub> is less than 100 mg/kg.

**In Nova Scotia, commercial and restricted class pesticides can only be sold through certified commercial vendor outlets and only sold to provincially certified pesticide applicators.**

**Manufacturing** pesticides are usually highly concentrated forms of pesticides that are approved for use by manufacturers to make

**Manufacturing**

other pesticides. They are not available for sale by retail vendors or for use by applicators.

The PMRA's Pest Management Information Service provides information on pesticides and federal pesticide legislation. The toll free number is **1-800-267-6315**. Information can also be found on the PMRA website.

## **FERTILIZERS ACT**

## **Fertilizers Act**

The Fertilizers Act regulates all fertilizers offered for sale in Canada, including fertilizers containing pesticides. Before a fertilizer/pesticide combination product can be sold or used in Canada the pesticide must first be registered under the PCP Act. The combination product is then registered under the Fertilizers Act and given a Fertilizers Act registration number.

## **ADDITIONAL FEDERAL LEGISLATION**

## **Additional Federal Legislation**

The Food and Drug Act and Regulations protect the health of consumers by prohibiting the sale of food that contains any harmful or poisonous substance. Where food residues are concerned, the safety pesticide product must be proven to Health Canada prior to registration under the PCP Act. Other federal legislation namely, the Migratory Birds Convention and the Fisheries Act, protect birds, fish and fish habitat.

## **PROVINCIAL PESTICIDE LEGISLATION**

### **Provincial Environment Act & Pesticide Regulations**

Provincially, pesticides are regulated by the Nova Scotia *Environment Act*, the *Pesticide Regulations* and the *Activities Designation Regulations*. The Act and Regulations are administered by Nova Scotia Environment. The *Environment Act* requires anyone who sells, distributes, uses, applies, stores or transports any pesticides to do so in accordance with the *Pesticide Regulations* and the requirements listed on the product label.

### **Provincial Pesticide Legislation**

### **Environment Act and Pesticide Regulations**

The *Pesticide Regulations* regulate the sale, transportation, storage, and disposal of commercial and restricted class pesticides. In addition, anyone who applies or sells a commercial or restricted class pesticide in Nova Scotia must successfully pass an exam and obtain a certificate of qualification from the Department of Environment. The *Activities Designation Regulations* further regulate certain specific uses of commercial and restricted class pesticides.

### **Non-essential Pesticides Control Act**

The *Act*, the *Exceptions to Prohibitions on Non-essential Pesticides Regulations* and the *List of Allowable Pesticides Regulations* restricts the sale and use of pesticides for use on lawns, trees, shrubs, flowers and other ornamental plants.

As a retail outlet, if you are selling **only** pesticides on the List of Allowable Pesticides (see Nova Scotia Environment web site for up to date list) domestic vendor certification is not required.

Retail outlets that wish to sell domestic class pesticides that are on the excepted use/controlled purchase list must obtain a Class I(B) Domestic Vendor Certificate. This list contains Domestic Class pesticides that have an excepted use on the label. Many of these pesticides are permitted for excepted uses, but not for use on lawns, trees, shrubs, flowers or other ornamental plants. This means they may be legal for some purposes but illegal for others.

**Pesticide Tip: Excepted use example.** A glyphosate product may be labeled for use on lawns and to control poison ivy. Under the Non-essential Pesticides legislation glyphosate is not allowed to be used on lawns. Glyphosate is allowed to be used to control poison ivy because this is considered an excepted use.

**A Certified Domestic Vendor must be aware of the following:**

- 1) The customer cannot have direct access to excepted use/controlled purchase pesticides. The retail outlet must prevent customer access by placing these products in locked cabinets, locked cages, locked glass cases, etc.
- 2) The customer must speak with the certified vendor to obtain access to the excepted use/controlled purchase product. This interaction will enable the vendor to educate the consumer in the proper use of the pesticide.
- 3) A vendor with a Class I(B) Domestic Vendor certificate must be available whenever excepted use products are sold, because the certified vendor must speak to the customer about the purchase of the pesticide.
- 4) The retail outlet that is selling excepted use/controlled purchase pesticides is not required to have a Business Operator's certificate.
- 5) The certified vendor must provide the customer with written information regarding the legal use of the excepted use pesticide. This sheet is available on the NSE website.

**PROVINCIAL WORKPLACE HEALTH AND SAFETY LEGISLATION**

**Nova Scotia Occupational Health and Safety Act**

The Occupational Health and Safety Act are administered by the Occupational Health and Safety Division of the Department of Labour and Advanced Education. The Act provides for the promotion, co-ordination, administration and enforcement of occupational safety and health in the Nova Scotia. The Act places emphasis on proactive approaches to prevent accidents, injury and disease through an internal responsibility system based on the cooperation and involvement of the workplace parties in occupational health and safety matters. In addition, the broad duties identified by the Act are further defined by the regulations (e.g. Occupational Safety General Regulations, First Aid Regulations). For information on obtaining a copy of these Acts contact the Occupational Health and Safety Division at the website or the number listed at the end of this section.

**Workplace Health and Safety Legislation**

**Occupational Health and Safety Act**

## **Occupational Safety General Regulations**

The Occupational Safety General Regulations further define the health and safety requirements for employers and employees in Nova Scotia. Included in this regulation are requirements for handling and storage of materials, personal protective equipment, ventilation, lighting, sanitation, and other requirements which affect pesticide vendors.

## **Occupational Safety General Regulations**

## **Workplace Hazardous Material Information System Regulations**

## **Workplace Hazardous Material Information System Regulations**

The Workplace Hazardous Materials Information System, commonly known as WHMIS, is a Canada-wide system designed to provide employees and workers with information about the hazardous materials they work with on the job. Because their labeling is covered under the Pest Control Products Act, pesticides and consumer products are exempt from the sections of the WHMIS Regulation dealing with WHMIS labeling and the requirement for Material Safety Data Sheets (MSDS).

**Pesticides are not exempt from the sections of the WHMIS Regulation which deal with training.** The worker's "Right to Know" about hazardous chemicals in the work place still applies. It is the responsibility of the supervisor to inform his or her employees about any possible danger to health and safety. Many pesticide manufacturers provide MSDS for their products. It is the employee's right to obtain information about any substances he/she works with, including information on the MSDSs when they are available.

In addition, Section 59 of the Nova Scotia Occupational Health and Safety Act requires employers to "prepare a list of all chemical substances regularly used, handled, produced or otherwise present at the workplace that may be a hazard to the health and safety of the employees or that are suspected by the employees of being a health hazard ..." This is a separate requirement from WHMIS and covers all potentially hazardous chemicals, even those exempted by WHMIS. These lists are required by all retail stores that stock hazardous products on their shelves or "in the back" if these products could present a hazard to workers under reasonably foreseeable circumstances.

### **First Aid Regulations**

The First Aid Regulations identify requirements for first aid supplies, services and certified first aid attendants that must be maintained at the vendor's work site. Additional information on first aid specifically for pesticides is provided in this manual.

For additional information or copies of the Occupational Health and Safety Act and Regulations visit the Department of Labour and Advanced Education Occupational Health and Safety Division website or contact the Occupational Health and Safety Division by telephone at (902) 424-5400 or toll-free 1-800-9-LABOUR (1-800-952-2687)

### **First Aid Regulations**

## **QUESTIONS FOR SELF STUDY**

## **Questions for Self Study**

1. Before a pesticide can be legally sold or used in Canada it must be registered by which federal government agency ?
2. What are the four categories in which a pesticide may be registered ?
3. Where are domestic pesticides intended to be used ?
4. Can an un-certified vendor sell any type of pesticide ?
5. Can pesticide use be regulated through municipal bylaws ?

## **Answers**

1. Health Canada's Pest Management Regulatory Agency (PMRA).
2. Domestic, Commercial, Restricted, and Manufacturing.
3. Domestic pesticides are intended for use in or around the home.
4. In Nova Scotia, commercial and restricted class pesticides can only be sold through certified vendor outlets and only sold to provincially certified pesticide applicators.
5. Yes.

# Labelling

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## Learning Objectives for Chapter 3:

- **Learn what kind of information is on a label and why it is important.**
- **Learn to understand the label and interpret label information for customers.**

## Learning Objectives

Pesticide products must be registered by Health Canada's, Pest Management Regulatory Agency (PMRA) before it can be sold or used in Canada. In order to obtain registration, the manufacturer must supply extensive field and laboratory data on the safety and effectiveness of the product. This data is used to produce a pesticide label with use directions, safety precautions, and first aid information. This label must be attached to every package or container of pesticide offered for sale and use.

## Introduction

Customers are required by law to follow the instructions on the label when using a pesticide.

## WHY THE LABEL IS IMPORTANT

The pesticide label is not only an important legal document; it is also an essential source of information for both the vendor and customer. The label is the best single source of information on the safe handling and effective use of the pesticide.

## Why the Label Is Important

Vendors should encourage customers to read the label when selecting a pesticide product, and to follow the label directions when they use the pesticide.

Vendors should be able to understand and interpret all of the information on a pesticide label. This helps the vendor to assist the customer to select an appropriate pesticide for the pest problem that they are trying to control and to answer questions related to safe use of the product. It is very important that all sales staff is familiar with the type of information contained on the labels of the pesticides offered for sale at their retail outlet. All pesticide labels must follow a format that has been approved by the PMRA. This chapter provides a description of the information that is found on pesticide labels.

**Pesticide Safety Tip:**

Pesticide labels are legal documents. Vendors should advise their customers to read the label before using any pesticide. Pesticides must be used according to the instructions on the label. If label directions are not followed, laws are being broken.

Manufacturers often provide extra product information in addition to what is provided on a label. These materials (e.g., posters, pamphlets, brochures etc. ) complement the label, but do not legally substitute for it. The manufacturer may also print information on the wrapper, or on stickers or tags that are attached to the container. **It is important to remember that this promotional literature does not take the place of label directions.**

The label must be kept on the container and in good condition. If a label becomes unreadable, contact your supplier for a replacement one and attach it to the package. Do not sell a pesticide with a damaged label.

## **COMPONENTS OF A LABEL**

A pesticide label provides basic information on use, limitations, disposal, first aid, contents, precautions, formulation, and toxicology. A pesticide label has two main panels. The front panel is called the principal display panel. The back panel is called the secondary display panel.

### **Principal Display Panel**

The 9 components of the principal label panel are:

1. Trade Name or Product Name
2. Class Designation for the Pesticide
3. Precautionary Symbols
4. "Read The Label Before Using" Statement
5. Guarantee Statement
6. PCP Act Registration Number
7. Net Contents
8. Name and Address of Registrant
9. Child Hazard Warning Statement

## **Components of a Label**

### **Principal Display Panel**

## Secondary Display Panel

## Secondary Display Panel

The six components on the secondary label panel are:

10. Directions for Use
11. Precaution Statements
12. Disposal
13. First Aid Instructions
14. Toxicological Information
15. Notice to Buyer

## Small Size Containers

## Small Size Containers

For small size containers of DOMESTIC class pesticides the following components may appear on the lower half of the secondary display panel:

- Name and Address of the Registrant/agent
- Net Contents
- PCP Act Registration Number
- Guarantee

The information on the label is defined as follows:

### Information on the Principal Display Panel:

### Information on the Principal Display Panel

1. **Trade or Product Name.** This is the name that the manufacturer gives the product. The type of formulation is described in one or two words or an abbreviation (e.g., emulsifiable concentrate or EC). The type of pest controlled by the product is also identified here, (e.g., Control-all indoor insect killer).
2. **Classification.** This is the class that the product has been assigned to (e.g., DOMESTIC, COMMERCIAL or RESTRICTED).

**DOMESTIC** pesticides are intended for use in or around the home. They are designed to have low toxicity and to pose a minimum risk to people and the environment when used properly.

**COMMERCIAL** pesticide products are designed for use in agriculture, forestry, industry and other commercial operations. More descriptive terms such as Agricultural or Industrial can be used on the label to further define the type of use. These products are not meant for consumer use around the home and garden. Applicators must be knowledgeable in safe handling procedures and usually require personal protective equipment.

**RESTRICTED** pesticides have restrictions on the label, usually due to toxicity or environmental concerns. The intent of the restricted category is to limit the availability of relatively hazardous products to situations where they can be used safely. Applicators require personal protective equipment.

**Anyone selling or using COMMERCIAL or RESTRICTED class pesticides in Nova Scotia must obtain a pesticide certificate from Nova Scotia Environment.**

**A Class I(B) Domestic Vendor certificate is required for vendors of DOMESTIC class pesticides that are considered excepted use/controlled purchase.**

3. **Precautionary Symbol.** This symbol is placed on the label if the product is hazardous to use or handle. The symbol illustrates how dangerous the pesticide is with respect to toxicity, flammability, explosiveness or corrosiveness. The degree of hazard is indicated by the shape surrounding the symbol. A detailed description of precautionary shapes and symbols is provided at the end of this section .
4. **READ THE LABEL BEFORE USING.** This warning must be on the front panel.
5. **Guarantee.** The Guarantee Statement lists each active ingredient in the pesticide and identifies the amount (by percent) of each active ingredient present. The active ingredient(s) is the chemical in the pesticide that kills or controls the target pest.

6. **PCP Act Registration Number.** The PCP Act registration number is usually written as “REGISTRATION NO. XXXXX PEST CONTROL PRODUCT ACT”. Due to container size limitations it may appear as “REG. NO. XXXXX P.C.P. ACT” on DOMESTIC class products. The higher the number, the more recently the product was registered. American products have an E.P.A. (Environmental Protection Agency) number. It is illegal to sell or use products labeled with an E.P.A. number in Canada.
7. **Net Contents.** The total amount of pesticide in the container, usually expressed as a weight (g or kg) or as volume (mL or L).
8. **Name and Address.** The name and postal address of the registrant of the product. The company listed here can be contacted for additional information about the product.
9. **Child Hazard Warning Statement.** The phrase “KEEP OUT OF REACH OF CHILDREN” is required on all DOMESTIC products on the principal display panel.

**Information on the Secondary Display Panel:**

10. **Directions for Use.** This section of the label identifies where the pesticide may be used, which pests will be controlled, and specific rates of application. The directions state how the user can obtain desired results while avoiding undesirable effects. This section may also include information on the minimum number of days between pesticide applications and harvesting of specified crops to ensure there is no hazard from pesticide residues. It is important that these directions be followed completely. They have been developed specifically for the product to ensure safety and efficacy.
11. **Precautions.** This section describes how the pesticide must be used or not used to prevent user exposure or environmental contamination. The precautions vary according to the properties and intended use of the product.

**Information on  
the Secondary Display  
Panel**

12. **Disposal.** This section provides information on how to properly dispose of empty containers to prevent accidental poisonings or environmental contamination.
13. **First Aid Instructions.** This section describes practical measures to be taken in the event of poisoning or accident. It is important to note that First Aid is a first response - it does not substitute for medical attention.
14. **Toxicological Information.** This section includes symptoms of poisoning and other information important to medical staff that is treating poisoned victims.
15. **Notice to Buyer.** The registrant may include a limited warranty statement in this section of the label.

An example of a label for a domestic product, identifying the main sections of the label is shown below and on the next page:



*Main sections of the principal display panel*

1. *Product Name*
2. *Classification*
3. *Guarantee*
4. *PCP Act Registration Number*
5. *Precautionary Symbols*



*Main sections of the secondary display panel*

6. *Directions for Use*
7. *Precautions*
8. *First Aid*
9. *Toxicological Information*
10. *Disposal*

**PRECAUTIONARY SHAPES AND SYMBOLS:**

**Precautionary Shapes and Symbols**

A combination of a precautionary symbol, shape and signal word is used on the label of a pesticide container to indicate the degree and type of hazard present.

## Precautionary Symbols

The “**skull and crossbones**” symbol warns that the chemical is **poisonous** if taken into the body.

The “**fire**” symbol is a warning that the pesticide is **flammable** or easily ignited.

The “**exploding grenade**” symbol indicates that the pesticide represents an **explosion** hazard. Aerosols and pressurized products represent such a hazard.

The “**corroded hand in liquid**” symbol indicates the pesticide is corrosive to the skin. The chemical is either acidic or alkaline and can burn the skin if mishandled.

## Precautionary Shapes

The precautionary symbol is enclosed in one of the following shapes:

**The octagon** indicates **extreme hazard** and has the word **DANGER** associated with it;

**The diamond** indicates **moderate hazard** and has the word **WARNING** associated with it;

**The inverted triangle** indicates **slight hazard** and has the word **CAUTION** associated with it. The label may contain none, one or several of the shape and symbol combinations. Where more than one symbol is required, only the most severe signal word is used on the label.

## Precautionary Symbols



## Precautionary Shapes



### **Pesticide Safety Tip:**

A simple way to remember what the precautionary shapes mean is; the greater the number of sides on the shape the greater the degree of hazard.

## Multiple Symbols

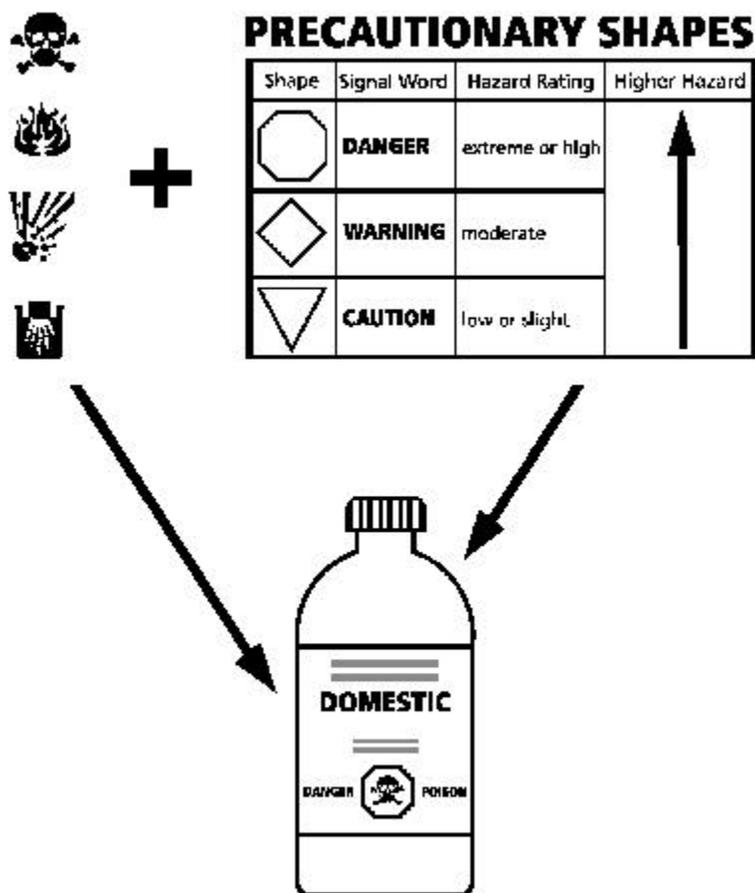
There may be more than one hazard associated with a pesticide. If this is the case then all of the hazard symbols and shapes must appear on the label, but, only one signal word is required. The signal word must represent the greatest degree of hazard. For example if a product was moderately flammable but extremely poisonous it would bear both the flammability and poison symbols but only the words Danger Poison.

## No Symbols

If a pesticide label does not have any hazard symbols and/or signal words, the product's hazards are such that the label does not require them. This does not mean that the product poses no risk at all - it should still be handled, used, and stored with care.

## Multiple Symbols

## No Symbols



## MATERIAL SAFETY DATA SHEETS (MSDS)

The Material Safety Data Sheet (MSDS) provides additional detailed information about health hazards, personal safety equipment and environmental protection that may not be on the label. The safety information found on the MSDS can assist the vendor and his or her staff to develop safe work procedures and emergency response plans for handling emergencies related to the pesticides that they stock. MSDS's are available for many pesticides.

### Parts of the MSDS

Material Safety Data Sheets are organized into the nine sections listed below. While all of the sections are required, the order in which the sections appear on an MSDS varies from company to company.

- Product Identification
- Hazardous Ingredients
- Physical Data
- Occupational Procedures/Preventive Measures
- First aid and Emergency Procedures
- Fire and Explosion Hazard
- Toxicity/Health Effects
- Reactivity Data
- Preparation Date & Group

**Product identification** gives the trade or product name, chemical name, and the primary use of the product. It also gives the name, address and emergency telephone numbers of the manufacturer and supplier.

**Hazardous ingredients** identify the active ingredient and provide its LD<sub>50</sub> and LC<sub>50</sub>. This section may also identify other ingredients in the product. It also gives the chemical registration numbers and transportation classification for the product.

**Physical data** includes information about the appearance, odor, specific gravity, pH and boiling point of the product.

**Occupational procedures/Preventive measures** explains what

## Material Safety Data Sheets (MSDS)

### Parts of the MSDS

personal protective equipment must be used when handling the product (e.g., eye protection, skin protection and respiratory protection). It also provides information on safe handling and storage as well as emergency procedures or steps to be taken in the event of an accidental spill, leak or release of the product.

**First aid and emergency procedures** provides instructions on specific first aid measures to be taken if an employee is affected by skin or eye contact, or has been overexposed to the product by ingestion or inhalation.

**Fire and explosion hazard** identifies whether a product will catch fire or explode. Vendors should advise their local Fire Department of the products and quantities that are present in the store display or storage. The Fire Department may request MSDSs for all products at the site.

**Toxicity/health effects** explain how personal health may be affected by exposure to the product. It includes signs and symptoms of exposure and identifies pre-existing conditions that may be aggravated by the product. This information can help a doctor deal with an emergency. The LD<sub>50</sub> and or LC<sub>50</sub> for the whole product (the active ingredients plus any formulants) may also be listed in this section.

**Reactivity data** gives any special chemical properties of the product. It will also identify any special storage requirements for the pesticide.

**Preparation date and group** identifies who prepared the MSDS and when it was prepared. MSDSs are updated at least every three years. **Make sure your MSDSs were prepared in the last three years.** If you have an outdated MSDS contact your supplier for an updated version.

## **QUESTIONS FOR SELF STUDY**

## **Questions for Self Study**

1. What information does the label provide the consumer with ?
2. Should you sell a pesticide with a damaged label ?
3. What does the skull and crossbones symbol mean on the pesticide label ?
4. What part of the label provides the directions for use ?

## **Answers**

1. Information on how to use the pesticide safely and correctly .
2. No.
3. The pesticide is poisonous if taken into the body.
4. The “Directions for Use” section of the secondary display panel. The secondary display panel is usually found on the back or side of the package.

# 4

## Human Health

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### Learning Objectives for Chapter 4:

- Understand what toxicity is and how it affects humans.
- Become aware of how pesticides enter the body.
- Be familiar with how toxicity is measured and what is meant by label warning statements.

### Learning Objectives

### Introduction

Pesticides are designed to control or kill living organisms. As a result they can be hazardous to people if not handled carefully. Accidental exposure to concentrated domestic pesticides by breathing pesticide vapours, spilling or splashing pesticides on the skin or into the eyes, or swallowing pesticides may cause injury. The nature and extent of injury depends on the toxicity of the pesticide as well as the dose (amount of material) that enters the body.

### RISK

### Risk

Risk can be defined as the likelihood that someone, something or the environment will be harmed by a particular activity. The risk that someone or something will be harmed by a pesticide is primarily affected by the toxicity of the pesticide and the type or length of exposure to it.

Therefore we can think of risk as:

$$\text{Risk} = \text{Toxicity} \times \text{Exposure}$$

## **FACTORS THAT AFFECT RISK**

- ✓ The greater the toxicity of the pesticide, the greater the risk.
- ✓ The type of active ingredient and the concentration of active ingredient affects the toxicity of the product.
- ✓ Some active ingredients are more toxic than others.
- ✓ Higher concentrations of an active ingredient in the product increase its toxicity.
- ✓ The larger the exposure the greater the risk. High exposure to a product with a low toxicity creates risk.
- ✓ The ease with which the pesticide can enter the body. Some products and/or formulations are absorbed more easily than others.

Risk can be minimized by choosing a less toxic pesticide, by reducing exposure, or both. Toxicity and exposure are explained in greater detail in the next sections.

## **TOXICITY OF PESTICIDES**

Toxicity refers to the ability to cause injury or illness. Toxicity can either be acute, causing ill effects that develop soon after exposure, or chronic, causing ill effects that develop over a long time after exposure. Anyone who handles pesticides should understand the type and degree of toxicity the product has so they can take steps to protect themselves, coworkers and the environment.

## **CHRONIC TOXICITY**

Chronic toxicity refers to the adverse effects that occur and persist over time after the exposure(s). Chronic effects are often irreversible. Symptoms resulting from chronic or long term exposures may not develop for many days, months, or even years. The chronic toxicity of a pesticide can vary with gender, health, age, weight, route of exposure and exposure to other products. Chronic effects of pesticide poisoning may include reduced body weight, skin irritation, anaemia, kidney disorders, central nervous system disorders and cardiovascular disorders.

## **Factors That Affect Risk**

## **Toxicity of Pesticides**

## **Chronic Toxicity**

## ACUTE TOXICITY

## Acute Toxicity

Acute toxicity refers to how poisonous a pesticide is to a human or an animal after a single short-term exposure. The toxicity of a pesticide is determined by subjecting test animals to different dosages of the active ingredients and each of its formulated products.

Acute toxicity describes the effects that appear immediately, or within 24 hours of exposure. A pesticide with a high acute toxicity can be very hazardous to health even when a very small amount is absorbed. Acute toxicity levels are used as a way to assess and compare how poisonous pesticides are. The acute toxicity of a pesticide is the basis for the poison warning statements on the label. Acute toxicity may be measured as acute oral toxicity, acute dermal toxicity, or acute inhalation toxicity.

## ACUTE TOXICITY TERMS

## Acute Toxicity Terms

To determine how acutely toxic a pesticide is, it is administered to test animals (e.g., rats, rabbits) in controlled laboratory experiments. The pesticide is applied to the skin (dermal exposure), fed to the animals (oral exposure), or added to the air that the animals breathe (inhalation exposure).

The following terms are used on pesticide labels and in publications about pesticides.

### Lethal Dose Fifty (LD<sub>50</sub>)

### LD<sub>50</sub>

“Lethal Dose fifty” (LD<sub>50</sub>) is one way the toxicity of chemicals is measured. LD<sub>50</sub> is the amount of a pesticide, administered in one dose that is required to kill half of the animals in a laboratory test. For example, the acute oral LD<sub>50</sub> indicates the amount of pesticide swallowed that has killed half of the animals tested. The LD<sub>50</sub> is expressed in milligrams of pesticide per kilogram of the animals' body weight.

LD<sub>50</sub> does not indicate how a chemical acts, nor show how sensitive different organs within an animal or human might be. It simply indicates how much of the chemical it takes to kill half of the test animals in a pre-determined time limit. LD<sub>50</sub>'s for different

Chemicals can only be compared if the same species of test animals are used.

The smaller the  $LD_{50}$  value, the smaller the amount of chemical required to kill half of the test animals, and the more poisonous the pesticide. So, a pesticide with a dermal  $LD_{50}$  of 25 is more poisonous than a pesticide with a dermal  $LD_{50}$  of 2000.

Information about the  $LD_{50}$  of a pesticide can be found on the MSDS.

### **Milligrams per kilogram (mg/kg)**

Pesticide  $LD_{50}$  values are measured in units of weight called “milligrams per kilogram” (mg/kg) of the animal’s body weight. For comparison, a single paper clip weighs about one gram. Cutting the clip into 1000 equal parts will make pieces that weigh one milligram each. For example, an acute oral  $LD_{50}$  of 5 mg/kg for Pesticide A (rat) indicates that it is toxic when there are 5 mg of this chemical given orally for every kilogram (or 2.2 pounds) of the animal’s weight.

### **Milligrams per kilogram (mg/kg)**

### **Lethal Concentration Fifty ( $LC_{50}$ )**

The Lethal Concentration Fifty ( $LC_{50}$ ) is the concentration of pesticide that is required to kill 50% of the test animals in a specific period of exposure (e.g., 4 hours). The  $LC_{50}$  is an estimate of the “acute inhalation toxicity” of a pesticide.  $LC_{50}$  values are also determined for aquatic organisms (e.g., fish) based on exposure to a concentration of pesticide in water for a specific period of time. Like  $LD_{50}$ , the lower the  $LC_{50}$  value, the more poisonous the pesticide.  $LC_{50}$  is measured in either milligrams per liter (mg/l) or ppm. Information about the  $LC_{50}$  of a pesticide, if available, may be found on the MSDS.

### **$LC_{50}$**

## ACUTE TOXICITY LABEL WARNING STATEMENTS

## Acute Toxicity Label Warning Statements

Based on the LD<sub>50</sub> and the results of other acute tests, each pesticide is classified into a “toxicity category” and given an associated “signal word”. A signal word must appear on every product label so that pesticide users are alerted to the pesticide’s acute toxicity. Toxicity categories are based on the acute oral, dermal, and inhalation toxicities, as well as eye and skin irritation effects of each pesticide. A pesticide is categorized by its highest level of toxicity. For example, if a pesticide has a moderate level of acute oral toxicity but an extreme level of acute inhalation toxicity the signal word DANGER will appear on the label. The following table indicates the four categories of pesticide toxicity. (Refer to Chapter 3 of this manual for more information on label signal words and symbols).

### Categories of Acute Toxicity

| Hazard Rating - toxicity | Signal Word Required on Label           | LD <sub>50</sub> |                  | LC <sub>50</sub> Inhalation mg/l | Approx. Oral Dose that can kill an average person   |
|--------------------------|---|------------------|------------------|----------------------------------|---|
|                          |   | Oral mg/kg       | Dermal mg/kg     |                                  |   |
| Extreme                  | Danger - * poison!<br>skull & crossbone | 0 to 50          | 0 to 200         | 0 to 0.2                         | a few drops to 5 ml<br>(or a few drops on the skin) |
| Very                     | Warning!                                | 50 to 500        | 20 to 2000       | 0.2 to 2                         | over 5 ml to 30 ml                                  |
| Moderate                 | Caution                                 | 500 to 5000      | 200 to 20,000    | 2.0 to 20                        | over 30 ml to 0.5 l                                 |
| Slight                   | Caution                                 | more than 5000   | more than 20,000 | greater than 20                  | over 0.5 l or 0.5 kg                                |

\* Not used for skin and eye irritation effects.

## EXPOSURE

## Exposure

Exposure to pesticides can occur at any stage of pesticide handling.

A vendor may be exposed to pesticides:

- when handling damaged or leaking containers during loading, unloading, stocking shelves,
- when cleaning up leaks and spills,
- by breathing in pesticide vapours,
- by handling pesticide contaminated clothing, waste materials or spill clean-up materials, or
- by accidental ingestion.

The type and formulation of the product affects the amount of exposure. Certain formulations can penetrate skin easier than others; some are more volatile and can pose a greater respiratory danger.

Also, individuals often vary in their response to pesticide exposure. An exposure that injures one person may have little effect on another. Age and body size often influences a person's response to a pesticide exposure.

The amount of exposure that vendors are subject to depends on:

1. **Vendor attitude.** A vendor must be safety conscious. Vendors who practice good work procedures will reduce the potential for exposure.
2. **The protective equipment used.** Suitable, clean and properly fitted and maintained protective equipment reduces exposure when used properly.
3. **The organization of the storage and display area.** Well organized pesticide storage and display areas reduce the risk of mishap.
4. **The safety practices followed.** Following proper safety practices will reduce the potential for exposure.

## HOW PESTICIDES ENTER THE BODY

There are four ways in which pesticides may enter the body. Exposure may occur through absorption through the skin (dermal absorption), inhalation, ingestion and absorption through the eyes (ocular absorption).

### Absorption Through the Skin

Dermal absorption refers to the intake of a substance through the skin. In most vendor work situations dermal exposure is the most common way in which a pesticide can enter the body. It can result from direct contact with the spray concentrate or from wearing contaminated clothing. Absorption is affected by skin condition, location of the exposure and the pesticide. Skin on different areas of the body absorbs pesticides at different rates. The small of the back, the head, eardrums, groin area, and armpits tend to be more absorptive. Dermal exposure can be reduced by following safety guidelines and wearing proper personal protective equipment.

### Inhalation

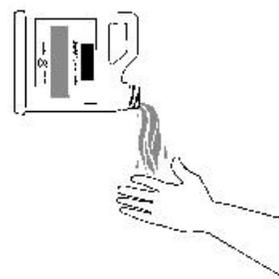
Inhalation refers to absorption of airborne particles of a substance through the respiratory system. Spray droplets, vapours, or gases can be inhaled. Inhalation of pesticides allows them to enter the blood stream rapidly and completely. The risk of inhalation increases in enclosed spaces. Inhalation exposure can be reduced by ensuring adequate ventilation, the use of proper respiratory protective equipment and following safety practices.

### Ingestion

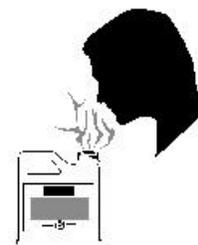
Ingestion or oral exposure refers to the intake of a substance by mouth. Accidental oral exposure occurs most frequently when pesticides have been taken from the original labeled container and put into an unlabeled bottle or food container. Oral exposure also occurs when liquid concentrates splash into the mouth (e.g., during spill clean-up or handling of damaged containers). Chemicals can also be swallowed when eating, drinking, smoking, or even licking one's lips after handling pesticides. Since many pesticides are rapidly and completely absorbed by the intestinal tract, it is essential to always wash one's hands and face thoroughly before eating, drinking, or smoking.

## How Pesticides Enter the Body

### Absorption Through the Skin



### Inhalation



### Ingestion



## **Absorption Through the Eyes**

Ocular absorption is the intake of a substance through the eyes. Under certain conditions and with certain pesticides, absorption through the eyes can be significant and particularly hazardous. Eyes are very sensitive to many pesticides and considering their size are able to absorb surprisingly large amounts of chemical. Serious eye exposure can result from a splash or spill or by rubbing the eyes with contaminated hands or clothing. Ocular exposure can be reduced by wearing eye protection and following safety procedures. It is important to note that safety glasses (e.g., those worn for construction and wood working) are not the same as splash goggles. Safety glasses do not provide adequate protection for pesticide exposure.

## **PROTECTING AGAINST EXPOSURE**

When used and handled according to label directions most domestic pesticides do not require special personal protective equipment to protect against respiratory or ocular exposure. In the event of a spill or accident refer to the MSDS for the recommended personal protective equipment.

## **PESTICIDE POISONING**

Acute pesticide poisoning symptoms may appear within a few minutes of exposure or not for many hours (up to 96) after exposure. Early recognition of poisoning symptoms allows you to minimize exposure and begin preventative actions or first aid procedures. Information on the symptoms of pesticide poisoning can usually be found on the pesticide label or the MSDS. The label and MSDS information should be provided to the doctor in the event that a poisoning or suspected poisoning occurs.

All pesticides do not have the same poisoning symptoms. Also, it is important to note that some poisoning symptoms may be vague and can be confused with other common ailments (flu, excess heat, hangover, food poisoning, etc.). If anyone at the facility is acting or feeling unusual or exhibiting poisoning symptoms, consult a doctor or the IWK Regional Poison Centre.

## **Absorption Through the Eyes**



## **Protecting Against Exposure**

## **Pesticide Poisoning**

### Poisoning symptoms can include:

- headache,
- dizziness,
- thirst,
- excessive salivation,
- nausea, stomach cramps, vomiting,
- diarrhoea,
- eye irritation, blurring of vision, constriction of pupils,
- skin irritation or burns,
- perspiration,
- anaemia,
- weakness, fatigue or exhaustion,
- feeling of constriction in throat and chest, wheezing, coughing,
- rapid or weak pulse,
- trembling, muscle twitching, seizures,
- mental confusion,
- inability to breathe, blue lips or face,
- loss of reflexes, slurred speech, staggering gait,
- restlessness, apprehensive, excitability,
- unconsciousness, and
- allergic response.

### Poisoning Symptoms

### QUESTIONS FOR SELF STUDY

1. What is the difference between chronic and acute toxicity ?
2. What does LD<sub>50</sub> mean ?
3. When can vendors be exposed to pesticides ?
4. What are the four ways that a pesticide may enter the body ?
5. Do all pesticides produce the same poisoning symptoms?

### Questions for Self-Study

## Answers

1. Acute toxicity refers to how poisonous a pesticide is to a human or animal after a single short-term exposure. Chronic toxicity refers to the adverse effects that occur and persist over time after the exposure.
2. Lethal Dose Fifty ( $LD_{50}$ ) is one way the toxicity of chemicals is measured.  $LD_{50}$  is the amount of a pesticide, administered in one dose that is required to kill half of the animals in a laboratory test.
3. Exposure to pesticides can occur at any stage of pesticide handling (e.g., when handling damaged or leaking containers during loading, unloading, stocking shelves)
4. Absorption through the skin, by inhalation, by ingestion and by absorption through the eyes.
5. No. In addition, the symptoms of pesticide poisoning can be confused with other ailments (e.g., the flu, food poisoning etc.)

## Pesticide Safety

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### Learning Objectives for Chapter 5:

- **Learn safety precautions for proper pesticide storage and handling.**
- **Understand the use and maintenance of personal protective equipment.**
- **Become familiar with how vendors can encourage customers to use and handle pesticides safely.**

If not handled safely, pesticides can poison people or pets, and can harm a wide variety of beneficial insects and organisms as well as the environment. Storing, displaying and selling pesticides safely protects the vendor and their staff, customers and the environment. Vendors should handle pesticides responsibly and encourage their customers to do so as well. This chapter provides general information on handling pesticides safely at the vendor site and outlines how customers can be encouraged to handle pesticides safely at home.

### SAFE HANDLING AT THE VENDOR'S SITE

#### Attitude and Training

Everyone who comes in contact with pesticides at the work site should be informed about safe practices to prevent them from harming themselves, others, or the environment. The employer, employees, managers and supervisors must cooperate to reduce injuries and illness in the workplace. The employer is responsible for health and safety in the workplace and must take steps to protect

### Learning Objectives

#### Introduction

#### Safe Handling at the Vendor's Site

#### Attitude and Training

employees and others (e.g., customers) who may enter the workplace. All managers and staff should familiarize themselves with the products in inventory each year.

As an employer you are responsible to:

- provide employees with information about the pesticides that they handle, including MSDSs when available,
- train employees to work safely around pesticides,
- ensure they are familiar with safety precautions that are needed when dealing with leaks, spill clean up, or damaged product containers, and
- have the proper personal protective equipment for employees, train employees on its proper use, and ensure they use it as required.

As an employee you are responsible to:

- know where to find information about the pesticides that your store carries,
- be aware of and follow your store's safety procedures for handling pesticides,
- wear the proper personal protective equipment when cleaning up accidents or spills or handling damaged containers or any other situations requiring it,
- ensure the safety of fellow employees, and
- report hazards.

Anyone handling pesticides must regularly review safety procedures because:

- product information may have changed, and
- repetition encourages automatic adoption of safety procedures.

A health and safety representative or health and safety committee is required by law in Nova Scotia. Contact the Department of Labour and Advanced Education's Occupational Health and Safety Division for additional information.

## Storage at the Vendor Site

Pesticides that are not stored safely present a hazard to employees. As well, proper storage of pesticides protects your inventory by extending product shelf life and preventing cross contamination of pesticides. The supplier or manufacturer of the pesticide can be an important source of information on the proper storage of their product. In Nova Scotia the storage of commercial and restricted class pesticides is regulated by the Pesticide Regulations. The storage and display of domestic pesticides is covered under Part 5 of the Occupational Safety General Regulations. Vendors should be familiar with the requirements of this regulation. It can be viewed at the Department of Labour and Advanced Education website.

In addition to the regulatory requirements, the following are recommended best management practices for storage of domestic pesticides at the vendor site.

1. Pesticides must be stored in a facility that will prevent uncontrolled release of the pesticide into the environment.
2. A copy of the following emergency telephone numbers should be kept by all telephones for immediate reference.
  - **Emergency Telephone Numbers:**
  - Fire, Police or Medical Emergency **911**
  - Environmental Emergency Number **1-800-565-1633**
  - IWK Regional Poison Centre **1-800-565-8161 or 911**
3. The storage area should be posted with “No Smoking” signs. Signs shall have black lettering not less than 50mm high with a 12 mm stroke on a yellow background. A symbol of not less than 150 mm by 150 mm is permitted in lieu of lettering.

## Storage at the Vendor Site

4. The building/storage area should be secured to prevent unauthorized access.
5. Pesticides must always be stored in their original, labelled containers.
6. Pesticides must be stored separately from flammable materials (e.g., other consumer chemicals such as paints, lubricants, solvents, etc.). Flammable and combustible liquids should not be stored within 1.5 metres of pesticides.
7. All pesticides should be stored separately from all food and animal feed products. Herbicides should be stored separately from seed, bulbs and potting soil/mixes.
8. The building/storage area should be insulated and maintained at moderate temperature and moisture levels year round to prevent overheating or freezing.
9. A list of the pesticides stored in the facility and an estimate of the quantities normally held in storage should be available for the chief of the local fire department. The fire department should have vehicle access to the storage building.
10. Combustible waste should not be allowed to accumulate in the pesticide storage area.
11. The storage site should be equipped with emergency equipment including a first aid kit, appropriate personal protective equipment, a sufficient quantity of absorbent material (e.g., spill pillows, kitty litter, sawdust, etc.) and spill clean-up equipment such as a shovel, bags, plastic lined containers, etc.
12. Other regulations, laws and codes, including the Occupational Health and Safety Act, Workplace Hazardous Materials Information System (WHMIS) Regulations and National Fire Code, may apply to the pesticide storage facility. The vendor must ensure that the facility is in compliance with all other applicable regulations, laws and codes.

## **Pesticide Display Areas**

The pesticide display area should be located in an area with adequate ventilation. Ensure displays are secure and shelving units are sturdy and solid. All display areas should be located where people are unlikely to bump into them and children will not be able to reach the pesticides or have easy access to them.

Regularly inspect all pesticide displays for signs of leaking or damaged packages. If damaged or leaking packages are found, they should be immediately removed from the retail floor. Broken bags or leaking containers should not be sold. Any spilled material should be properly cleaned up and disposed.

Remember, the customer cannot have direct access to excepted use/controlled purchase pesticides. The retail outlet must prevent customer access by placing these products in locked cabinets, locked cages, locked glass cases, etc.

## **Transportation**

There are no Transportation of Dangerous Goods (TDG) Act requirements for a customer transporting a domestic pesticide from a retail outlet to a residence. The following safety precautions should be taken:

1. Pack containers so they are upright and secure.
2. Make sure containers are tightly sealed and bags are not torn or ripped.
3. Protect paper and cardboard containers from moisture.
4. Bag or box pesticide items separately from food, fertilizer, clothing or household goods.
5. Remind customers not to transport pesticides in the passenger compartment of the vehicle a spill could cause injury or contaminate the vehicle.

## **Pesticide Display Areas**

## **Excepted use/ Controlled Purchase**

## **Transportation**

## **Disposal of Damaged or Unwanted Product by Vendor**

If pesticide concentrates cannot be sold, vendors should contact the manufacturer or distributor to determine whether unopened containers can be returned.

If the pesticide cannot be returned, contact your local office of the Nova Scotia Department of the Environment to obtain instructions for disposal of unused pesticides, leaking or damaged containers, and spill clean-up materials.

## **Protective Clothing and Equipment**

Pesticides can enter the body through the skin, eyes, nose or mouth. Protective clothing and equipment is used to limit exposure to pesticides. The personal protective equipment needed for handling can be affected by the pesticide; the type of exposure; length of exposure; the toxicity and volatility of the specific pesticide; and the ability of the pesticide to be absorbed through the skin. The more toxic the product the greater the need for protection.

The “precaution” section of the pesticide label provides information about the type of personal protective equipment needed when handling the pesticide. Always follow the label directions. Additional information on protective clothing and equipment for each pesticide can be found on the MSDS. In some cases the label will not mention specific protective equipment but will indicate that protection is needed with statements such as the following:

- keep from breathing dust or fumes
- avoid skin contact
- keep out of eyes

Generally, when handling unopened pesticide containers one should wear chemical resistant unlined boots and gloves, and coveralls or a long-sleeved shirt and long pants. Additional personal protective equipment may be required when handling damaged or leaking containers or when cleaning up pesticide spills (see Chapter 9 of this manual for more information on personal protective equipment).

## **Disposal of Damaged or Unwanted Product by Vendor**

## **Protective Clothing and Equipment**

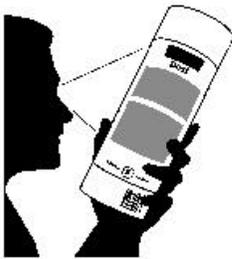
## PROMOTING SAFE PESTICIDE USE AROUND THE HOME

## Promoting Safe Pesticide Use Around The Home

Part of the role of a responsible pesticide vendor is to promote pesticide safety to their customers.

Customers should be encouraged to properly select, use, store and dispose of pesticides. Vendors should be able to draw the customer's attention to key pieces of label information. Vendors and their staff should familiarize themselves with the product inventory each year so they can answer customer questions and assist them to accurately interpret label information.

### **Pesticide Safety Tip:**



Reading the label is the first step to:

- Choosing the right product for your needs.
- Keeping you, you're children, and your pets safe.
- Saving money.
- Helping the environment.

**Vendors are strongly encouraged to advise consumers to read the label. A tear off sheet called "Read the Label" is available from Nova Scotia Environment.**

### **Assisting the Consumer with Product Selection**

### **Assisting the Consumer with Product Selection**

When a customer requests assistance in selecting a pesticide the vendor should:

- ask what the pest is and where it is;
- be able to direct customers to information that will assist in identification of the problem if the customer is not certain what the pest is;
- identify the control options that they stock for the pest problem (this may include various formulations, lower toxicity products, physical controls like traps, etc.);

- assist the customer to select the right type of product and formulation that suits their needs;
- ensure that the product label lists the name of the pest that they want to control;
- make sure the customer understands how to use the pesticide
- assist the customer to purchase the right size container for their needs;
- encourage the customer to read the label;
- make sure the customer understands the label restrictions for re-entry and pre-harvest interval.

**Pesticide Safety Tip:**

Customers should be encouraged to purchase only what they need for the season and to avoid storing pesticides. Purchasing only what is required will reduce the need to dispose of unwanted pesticides.

**Interpreting Label Information**

- Customers may ask for the vendors' assistance with interpreting specific label information, such as determining how much pesticide to buy or how to properly mix a concentrated pesticide to make up the spray mixture. The pesticide label will list the application rate for each specific type of pest, plant or site to be treated. This information can be used to assist the customer to answer these questions.

**Interpreting Label Information**

**Helping the Customer Decide How Much to Buy**

Helping a customer carefully plan a pesticide purchase can reduce the amount of pesticide stored by the customer and reduce the risk of human or environmental exposure.

The total amount of product required will be:  
 = pesticide rate X treatment area X number of treatments per year

The number of containers needed will be total amount of product divided by the size of the container.

**Helping the Customer Decide How Much to Buy**

**Example:**

A customer plans on using a granular, ready-to-use pesticide and wants to know how much product to buy. Most ready-to-use product labels state the amount of pesticide to be applied to an area of a given size. If the size of the area to be treated is known, calculating the amount of product to buy is a simple ratio calculation.

The label on the granular pesticide that the customer wants to purchase states that the product is to be applied at a rate of 2.5 kg per 100 m<sup>2</sup>. The area that the customer plans to treat is 50m<sup>2</sup>. The total amount of pesticide that the customer needs to purchase is calculated as follows:

$$\frac{? \text{ kg}}{50 \text{ m}^2} = \frac{2.5 \text{ kg}}{100 \text{ m}^2}$$

$$? \text{ kg} = \frac{2.5 \text{ kg} \times 50 \text{ m}^2}{100 \text{ m}^2}$$

$$? \text{ kg} = 1.25 \text{ kg}$$

The customer must purchase 1.25 kg of the pesticide to treat a 50m<sup>2</sup> area once.

**Customer Service Tip:**

It is a good idea to keep a calculator in the display area to aid customers and staff when calculating how much pesticide to buy.

**Understanding Important Label Statements - Pre-Harvest Interval and Re-entry Period**

**Important Label Statements**

**Re-entry Intervals**

**Re-entry Intervals**

Re-entry intervals are listed on some pesticide labels. A re-entry interval is the period of time that must pass after a pesticide application before anyone can go back in to the treated area. It is important to follow these instructions about entering treated areas following a pesticide application. If no instructions are given on the

label, then people and pets should not be allowed to enter the treated area until the pesticide is dry (usually 4-6 hours). After indoor treatments, the area should also be well ventilated to allow a complete change of air before re-entry.

### **Days to Harvest**

Some pesticides that are applied to garden fruit, vegetables or other edible plants also have a “days to harvest” period listed on the label. The days to harvest refers to the period of time that must pass after a pesticide application before the plants can be harvested and safely eaten. If the plants are harvested too soon after the pesticide application, the plant may contain an unacceptably high level of pesticide residues. The days to harvest depends on the pesticide and the type of plant. Some pesticides are safe enough to be used up until the day of harvest, others require a longer waiting period. Pesticide labels list the days to harvest for each type of food crop for which the pesticide is approved. Days to harvest are based on scientific testing done during the product registration. Pesticides should only be used for food crops stated on the product label.

**Customers should be advised to follow all re-entry and days to harvest requirements stated on the pesticide label.**

### **Promoting Pesticide Safety to Customers**

Vendors should encourage customers to use, store and dispose of pesticides safely. The following general precautions should be followed when using or handling all types of pesticides:

- never eat drink or smoke when handling pesticides,
- always wash before eating drinking or smoking,
- wash thoroughly when finished handling pesticides,
- always carefully read and follow label directions,
- wear clean protective clothing,
- wash garden clothes separate from household laundry.

The labels of domestic pesticides often do not require the use of personal protective equipment to protect against respiratory or ocular exposure. However, the wearing of additional personal protective equipment by users who exhibit sensitivity or express health concerns should not be discouraged.

### **Days to Harvest**

### **Promoting Pesticide Safety to Customers**

## Safe Storage at Home

If not stored properly, pesticides can present a hazard to children and domestic pets. The following general precautions should be used if storing pesticides at home:

- store pesticides only in locked cabinets,
- keep pesticides out of reach of children and pets,
- don't store pesticides with human or pet food,
- always keep pesticides in their original containers,
- don't store pesticides or household chemicals under the kitchen sink.

## Disposal

Vendors should be able to advise customers on the proper disposal of empty pesticide containers and unwanted pesticide products.

### Empty Pesticide Containers

Empty domestic pesticide containers can be safely disposed of in the household garbage. If the product is a liquid concentrate the container should be rinsed three times and the rinse solution should be added to the sprayer. Containers should be crushed if possible (except aerosol containers), wrapped in newspaper, and placed in the household garbage. The rinse water should be used in the spray tank. Note: "empty" pesticide containers are never really empty and should not be reused for any other purpose.

### Disposal of Unwanted Pesticide Concentrate

Good planning is the best precaution against a pesticide disposal problem. Customers should be encouraged to purchase only enough pesticide for their immediate needs, or at most a one year supply to

## Safe Storage at Home

## Disposal

### Empty Pesticide Containers

### Disposal of Unwanted Pesticide Concentrate

avoid having excess that they may need to dispose of.

Waste pesticides can be hazardous to the environment. Improper disposal of pesticides can result in pollution of groundwater or surface water, and can pose a hazard to people, pets and other animals.

Customers who have leftover or unwanted pesticides should be advised to take the material to their local household hazardous waste depot or to store the material in a safe area until it can be properly disposed of at a community Household Hazardous Waste (HHW) Collection Day or HHW Depot. There is usually no charge to drop off domestic class pesticides at these locations.

**Pesticide Safety Tip:**

The best way to dispose of unwanted pesticide is to use it. If a customer has unwanted pesticide they no longer need, vendors should suggest that they offer it to a responsible neighbour or gardening friend who can use it according to the label directions.

Customers should be advised never to dispose of unwanted pesticide in the household garbage where it could harm pets or wildlife, or by pouring it down the drain or toilet where it may harm sewer systems or home septic systems.

**Customer Service Tip:**

Larger municipalities in Nova Scotia have either a household hazardous waste depot or have at least one household hazardous waste collection day per year. Vendors should be able to provide contact customers with the contact numbers or locations for HHW drop off in the areas they serve. This information can be obtained by contacting the municipal office in your area.

## QUESTIONS FOR SELF STUDY

## Questions for Self Study

1. Should torn or damaged pesticide containers be repaired and sold to customers ?
2. Why should customers be encouraged to only purchase the amount of pesticide they need for one season ? (2 reasons)
3. What is meant by “days to harvest” ?
4. What is a re-entry interval ?
5. Name two ways in which customers can dispose of unwanted pesticide ?

## **Answers**

1. No.
2. It will reduce the need to dispose of unwanted pesticide in the future. Also, an unheated garage or garden shed may not provide suitable, winter storage conditions and may result in a ruined product following season.
3. Days to harvest refers to the period of time that must pass after a pesticide application before the plants can be harvested and safely eaten.
4. A re-entry interval is the period of time that must pass after a pesticide application before anyone can go back in to the treated area.
5. Give it to someone who can use it properly (according to label directions) or take it to their local household hazardous waste collection facility or collection day.

# 6

## Environment

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### Learning Objectives for Chapter 6:

- **Understand the dangers of pesticides in the environment.**
- **Be familiar with how pesticides can contaminate water resources.**
- **Be familiar with steps that can be taken to protect the environment if using pesticides.**

### Learning Objectives

### Introduction

Pesticides can be an effective way to control an occasional pest outbreak; however, customers should not be encouraged to rely on pesticides as a quick fix for all lawn and garden problems. Where possible, customers should be assisted to properly identify the pest problem and encouraged to select products that have the least impact on human health and the environment.

When used properly, pesticides can be an important tool for protecting human health and property. However the benefits are meaningless if contamination and damage occurs through mis-use or carelessness. When used or handled incorrectly, pesticides can harm the non-target organisms and the environment. It is the user's legal responsibility to ensure that the pesticides they use do not harm the environment. Vendors should try to make sure that customers know enough about handling pesticides correctly to avoid causing damage to their own gardens, neighboring properties, or the surrounding environment.

## CLIMATE CONDITIONS

## Climate Conditions

When applying pesticides outdoors the customer must take into account the following weather conditions:

**Wind.** Spraying outdoors should be done when there is little or no wind. Winds will blow pesticides away from the treatment area, giving poor results and risking contamination of non-target areas and damage to non-target plants.

**Rain.** Pesticides should not be applied outdoors when rain is forecast or during a rainfall. The pesticide may be diluted or washed off, giving poor results, and possibly contaminating non-target areas.

**Temperature.** Pesticides should be applied when temperatures are moderate. High temperatures (above 30°C) can result in excessive release of pesticide vapours and increase the risk of plant injury. Low temperatures (below 10°C) may prevent the pesticide from working as it should.

**Humidity.** High humidity, especially in combination with high temperatures can cause pesticides to move away from the treatment area.

## PREVENTING ENVIRONMENTAL DAMAGE

## Preventing Environmental Damage

Customers using pesticides can reduce the risk of environmental damage in the following ways:

- 1. Identify the pest.** Ensure the pest has been correctly identified so that the correct type of product can be chosen. Also ensure that the pest is at a stage that can be controlled with the pesticide. For example, certain types of herbicides are only effective if applied while weeds are actively growing and will not work on mature plants. Some insecticides are not effective against all stages of certain insects. For example, an insecticide may control the juvenile form but not the adult.
- 2. Use pesticides properly.** Follow all label directions, including any specific environmental restrictions or listed

**Identify the pest**

**Use pesticides properly**

Precautions.

- 3. Minimize spray drift.** Spray drift is the airborne movement of spray droplets or dust particles away from the treatment site during application. Spray drift is most likely to occur under excessively windy conditions. Drifting pesticides may settle onto gardens, lawns and neighboring properties where they can damage nearby landscape plants or harm beneficial insects and pollinators. For example, even a tiny amount of an herbicide can injure or kill nearby garden plants.

To prevent or minimize drift damage:

- use a coarse spray of large water droplets rather than a fine spray,
- where ever possible, use spot treatments to target areas instead of broadcast applications,
- apply the pesticide close to the target,
- apply the pesticide when there is little or no wind, and
- when applying herbicides leave an untreated buffer area around vegetable gardens and ornamental beds.

- 4. Minimize vapor drift.** Pesticide vapors are created when a solid or liquid pesticide evaporates into a vapor (gas). High temperature alone and/or high humidity can increase the potential for vapor drift. Vapors from some pesticides can be hazardous, especially if applied indoors. Like spray drift, pesticide vapors can also move in the air and settle on non-target areas and plants. Minimize vapor drift by applying pesticides when air temperatures are below 27°C.

- 5. Prevent water contamination.** Pesticides can be particularly damaging if applied too close to sensitive areas, such as wells, or surface waters, such as ponds, streams, or lakes. To avoid contaminating these areas, anyone applying pesticides should leave an untreated border or buffer zone between the treatment area and the sensitive areas. This zone must be wide enough to ensure that any over-spray or pesticide drift does not reach the sensitive areas.

**Minimize spray drift**

**Minimize vapor drift**

**Prevent water contamination**

**6. Prevent run-off.** During heavy rains or excessive watering (applying more water than the lawn or garden can soak up) water flows across the yard, lawn and garden picking up soil, fertilizer, pesticides, yard wastes and other potential pollutants. It then drains into storm drains and ditches. From there it flows untreated into streams, lakes, rivers, coastal areas and other bodies of water where it can degrade water quality and harm fish or other aquatic organisms. Pesticide losses in run-off are most likely to occur when a heavy rainfall or irrigation occurs shortly after a pesticide application. Pesticide run-off from residential areas can be a factor in the pollution of surface water such as lakes, ponds and streams. Pesticide residues in surface water can harm aquatic plants and animals. Herbicide run-off into non-target areas can damage sensitive plants.

### **Prevent run-off**

To prevent pesticides from becoming a pollutant in run-off water applicators should:

- clean up all pesticide spills immediately,
- do not apply pesticides when heavy rains are forecast,
- follow label directions for watering the lawn or garden after pesticide application, and
- If watering when the soil is very dry, apply water in stages and allow it to soak in.

**7. Prevent animal poisoning.** Many pesticides, particularly insecticides, rodenticides, and slug baits, are highly toxic to domestic pets and wildlife. As a rule, pesticides that are poisonous to humans (those with the skull and cross bones on the label) are also toxic to wildlife such as birds, racoons, and squirrels. When using pesticides, keep pets and wildlife out of treated areas and ensure that rodenticides and slug baits are not placed where they are accessible to pets or wild animals.

### **Prevent animal poisoning**

**8. Protect fish.** Some pesticides are highly toxic to fish and other aquatic life. Follow all label warnings regarding use

### **Protect fish**

Around water.

**Protect beneficial organisms**

9. **Protect beneficial organisms.** Beneficial organisms (e.g., predatory insects, beneficial bacteria, and fungi) help to control many pests in the garden so it is important to protect them in order to prevent serious pest problems. Avoid killing beneficial organisms by limiting pesticide applications to only those plants or areas that require treatment. Most insecticides are toxic to bees and predatory insects, such as lady beetles, lacewings, ground beetles, and parasitic wasps. To protect beneficial insects, use insecticides that are the most selective (e.g., they only affect certain groups of insects). For example, products containing *Bacillus thuringiensis* only affect caterpillars, but not other insects. Where possible, use short-lived insecticides such as those containing soaps and pyrethrins. To protect honeybees, avoid applying insecticides near fruit trees or other plants when they are in bloom.
10. **Protect desirable plants.** Always follow label directions. Some pesticides will damage plants if not properly mixed or if used incorrectly.

**Protect desirable plants**

## **PESTICIDE BREAKDOWN IN THE ENVIRONMENT**

**Pesticide breakdown in the environment**

Three main processes affect the breakdown of pesticides following an application. These are:

1. **Microbial breakdown** is the breakdown of pesticides by microbes into simple compounds.
2. **Chemical breakdown** is the breakdown of pesticides by chemical reactions. Some pesticides start to degrade when they react with water.
3. **Photodegradation** is the breakdown of pesticides by sunlight. Pesticides breakdown at different rates when exposed to sunlight.

Various pesticides are affected differently by each process. If a customer wants more information the vendor should refer them to

The product supplier or manufacturer.

### **Adsorption and Leaching**

Adsorption is the binding of chemicals to soil particles. Soils high in organic matter or clay are the most adsorptive, while sandy soils are less adsorptive. Leaching is the movement of pesticides with water down through the soil. Leaching can contaminate ground water (e.g., subsurface water such as wells). Most soil bound pesticides are less likely to leach and less likely to be broken down by microbes.

### **Adsorption and leaching**

### **QUESTIONS FOR SELF STUDY**

1. What weather conditions must be taken into account by customers when planning a pesticide application?
2. Why is it important to identify the pest?
3. Name two ways in which spray drift damage can be minimized?
4. Why is it important to take steps to prevent run-off?
5. How can honey bees be protected when using pesticides?

## **Answers**

1. Wind, rain, temperature, and humidity.
2. Identifying the pest enables the customer to select the correct type of pesticide.
3. Use a coarse spray. Apply pesticides when there is little or no wind.
4. Pesticide run-off can be a factor in the pollution of surface waters such as lakes, ponds, and streams.
5. by avoiding applications of insecticides near fruit trees or other plants when they are in bloom.

# 7

## Pest Management

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### Learning Objectives for Chapter 7:

- **Learn what is meant by integrated pest management (IPM).**
- **Understand how IPM is applied to the home garden.**
- **Recognize the main types of pests by identifying physical characteristics and damage they inflict.**
- **Understand how different types of pests reproduce and develop.**

### Learning Objectives

### Introduction

The goal of any pest management program is to manage pests effectively, economically and safely. This usually involves suppression of pest numbers to acceptable levels where they will not damage garden plants, or buildings, or enter homes. It does not usually involve eradication, which is the total elimination of a pest population.

**Integrated Pest Management (IPM)** is based on the principal that a combination of pest control strategies is more effective than the reliance on a single pest control strategy such as using pesticides. Many different strategies are used in an IPM approach, including pest prevention and physical, biological, and/or chemical controls. IPM can reduce the quantity of pesticides entering the environment and can save money. Vendors who understand the concept of IPM and how it can be applied to the home lawn or garden will be able to provide effective pest management information to their customers.

## **DEFINING INTEGRATED PEST MANAGEMENT (IPM)**

## **Defining Integrated Pest Management**

Integrated pest management is a decision making process for preventing pest problems and for determining what actions to take when pest problems occur. In an IPM program all available information and treatment methods are considered in order to manage pests effectively, economically and in an environmentally friendly manner.

The elements of integrated pest management are:

- planning and managing the crop or ecosystem to prevent pest problems;
- identifying the pest and beneficial species;
- regularly inspecting/monitoring pest and beneficial species populations, pest damage and environmental conditions;
- using action thresholds to determine when to treat pests;
- using a combination of methods (cultural, biological, Physical, mechanical, behavioral, or chemical) to achieve acceptable pest control with minimal impact on the environment; and
- evaluating the effectiveness of pest management strategies.

## **IPM IN NOVA SCOTIA**

## **IPM In Nova Scotia**

In Nova Scotia today, IPM programs are being used in the production of many agricultural crops, such as apples, strawberries, cranberries, potatoes, greenhouse vegetables and in processing vegetables such as carrots, peas, and beans. IPM is also used in the structural pest control industry to control pests such as rodents, fleas and bed bugs. Throughout the world there are examples of IPM programs for almost any pest management situation one can imagine from pests in food, fibre, and stored products; to pests in schools; and even to pests in museum collections. Many home gardeners also practice IPM with the help of publications that are available through Nova Scotia Department of the Environment and local garden centers.

## WHY PRACTICE IPM?

You may wonder about the significance of IPM when chemical pesticides so often succeed at controlling pests. There are actually a number of reasons for this approach:

**IPM helps keep a balanced ecosystem.** Every ecosystem, made up of living things and their non-living environment, has a balance; the actions of one creature in the ecosystem usually affect other, different organisms. The introduction of chemicals into the ecosystem can change this balance, destroying certain species and allowing other species (sometimes pests themselves) to dominate. Beneficial insects, such as the ladybird beetle and lacewing larvae, both of which consume pests, can be killed by pesticides, thereby leaving few natural mechanisms of pest control.

**IPM saves money.** IPM can save money by avoiding unnecessary pesticide applications.

**IPM helps promote a healthy environment.** Careful and limited use of pesticides means less risk to surface water and groundwater, and fewer hazards to wildlife and humans.

## BACKYARD IPM

Commercial IPM programs, for example in agriculture or forestry, can be quite complex and usually require a great deal of effort than a home owner would be willing to put into pest management. But, consumers can apply the same pest management principles of IPM to manage pests around their own homes and gardens by following these four simple steps:

1. **First, prevent pest damage.** Ideally, good pest management starts with prevention. However, most

## Why Practice IPM?

## Backyard IPM

customers entering the pesticide area of the retail outlet will already have a pest problem they want to control. Once an appropriate control is identified, they should be encouraged to take preventive steps to keep the problem from re-occurring. Depending on the pest this could include anything from applying fertilizer, to using weed suppressing fabric or mulches, to caulking around door jams and windows.

## **Prevent pest damage**

- 2. Regularly inspect.** Customers should be encouraged to regularly check the lawn, yard and garden to see if weeds, insects or plant diseases are building up. This is sometimes called “monitoring” in pest management publications.

## **Regularly inspect**

- 3. Determine if there is a problem.** Urban gardens can harbor a wide variety of insects, sometimes in very high numbers, but only a few species are capable of causing significant damage to garden plants. As well, plant problems frequently result from poor growing conditions. This may be confused with pest damage. Correctly identifying the problem enables the consumer to manage the real source of the problem and avoid merely treating the symptoms (or controlling non-pests). Information from government publications or garden books by local authors can help the customer identify the cause of garden problems.

## **Determine if there is a problem**

- 4. Take action.** If there is a pest problem select the appropriate type of control(s) and take action. Many consumers think pesticides are the only answer to a pest problem around the home. Although pesticides may be part of the answer they can rarely be used alone to cure a pest problem. Most garden retailers stock a variety of pest control tools. Pesticides are just one of those tools. For example, taking action against a pest problem may involve one or more of the following; physical controls like mouse traps, tree guards, weed suppressing mulches, weed- barrier fabric, biological controls (like Bt. insecticides), or chemical controls like pesticides.

## **Take action**

## **SOURCES OF INFORMATION FOR IDENTIFYING PESTS**

## **Sources of Information for Identifying Pests**

Many kinds of pests can be found in buildings, lawns, yards, garden plants, and even on pets. In order to provide good customer service the vendor should be familiar with the common pests found in Nova Scotia, and/or are able to direct their customers to accurate sources for this type of information. Information on the identification and biology of a number of pests commonly found in Nova Scotia can be found on the Nova Scotia Environment web site.

## **AN OVERVIEW OF PEST BIOLOGY**

## **An Overview of Pest Biology**

Some general knowledge of pest biology can be useful to vendors when interpreting the information presented on pesticide labels. The following is an overview of the biology of the main groups of pests found in urban areas.

Pests can be placed into four main categories:

- insects and their relatives,
- plant diseases,
- weeds, and
- vertebrates.

### **Insects**

### **Insects**

Insects outnumber all other living animals on earth. They are found everywhere; in snow, water, air, soil, hot springs, and in or on

plants and animals. Insects are an extremely important part of the earth's ecosystem; we could not survive without them. In fact, only about 1 percent of all of the insects on earth are pests. The other 99 percent are beneficial insects or insects that do not directly affect humans or their activities. Beneficial insects include predators and parasites that feed on pest insects and weeds. Examples of beneficial insects are ladybird beetles (lady bugs) and pollinating insects such as honeybees and bumblebees. Also included in the 99 percent are insects such as decomposers that help break down organic material into nutrients for other living things and insects that do not directly affect us at all (e.g., they are food for other animals including birds, fish, mammals, reptiles).

### **Identifying Insects**

All adult insects have two characteristics in common; they have three pairs of jointed legs and they have three body regions - the head, thorax and abdomen. The shape of these body regions along with other distinguishing characteristics like the shape of antennae or the wings, are used to identify insects.

The mouthparts of various groups of insects are also quite different and are often used when identifying insects. The type of mouthpart an insect has determines how the insect feeds and what sort of damage it is capable of. Some of the more common types are:

Chewing mouthparts are "toothed" jaws that bite and tear the food. They are found in beetles, cockroaches, ants, caterpillars, and grasshoppers.

Piercing-sucking mouthparts are usually long slender tubes that are forced into plant or animal tissue to suck out fluids or blood. They are found in mosquitoes, aphids.

Sponging mouthparts tongue-like structure that has a spongy tip that sucks up liquids or food that can be made liquid by the insect's saliva. They are found in house flies, blow flies.

### **Insect Development**

In most insects, reproduction results from the males fertilizing females. The females then lay the eggs. There are a few insects that give birth to live young, without the egg stage.

### **Identifying Insects**

#### **Chewing Mouthparts**

#### **Piercing-sucking Mouthparts**

#### **Sponging Mouthparts**

### **Insect Development**

Eggs come in several shapes (round, oval, flat, and elongate) and sizes. They may be laid one at a time or in groups. Sometimes the eggs or egg masses are distinctive enough that they can be used by gardeners to help indicate that a problem may be developing. For example, one way to avoid problems with Eastern tent caterpillar is to look for and remove the egg masses in the early spring.

Most insects go through a series of changes as they develop from the egg to adulthood. During this process, called metamorphosis, the insect grows larger and its appearance may change. The immature form may look similar to the adult, as in the case of chinch bugs, or look very different from the adult and feed in a different way. For many pest insects it is the immature form that does the damage to garden plants. For example caterpillars, the immature form of moths and butterflies, or lawn grubs, the immature form of the June beetle, can be very damaging.

### **Insect-like Pests**

Spiders, ticks, mites, sow bugs, pill bugs, millipedes, and centipedes resemble insects in habit, appearance, life cycle, and size. Although they are not insects, they are often mistaken for them.

### **Centipedes and Millipedes**

Centipedes are flattened, long, worm-like animals, with each body segment having one pair of legs. They have chewing mouthparts and some can give painful bites to humans. Centipedes are found in protected places under tree bark or in rotting logs. These centipedes are very fast and predatory, capturing and feeding on insects, spiders, and other small animals.

Millipedes have a cylindrical shape, like an earthworm, and have many legs, two pairs on each body segment. The mouth parts are adapted to feeding on decaying organic material. They are found in decaying leaf litter, rotting logs, and near damp debris.

### **Crustaceans**

This class of animals (lobsters, shrimp) are nearly all aquatic (living in water) but there are members living on land that may become pests and are often thought to be insects. Sowbugs (often called pillbugs) are black, gray or brown and are capable of rolling

### **Insect-like Pests**

### **Centipedes and Millipedes**

### **Crustaceans**

up into a ball. Sowbugs are found in damp decaying wood or under objects such as stones, boards, or blocks. They are also commonly found living in damp basements or garages where people do not want them.

## **Plant Diseases**

## **Plant Diseases**

A plant disease is any harmful condition that alters a plant's growth, appearance, or function. Diseases may be caused by stress or poor growing conditions (e.g., not enough light, water or nutrients) or by biological agents called plant pathogens. Diseases caused by poor growing conditions can look very similar to diseases caused by plant pathogens. It is important for gardeners to distinguish between the two as pesticide applications will not control diseases caused by poor growing conditions. Plant diseases are often identified in the home garden by carefully comparing the symptoms to pictures and descriptions from gardening books or government publications.

Plant pathogens that can cause disease in the home garden include bacteria, fungi, viruses and nematodes. They are spread to plants by wind, rain and insects and can be carried by contaminated equipment and tools (e.g., during pruning). In order for a disease to develop the temperature and moisture or humidity must be favorable for the growth of the pathogen.

**Fungi.** Most plant diseases in the home garden are caused by fungi. Fungi cannot make their own food and must obtain it by breaking down organic matter. Some fungi are break down organic matter in the soil while others obtain nutrients by breaking down living plant tissue. Fungi reproduce chiefly by spores (microscopic seed-like structures). Fungi need water or high humidity to grow. Fungi (spores or mycelium) can be spread from diseased to healthy plants by wind, water, soil, machinery, humans and animals. Powdery mildew and potato blight and tomato blight are common examples of fungal diseases.

## **Fungi**

**Bacteria.** Bacteria are microscopic, single-celled organisms that can affect any part of a plant, either above or below the soil surface. Bacteria numbers multiply quickly under warm, humid weather. Several common leaf spot and rot diseases are caused by bacteria.

## **Bacteria**

**Viruses.** Viruses are smaller than bacteria and can only reproduce in living cells. They cause a variety of diseases and symptoms that usually reduce yields, create distorted growths, or affect flowers instead of killing the host outright. Practically all plants can be infected by one or more viruses. They enter healthy plants through wounds; or can be transmitted by insects (e.g., aphids) when they are feeding. Viruses can also be carried in the seed or in cuttings from a virus-infected plant. Perennial weeds often serve as a reservoir for the virus.

## Viruses

## Weeds

## Weeds

Any plant that is growing where it is not wanted can be considered a weed. Weeds can harm desirable plants by inhibiting their growth, competing for water, nutrients, light, and space; and by harboring plant damaging insects, mites, or plant pathogens like fungi, bacteria, and viruses. Weeds can cause skin irritation (e.g., poison ivy), hay fever (ragweed), or harbor pests such as rodents and ticks. Like garden plants, weeds can be divided into annual, biennial and perennial plants.

**Annuals.** Annuals are plants that grow from seed, mature, and then produce seed for the next generation in one year or less. This group has many grass-like (crabgrass) and broadleaved (pigweed) members.

## Annuals

**Biennials.** These plants have a two-year life cycle. During the first year, they grow from seed and develop a heavy root and compact cluster of leaves called a rosette. During the second year they mature, produce seed, and die. Examples include the bull thistle and burdock.

## Biennials

**Perennials.** When plants live more than two years, they are called perennials. Perennials may mature and reproduce in the first year, but they will repeat the cycle for several years or maybe indefinitely. Some perennial plants die back each winter. Others, such as shrubs or trees, may lose their leaves but do not die back. Most perennials grow from seed and many produce tubers, bulbs, rhizomes (below ground rootlike stems), or stolons (above ground stems that produce roots).

## Perennials

## Identifying Weeds

Weeds are usually identified by examining the following characteristics: leaf shape, leaf size, arrangement of leaves on the plant, flower size, flower shape, flower color, and by stem characteristics such as height, woodiness, and shape. It is important to note that immature weeds (when they first germinate) may not look like the mature weed.

## Major Classes of Weeds

**Grasses.** Leaves of grasses are narrow, stand upright, and have parallel veins. When the seedlings sprout, they have only one leaf. Grasses grow from a protected point (growing point) located below the soil surface and most have a fibrous root system. As a result they can be mowed without killing the plant. Grasses include both annual and perennial species.

**Broadleaf Weeds.** Seedlings of broadleaves have two leaves that emerge from the seed. The veins of their leaves are netlike. Broadleaves usually have a taproot and their root system is relatively coarse. All broadleaf plants have exposed growing points that are at the end of each stem and in each leaf axil. Perennial broadleaf plants may also have growing points on roots and stems above and below the surface of the soil. Broadleaf weeds include species with annual, biennial and perennial life cycles.

## Vertebrate Pests

Vertebrates can become pests in certain situations. Sometimes birds, rodents, racoons, or deer may damage crops of ornamentals. As well, rodents may occasionally enter dwellings in search of food or a place to live. Vertebrate pests have a complex biology and habits. Their long-term management can only be achieved with the use of preventive practices (e.g., sanitation, preventing access) along with physical or chemical controls.

## Identifying Weeds

## Major Classes of Weeds

### Grasses

### Broadleaf Weeds

## Vertebrate Pests

## Questions for Self Study

## **QUESTIONS FOR SELF STUDY**

1. What is integrated pest management (IPM)?
2. How can customers practice simple IPM techniques at home?
3. Do immature insects always look similar to the mature insects (adults) of the same species?
4. What are the two major classes of weeds?
5. How can a customer identify a plant disease in a home garden?

## Answers

1. Integrated pest management is a decision making process for preventing pest problems and for determining what actions to take when pest problems occur.
2. Take steps to prevent pest damage. Regularly check their yard and garden to see if pest problems are developing. Determine when (if) to treat problems. Select the appropriate treatment(s).
3. No.
4. Grasses and broad leaf weeds.
5. By carefully comparing symptoms to pictures and descriptions from gardening books or government publications.

# 8

## Application Technology

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### Learning Objectives for Chapter 8:

- **Learn the names and uses of the various types of application equipment.**
- **Learn how to select the best application equipment for the job.**
- **Understand the basic principles of operation for each type of equipment.**
- **Know the advantages and disadvantages of each type of application equipment.**

### Learning Objectives

Pesticide application equipment varies from the simple paint brush or bulb duster to the hand-pumped, pressurized garden sprayer. Application equipment should deposit the pesticide uniformly on the treatment area and not contaminate non-target areas. This requires that the right type of application equipment be selected for the job, the type of area to be treated and the type of pesticide formulation being used. Some types of equipment, such as small garden sprayers, also have to be accurately calibrated and properly maintained to ensure that they consistently apply the correct amount of pesticide.

Most pesticides come in a number of formulations, including ready-to-use mixtures packaged in containers that serve as the application equipment. If a customer does not have, or is not comfortable using, a particular type of application equipment then selecting another formulation or pesticide may be a good solution. This chapter gives an overview of the types of pesticide application equipment commonly available to home gardeners.

### Introduction

## READY-TO -USE PESTICIDES

## Ready-to-use Pesticides

Ready-to-use pesticides are pre-mixed and ready to use directly from the container. No further calibration or dilution of pesticide is required. These products come in a variety of formulations, such as baits, liquids, granules, or dusts and are packaged in applicator containers such as ant traps, pressurized aerosol cans, trigger sprayers, or dust applicators .

Customers should be encouraged to purchase ready-to-use pesticides whenever possible. Many customers have small yards and gardens and only require a small amount of a pesticide to treat a pest problem. By encouraging them to purchase ready-to-use products, vendors can help customers to avoid the risk of mixing the pesticide and storing any leftover pesticide concentrate.

### **Pesticide Safety Tip:**

Ready-to-use products may be the best choice when customers:



- have a pest problem that is likely to occur infrequently or that involves only a small area of their home or garden,
- are not familiar with the use or handling of concentrated pesticides,
- are unsure of how to calculate and mix the concentrated pesticide to get the proper application concentration,
- do not have the right type of application equipment, or
- do not have a safe storage area for concentrated pesticides

## **PESTICIDE APPLICATION EQUIPMENT**

## **Pesticide Application Equipment**

### **Trigger Pump Sprayers**

### **Trigger Pump Sprayers**

These are small, hand-held containers that usually contain less than 4L of a ready-to-use pesticide. The pesticide is applied by pumping a small lever with the index finger while directing the nozzle at the area to be treated. These sprayers are used to treat small areas. Products for use outdoors and indoors are packaged in this type of applicator.

### **Aerosol Cans**

### **Aerosol Cans**

Aerosol cans are the most convenient and often the most expensive way to purchase pesticides. Aerosols pressure cans contain pesticides that are driven through a fine opening by a carrier gas under pressure when the nozzle is triggered. These hand held containers generally hold less than 1 L of a ready to use pesticide. They are useful for treating small areas both indoors and outdoors. Many personal insect repellants are also packaged in this type of applicator.

### **Dust Applicators**

### **Dust Applicators**

Dust applicators are used to apply fine particles of pesticide dusts onto the surface to be treated. Often the package containing the pesticide dust is also the dust applicator. Examples of this include pesticides that are sold in plastic squeeze bottles or shaker cans. Dusters are most often used for the treatment of individual plants or small groups of plants, or to treat small areas. Specialized applicators such as bulb dusters are also available for products that do not come packaged in applicator containers.

## Bait Stations

## Bait Stations

Health Canada is informing consumers, retailers and pest control operators of new measures to reduce the risks associated with the use of certain rodent control pesticides, also known as rodenticides.

The new measures are aimed at reducing the exposure of children, pets and non-target animals to rodenticides.

### **Pesticide Safety Tip:**

- Rodenticides used by individual consumers or professional pest control operators in areas accessible to children and pets will have to be placed in a tamper-proof bait station.
- Rodenticides sold to individual consumers will have to be packaged together with a pre-baited, ready-to-use bait station.

## Granule Spreaders

## Granule Spreaders

Granular application equipment is designed to be used outdoors to apply coarse, dry particles that are uniform in size, to soil, and in some cases foliage. There are two main types of spreaders used by home gardeners; rotary spreaders (which fling granules from a spinning disc located under the hopper) and drop spreaders (which drop the granules straight down from slits in the bottom of the hopper). Both of these types of applicators may be used for the application of granular fertilizers or granular pesticides.

## Hose End Sprayers

## Hose End Sprayers

Hose end sprayers are designed to connect to the end of a garden hose and allow the user to apply the pesticide using the water pressure from a household water supply. A typical hose end sprayer consists of a container with a nozzle attached to the lid and a hose fitting for attaching the sprayer to a garden hose. The container is

filled with a liquid pesticide concentrate and attached to the end of the hose. When the hose is turned on the water mixes with the pesticide concentrate to produce a diluted pesticide spray. These sprayers are used for treating large outdoor areas such as lawns and ornamental plantings. The main disadvantage of this system is that any changes in water pressure or clogging of the nozzle can affect the dilution rate of the pesticide. This can make it difficult to consistently apply the correct rate of pesticide to the area being treated. Hose end sprayers that are designed for applying fertilizer are not suitable for applying pesticides. If using a product that is to be applied with a hose end sprayer, customers should be advised to purchase a hose end sprayer specifically designed for pesticide application. and to ensure the hose end applicator is equipped with an anti-siphoning device (it is usually marked on the packaging).

### **Hand Operated Sprayers**

Hand operated sprayers are most commonly used to control pest problems in larger gardens or fruit trees. Hand sprayers use compressed air, or less frequently carbon dioxide, to force the spray liquid through a nozzle. These sprayers may be available for use with single or multiple nozzle systems. The capacity of hand sprayers generally ranges from two to ten litres. The sprayer selected depends on the size of the area to be treated, the pest being treated and the recommended method of pesticide application.

### **Hand Operated Sprayers**

#### **Customer Service Tip:**

When assisting a customer to select a pesticide, vendors should ensure that the customer understands the label directions regarding application and has the necessary measuring and application equipment. Depending on the product, this may include a measuring device(s), rubber gloves, and the appropriate type of sprayer or applicator.

## PESTICIDE CONCENTRATES

## Pesticide Concentrates

Many types of pesticides are sold as concentrates. These products must be diluted with water and properly mixed before they are applied. The pesticide label provides the recommended mixing instructions. It is essential that customers follow the dilution rates listed on the label and measure carefully to ensure their application has the desired effect.

### **Pesticide Safety Tip:**

Customers may be tempted to apply more pesticide or mix up a stronger solution for a “really serious problem”. If a customer suggests this approach it is important to advise them that this will not give better or faster control and may result in plant damage or unacceptable high residue levels in the case of edible garden plants.

### **Measuring Pesticide Concentrate**

### **Measuring Pesticide Concentrate**

Pesticides should be measured and mixed outdoors. An inexpensive set of kitchen type measuring tools is useful for measuring pesticide concentrates. These tools should be reserved for use in the garden only and not returned to the kitchen where they may accidentally be used for food preparation.

It is useful to remember the following conversion factors. This information is often listed on the label of pesticide concentrates.

1 teaspoon = 5 ml

1 table spoon = 15 ml

### **Mixing Pesticide Concentrates Correctly**

### **Mixing Pesticide Concentrates Correctly**

Concentrated pesticides must be evenly mixed with water in the correct proportion before application. Poor pest control or plant damage may result if the pesticide is not completely mixed with the water or is allowed to settle in the spray tank.

To ensure the pesticide is properly mixed with the water:

- add half of the required water to the sprayer,
- measure the correct amount of pesticide concentrate and add it to the sprayer,
- top up the sprayer with the remaining amount of water, and
- close the tank and shake well to completely mix the pesticide and water.

## **CALIBRATING HAND OPERATED SPRAYERS**

## **Calibrating Hand Operated Sprayers**

The label on most pesticide concentrates for use in the home garden gives the application rate in the form of a dilution ratio . For example, mix 10ml per litre of water. Spray to thoroughly cover all foliage. However, some labels give the application rate as an amount per unit area (e.g., apply 250 ml per 100m<sup>2</sup> ). To determine how much pesticide to put in the sprayer to cover a given area of lawn the customer first needs to know how much area their sprayer will cover. This is called sprayer calibration.

Calibration is a procedure for checking and adjusting the delivery rate of application equipment. Properly calibrated equipment will deliver the correct amount of the pesticide to the treatment area in a uniform distribution.

### **Pesticide Safety Tip:**

Under applying a pesticide - whether through incorrect measuring, poor mixing or poor application can result in poor control of the pest problem making re-treatment necessary. Repeatedly using less pesticide than the label recommends can lead to a build-up of pesticide resistance in the pest population.

The easiest way to calibrate a small, hand-operated sprayer is to do the following:

- fill the tank with a known volume of plain water,
- walking at a uniform speed, spray out the water to uniformly cover the area, and
- measure the area covered.

For example, if the area covered was 20m x 6m then the sprayer covers 120 m<sup>2</sup> .

The customer can then use a simple ratio calculation to determine how much pesticide to put in the sprayer. Using the above example of a product with an application rate of 250 ml per 100m<sup>2</sup>:

$$\frac{? \text{ ml}}{120\text{m}^2} = \frac{250 \text{ ml}}{100\text{m}^2}$$

$$? \text{ ml} = \frac{250\text{ml} \times 120\text{m}^2}{100 \text{ m}^2}$$

$$? \text{ ml} = 300\text{ml per tank}$$

Some concentrated products give the application rate in ml per litre and indicate the size of the area to be covered (i.e., give the dilution rate and application rate in one statement). A calculation for this type of label recommendation is shown below.

A customer plans on using a liquid pesticide with the following directions for application “ apply 6ml per litre per 5 m<sup>2</sup> “ and he would like to know how to use it to treat his 20 m<sup>2</sup> lawn.

Step 1: Determine how much spray is needed to treat the entire area.

$$\frac{? \text{ L}}{20\text{m}^2} = \frac{1\text{L}}{5 \text{ m}^2}$$

$$? \text{ L} = \frac{1\text{L} \times 20\text{m}^2}{5 \text{ m}^2}$$

$$? \text{ L} = 4\text{L}$$

The home owner needs 4L of water to treat the area.

Step 2: Determine how much pesticide is needed to treat the entire area.

$$\frac{? \text{ ml}}{4\text{L}} = \frac{6\text{ml}}{1\text{L}}$$

$$? \text{ ml} = \frac{6\text{ml} \times 4\text{L}}{1\text{L}}$$

$$? \text{ ml} = 24\text{ml}$$

The home owner needs 24 ml of product to treat the 20m<sup>2</sup> area.

**Note: The sprayer must be calibrated to deliver as close to 1L of water per 5m<sup>2</sup> as possible.**

The delivery rate of hand operated garden sprayers can easily be mediated by the applicator adjusting his or her walking speed. Some sprayers come with an adjustable nozzle. For others, replacement nozzles, that deliver the liquid at a faster or slower rate may also be purchased from garden specialty stores.

**Customer Service Tip:**

Many customers know the size of their lot in imperial measurements but may not know it in metric measurements. The following conversions are useful:

feet x 0.305 = meters

yards x 0.91 = meters

square feet x 0.093 =square meters

**COMMON APPLICATION TERMINOLOGY FOUND ON PESTICIDE LABELS**

**Common Application Terminology Found on Pesticide Labels**

The pesticide label will often give specific information on how to apply the pesticide. The following are examples of common label terms:

If the label states “**spray to wet surface**” or “**spray to thoroughly**

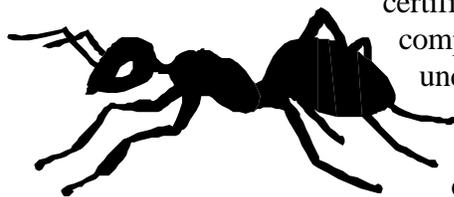
**cover”** then apply enough pesticide to just wet the area being treated but not enough to cause dripping or pooling.

If the label states **“spray to run-off”** or **“spray to drip”** then spray until the pesticide just begins to drip off the edge of the surface being treated.

If the label states **“lightly cover”** or **“apply a light dusting”** then apply the dust in a very fine layer so that a dusty effect is just barely visible. Note: Dusts should not be thick enough to obscure the surface being treated.

### **Customer Service Tip:**

In some instances, because of the nature of the problem or a limitation that the customer may have, the pesticide application may be better left to a pest control professional. In these cases, the vendor should advise the customer that it would be best for them to call a provincially certified pest control company. A listing of pest control companies can be found in the yellow pages of the phone book under “pest control”. When selecting such a company, the customer should verify that all applicators are certified by the provincial government. Each retail outlet should develop its own policy for making this type of recommendation, and discuss it with staff at the beginning of each season and/or when new staff are hired. The following are some examples of situations where professional pest control services may be required:



- a large rodent infestation in a home,
- serious structural damage from carpenter ants,
- removal of wasp nests located inside a house (e.g., an attic) or wall, or the removal of large wasp nests in the late summer (wasps are most aggressive at that time of the year), or
- when a customer is not able to read the pesticide label or understand how to use the pesticide.

## QUESTIONS FOR SELF STUDY

## Questions for Self Study

1. Name three types of applicator containers that ready-to-use pesticides are packaged in?
2. In what circumstances may ready-to-use pesticides be the best choice for the customer ?
3. Why is it important to use tamper proof bait stations when using bait products ?
4. Why is it important to follow label dilution rates when using concentrated pesticides that must be diluted with water ?
5. What is meant by calibration ?

## **Answers**

1. Trigger pump sprayers, aerosol cans, dust applicators.
2. Answers include ... Customer has a pest problem that is likely to occur infrequently or that only involves a small area of the home or garden. Customer not familiar with use or handling of concentrated pesticides. Customer does not have right type of equipment to apply concentrated pesticides.
3. To reduce the chance that children, pets or non-target wildlife will come in contact with the bait.
4. To ensure that application has the desired effect. Also mixing up stronger solutions of pesticide may result in plant damage or unacceptable high pesticide levels in edible garden plants.
5. Calibration is a procedure for checking and adjusting the delivery rate of pesticide application equipment.

# 9

## Emergency Response

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### Learning Objectives for Chapter 9:

- **Become familiar with how to safely and effectively respond to an emergency involving pesticides.**

Pesticide spills and fires involving pesticides can happen at various locations around a vendor work site, including the warehouse or storage area, stockroom, and retail sales areas. Special safety precautions are required in the event an emergency occurs in an area where pesticides are stored or displayed. Vendors must be prepared to take appropriate action during an accident or emergency to ensure the safety of all employees and customers at the vendor site. This is done by recognizing the hazard, and preparing a contingency plan(s) and ensuring staff are familiar with it.

### **PREPARING FOR EMERGENCIES - GENERAL INFORMATION**

Being prepared is the key to safe and effective emergency response. Vendors should be familiar with the information on the product label and Material Safety Data Sheets for the products they sell so that any emergency that may arise can be dealt with quickly and safely.

To prepare for emergencies, vendors should develop an emergency response folder and keep it in a location away from the pesticide display and storage areas. The folder should include a copy of all pesticide labels, MSDSs (when available), a current list of

### Learning Objectives

#### **Introduction**

#### **Preparing for Emergencies**

products and average quantities present on site and a floor plan of the building that the pesticides are stored or displayed in. On the floor plan note the location of any drains in the building, the direction of runoff from the building and the location of any wells or water supplies. The folder should also include spill and fire plans and all emergency contact numbers.

## **PESTICIDE SPILLS**

## **Pesticide Spills**

Pesticide spills jeopardize the safety of people in the surrounding area and can contaminate both surfaces in the building and the environment. Pesticide spills can occur during the receiving and unloading of shipments, when stocking shelves, or any time when containers are accidentally dropped, torn, or damaged. Vendors should take steps to minimize the risk of spills and be prepared to respond to accidents spills when they occur. In order to do this vendors should:

- know the hazards associated with the products being sold,
- have copies of MSDS (when available) for the products being sold,
- have a plan of action for responding to spills (often called a contingency plan),
- be aware of the provincial requirements for reporting spills,
- have emergency phone numbers in an accessible location,
- have adequate protective clothing and spill clean up equipment available for use, and
- train staff and ensure that they are aware of the plan and know what to do in the event of a spill.

### **Know The Hazards**

### **Know The Hazards**

The hazard presented by a spilled product depends on the pesticide involved. For example, a spill involving low-toxicity insecticidal soap would not require the same reaction as an acutely toxic dimethoate concentrate. Hazard should be evaluated by checking the label of stored pesticides for warnings and poison symbols.

## Have a Spill Response Plan

## *Spill Response Plan*

A good spill response plan provides a plan of action in the event of an emergency. The plan must cover all aspects of handling a spill. As a minimum it should include all of the sections described below. A copy of all emergency response procedures must be available at all vendor sites. Employees must know where the plan is kept, and be familiar with their role in the event of a spill. The plan must be reviewed at least annually with all employees who may handle pesticides. It should also be reviewed with each new employee when their employment commences.

The main sections of a spill response plan are:

- 1. Scope of the Plan.** Describes the general purpose of the plan.
- 2. Notification Procedures.** It is important to have all emergency phone numbers readily available. List the various agencies that may need to be contacted depending on the severity of the situation. Provincial spill reporting requirements are listed below. Identify the names and phone numbers (24 hours/day) of all appropriate company representatives who must be notified in the event of a spill.
- 3. Identification of the Person in Charge.** This person will oversee response to emergencies. The contingency plan should identify the person in charge and clearly define the scope of the authority and responsibility of this individual.
- 4. Containment and Clean-up Procedures.** List the names of pesticides, including PCP Act registration numbers, which may be stored on site or transported at any given time. Identify the maximum amount of pesticides that may be present on site. Indicate the types of equipment that is available at the site for personal protection, containment, and clean-up. (see spill kit - below). Indicate where this equipment is located. Describe any clean up procedures to be used (see example in the following section of this manual).

5. **Acceptable Disposal Procedures.** Describe how damaged pesticide containers and contaminated clean up material will be dealt with.
6. **Public Relations.** Identify and provide a contact number for the person who will respond to media/public inquiries.

**Pesticide Safety Tip:**



Being prepared is the key to safe and effective emergency response. Vendors should review the spill and/or emergency response plans with each new employee when their employment commences and at least annually with all employees who handle pesticides.

## Spill Reporting

Vendors should contact their provincial government emergency number if the spill is likely to harm the environment, injure people or damage property or affect the safety of an area.

In Nova Scotia, spills in excess of 5 L or 5 kg of concentrated pesticide, or any quantity that may cause injury or damage to the environment must immediately be reported to the Environmental Emergency Centre by calling 1-800-565-1633.

A fire or accident that has resulted in an bodily injury to an employee must be reported to the Department of Labour and Advanced Education's Occupational Health and Safety Division at 1-800-9LABOUR (1-800-952-2687) within seven days of its occurrence.

## Emergency Phone Numbers

A copy of the following emergency phone numbers should be kept by all telephones in all areas where pesticides are stored or displayed.

|  |                |
|--|----------------|
| Fire Police or Medical Emergency   | 911            |
| Environmental Emergency Number<br>(for spills/environmental emergencies) | 1-800-565-1633 |
| IWK Regional Poison Centre<br>or 911                                     | 1-800-565-8161 |

## Pesticide Spill Clean-up Kit

A well labeled pesticide spill kit should be located near pesticide storage and display areas. Pre-packaged kits can be purchased from safety supply retailers, or a kit can easily be created by the vendor. At a minimum, the kit should contain:

- 2 pairs of unlined, chemical resistant gloves,
- unlined, chemical resistant boots,
- cloth or disposable coveralls,
- a cartridge respirator suitable for pesticides,
- goggles,
- absorbent material for containing and soaking up spills  
(e.g., kitty litter, vermiculite, or absorbent chemical pads)

## Spill Reporting

## Emergency Phone Numbers

## Pesticide Spill Clean-up kit

- or sock booms),
- heavy duty detergent,
- long handled broom, dustpan, and shovel,
- heavy duty plastic bags, and
- plastic bucket or garbage pail with lid.

## **Protective Clothing and Equipment**

The following personal protective equipment may be required when handling damaged or leaking containers or when cleaning up pesticide spills:

- appropriate goggles, and
- appropriate respirator.

The maximum level of protection should be worn if you are unsure of the product involved or if there are multiple products involved.

General information on protective clothing and equipment may be obtained from:

- product pamphlets,
- safety equipment suppliers,
- applicator handbooks (e.g., the Atlantic Canada Pesticide Applicator Manual Training Series), and
- pesticide trainers,

## **Selecting Personal Protective Equipment**

Gloves. The skin is the major route for pesticides to enter the body and the hands are the most highly exposed part of the body. When handling pesticides select unlined, chemical-resistant gloves made of an impermeable material such as neoprene, nitrile or butyl rubber. Gloves made of these materials can be obtained from a safety supply vendor. Don't use gloves made of leather, cloth or canvas or gloves with a cloth lining. These materials can absorb pesticides and keep them in contact with the skin. Gloves should be long enough to cover the wrist and should be worn under the shirt sleeve to keep pesticide from running into the glove.

Boots. Select unlined, chemical-resistant boots. Boots should come above the ankle and should be worn under the pant leg.

## **Protective Clothing and Equipment**

## **Selecting Personal Protective Equipment**

Body covering. As a minimum, a long-sleeved shirt and long-legged trousers should be worn. Wear waterproof coveralls if there is a chance that pesticides are likely to substantially wet the work clothes.

Goggles. Goggles should be worn when there is a risk of exposure to eyes from pesticide splash or dust. **Prescription eyeglasses and “shop” safety glasses do not provide enough protection**, and goggles will fit over most eyeglasses. Do not use goggles with cloth or foam headbands or with ventilation holes.

Respirators. Respirators are not normally worn when handling unopened containers of pesticides. However, a respirator should be worn when cleaning up a pesticide spill in an enclosed area. A NIOSH approved respirator should always be worn when the pesticide label or MSDS states that a respirator should be worn or cautions the user to “avoid inhalation”.

The most common type of respirator used for pesticides is the half-face cartridge respirator, which covers the mouth and nose and prevents pesticide droplets, particles and vapor from being inhaled. The respirator should be equipped with cartridges that provide organic vapor protection. A dust mask should not be used in place of a respirator as they do not provide protection from pesticide vapours. A dust mask will only protect the lungs from dust particles.

Respirators come in different sizes and shapes. Only a properly fitted respirator will provide protection to the wearer. Follow the manufacturers instructions for ensuring that the respirator properly.

If no instructions are given, the following fit test may be used:

Place the palm of the hand over the exhalation valve cover and exhale gently. In a properly fitting respirator the face piece should bulge slightly and there should be no air leaks between the face and the side of the respirator. If air leakage is detected, reposition the respirator on the face and/or tighten the straps. Repeat the fit test.

## Cleanup and Maintenance of Protective Equipment

Clean protective clothing and equipment after each use. Always follow the manufacturer's instructions for cleaning personal protective equipment and clothing. **Leave gloves on while removing and cleaning protective clothing and equipment; clean gloves last.**

### To clean body covering:

- rinse off waterproof clothing before removal;
- discard heavily contaminated clothing;
- use disposable plastic garbage bags for temporary storage of pesticide-contaminated clothes prior to washing;
- follow manufacturer's instructions for care/disposal of disposable coveralls.

### To clean and maintain respirators:

- inspect regularly for damage;
- to prolong the life of charcoal cartridges/canisters remove them from the respirator and keep them in a clean air-tight container when not in use;
- after each use, wash the respirator face piece in warm water with mild detergent, then rinse well;
- follow the manufacturer's instructions for replacing pre-filters and cartridges/canisters;
- immediately replace cartridges/canisters if you get a chemical smell or taste through the respirator.

### To clean gloves:

- wash gloves before taking them off;
- wash thoroughly with detergent and rinse well;
- check gloves for leaks;
- discard leaky gloves and replace gloves on a regular basis.

### To wash pesticide contaminated clothing:

- use chemical-resistant gloves to handle clothing;
- use a pre-wash additive on contaminated areas;

## Cleanup and Maintenance of Protective Equipment

### To clean body covering

### To clean and maintain respirators

### To clean gloves

### To wash pesticide contaminated clothing

- pre-soak and **launder separately from normal laundry**;
- avoid overcrowding clothes in the washing machine;
- pre-rinse clothing using the pre-soak cycle;
- use hot water;
- use full water level;
- use normal wash cycle;
- use a heavy duty detergent, bleach, or household ammonia (do not mix these cleaners);
- repeat wash cycles may be required to remove some chemicals;
- hang clothes out to dry to prevent possible contamination of the dryer;
- run the empty washing machine through a full cycle again after use, using hot water and detergent to rinse it thoroughly.

### **Storage of Personal Protective Equipment**

Personal protective equipment should be kept in a cool dry area close to where the pesticides are stored to allow quick access in case of an emergency. Do not store personal protective equipment in the pesticides storage area or with regular clothing. Keeping waterproof clothing (e.g., gloves, boots, etc.) away from sunlight will help extend its life.

### **Staff Awareness and Training**

An emergency situation often provides an unfamiliar working environment. Staff with little training or experience will have difficulty dealing effectively with an incident. Staff training should include a pre-season review of emergency response plans or procedures, and a review of staff roles and responsibilities in the event of an incident.

### **Procedures for Handling Spills**

All spills are to be cleaned up immediately. The following steps should be taken:

1. **Isolate the area.** Keep people and animals away from the spill area.

### **Storage of Personal Protective Equipment**

### **Staff Awareness and Training**

### **Procedures for Handling Spills**

2. **Read the label and MSDS.** Product labels and MSDSs may contain information on how to respond to a spill and should be consulted first for specific precautions. The registrant's emergency phone number is also listed on the MSDS.
3. **Ventilate.** If the spill is indoors, ensure there is maximum ventilation by opening all possible windows and doors to prevent the build-up of vapours.
4. **Wear protection.** Put on personal safety equipment as required by the pesticide label and/or MSDS to keep the pesticide from contacting skin or clothing. At a minimum, wear unlined rubber or plastic gloves, a long-sleeved shirt, long pants, and shoes and socks. The label or MSDS may also recommend the use of a respirator to prevent inhalation of pesticide vapours. The maximum level of protection should be worn if unknown or multiple products are involved.
5. **Contain the leak.** Place leaking or broken containers inside a plastic container to prevent additional pesticide from spilling.
6. **Contain and clean up spilled material.**
7. **Decontaminate protective equipment.**
8. **Shower.**

### **Cleaning Up Spilled Pesticides**

Follow all emergency guidelines provided on the product label or MSDS. If specific emergency guidelines are not provided, the following general procedures should be followed:

Liquids. Liquids are to be absorbed and removed, not mopped or washed away. Mopping or washing can lead to greater contamination. Ensure spilled liquids do not enter floor drains, storm drains, water systems or waterways.

### **Cleaning Up Spilled Pesticides**

Surround the edge of the spilled liquid with a barrier of absorbent material to contain it and prevent further spreading. Once the spill is contained soak up the spilled liquid with additional absorbent material. Shovel or sweep the absorbent material into a plastic bucket lined with a heavy plastic bag.

Dusts. Moisten dust with a fine mist of water to prevent it from floating into the air during clean-up. Do not use a vacuum cleaner to collect spilled dust.

Granular Products. A granular pesticide from a spill on a dry, hard surface may still be good for use and not require disposal. This material may be collected and used, according to label directions, at the vendor site. However, it should never be re-packaged and sold to the consumer.

### **Decontaminating Spill Sites**

Decontaminate hard surfaces such as cement or tile floors by washing with a small amount of soap and water. Remove the wash solution with more absorbent material. The wet material should be placed in a plastic bag and deposited in an outdoor garbage can.

### **Disposal of Waste**

Any material that comes into contact with a pesticide, including absorbent and contaminated pallets must be disposed of by the owner in accordance with Nova Scotia Environment (NSE) instructions. Label all waste containers with the name of the pesticide and PCP Act registration number. Contact the local office of NSE for directions on disposal of any contaminated material.

### **Decontaminating Spill Sites**

### **Disposal of Waste**

## **First Aid for Pesticide Exposure**

First aid provides immediate assistance to help stabilize a person until medical attention arrives. First aid is not a substitute for medical attention. Vendors and staff working near pesticides should be familiar with first aid procedures for pesticide poisoning.

Poisoning can occur if pesticides are splashed onto the skin, or into the eyes, or swallowed or inhaled as vapour, dust, or fumes. If a person becomes ill during or after handling pesticides or cleaning up a spill they should seek medical attention immediately. Be sure to provide medical personnel with information about the product suspected of causing the poisoning or injury. A copy of the pesticide label should be sent to the medical centre with the victim. If the label is not available, write the following information on a piece of paper and send it with the victim: product name, chemical name, manufacturer name and product PCP Act registration number.

## **First Aid Kit**

Keep a first aid kit for pesticide emergencies near the area where pesticides are stored. The kit should include the following items in addition to a regular first aid kit:

- clean water for drinking or washing eyes or skin,
- soap for washing pesticides off skin,
- gloves for protecting the person administering first aid,
- cup for drinking,
- face mask/mouth guard to provide protection for the person providing mouth to mouth resuscitation,
- emergency telephone numbers,
- paper towel for cleaning,
- plastic bag or jar for collecting vomit,
- waterproof bandages to prevent pesticides from entering cuts or scrapes,
- a blanket to cover the victim,
- paper towels for clean-up

plus:

## **First Aid for Pesticide Exposure**

## **First Aid Kit**

→ Activated Charcoal to absorb pesticides in the stomach

**Activated charcoal is only to be administered upon instructions from a poison control centre or doctor, and only if the patient is alert.**

### **General First Aid Procedures for Pesticide Exposure**

Most pesticide labels provide specific first aid information that should be followed in the event of an emergency. General procedures for any pesticide poisoning are listed below:

Customers and staff could also suffer a physical injury in an accident involving pesticides (e.g., a fall or slip leading to or resulting from a spill). Internal injuries take precedence over the contamination.

1. Remove the person from the contaminated area.
2. Check if the person is conscious. If the victim is unconscious, check that he/she is breathing and give artificial respiration if necessary. Cardiopulmonary resuscitation (CPR) should only be done by trained people. Artificial respiration and/or CPR take precedence over all other first aid procedures.
3. Call immediately for medical aid. Provide as much information as possible about the pesticide by keeping the container and label handy. Provide the history of exposure and poisoning symptoms.
4. Remove any contaminated clothing. As soon as possible wash with soap and water any body areas in contact with the pesticide.
5. The victim should be kept calm, warm and reassured until medical help arrives. Continue any first aid treatment.

Specific procedures for dermal exposure, oral exposure, ocular exposure or respiratory exposure are listed below. Always treat respiratory exposure first, eye contamination second, skin contamination third and ingestion fourth.

### **General First Aid Procedures for Pesticide Exposure**

**If the victim has inhaled poisonous dust, vapors, or gases:**

- Move the victim to fresh air as quickly as possible.
- Call for medical help.
- Loosen tight clothing.
- Watch for signs of unconsciousness or convulsions. If a convulsion occurs; keep the victim's airway open by placing a padded gag between their teeth and a pillow or blanket under the head. Do not forcibly restrain the victim.
- If breathing has stopped, apply artificial respiration. Remember to use a plastic face mask with a one-way valve to protect yourself from contamination. Place a blanket beneath the victim's shoulders and tilt their head back with the chin forward to clear air passages.
- Keep the victim as quiet as possible while waiting for medical help.

**If pesticide contacts the eyes:**

- Put on gloves to avoid contamination.
- Hold the eyelids open and rinse with large amounts of clean water.
- Continue this treatment for fifteen minutes or more.

**If pesticide contacts the skin:**

- Put on gloves to avoid contamination.
- Remove the victim's contaminated clothing and footwear.
- Immediately drench the skin with water. Cold water is preferred, as hot water opens pores and increases absorption.
- Wash the affected area of the skin with soap and water. Clean under fingernails and toenails if they've been contaminated.
- Dry the skin thoroughly and keep the victim warm.
- Get medical help.

**If the skin is burned:**

- Put on gloves to avoid contamination.
- Remove contaminated clothing.

**If the victim has inhaled poisonous dust, vapors, or gases**

**If pesticide contacts the eyes**

**If pesticide contacts the skin**

**If the skin is burned**

- Wash skin with lots of cold running water.
- Cover the burned area with a clean cloth loosely applied.
- Do not apply any drugs or medications to the burned area.
  
- Get medical help.

**If pesticide has been swallowed:**

- Get medical help immediately.
- Read the label for first aid instructions
- **Do not induce vomiting unless specifically indicated on the label.**
- **DO NOT induce vomiting if:**
  - the victim is unconscious;
  - the victim is convulsing;
  - the substance swallowed is corrosive such as a strong acid or alkaline product.
  
- Symptoms of swallowing a corrosive substance include severe pain and burning sensation in the mouth and throat. Check the pesticide label for the corrosive symbol.
  
- Never give anything by mouth to an unconscious or drowsy patient
  
- To induce vomiting, give the victim water, position the person upright in a sitting or standing position and gently tickle the back of the throat. Collect some of the vomitus for the doctor.

**If pesticide has been swallowed**

**If you are working alone:**

If you are exposed to a toxic pesticide while working alone and feel any poisoning symptoms, remain calm, and try to find someone to help you. If no help is immediately available, follow the steps as described above for treating a victim of poisoning. Once you have followed the immediate treatment steps, obtain help as soon as possible. When getting medical help, take the trade name and the PCP Act registration number with you.

**If you are working alone**

## Information Required by Medical Personnel

Provide medical personnel with the following information about the pesticide poisoning:

- name of the pesticide, the name of each active ingredient, and if possible, the label and container,
- PCP Act registration number,
- type of exposure,
- length of exposure and the amount ingested (if product was ingested),
- symptoms of poisoning,
- age and weight of the victim, and
- first aid performed.

## Fires

Fires involving pesticides can be hazardous because pesticides may be flammable, explosive, and/or produce highly toxic fumes when they burn.

The toxicity and hazard of a number of pesticides burning together in the same fire are unknown. The fumes may poison fire fighters or bystanders. Also, run-off water from fighting a pesticide fire may contain pesticide residue that could contaminate the soil, sewers, streams lakes etc.

## Preventing Fires

- Do not use open flame in the storage area.
- Use stretch wrapping instead of shrink wrapping - stretch wrapping does not require heat.
- Don't smoke in the storage area.
- Secure doors to prevent unauthorized people from entering the storage area.

## Fire Safety Plan

Pesticide vendors should have a fire safety plan ready in the event that a fire occurs in an area where pesticides are stored or displayed. Staff should be aware of this plan and trained to

## Information Required by Medical Personnel

## Fires

## Preventing Fires

## Fire Safety Plan

respond properly in an emergency. Safety preparations for fires include:

1. A current list of the pesticides stored/displayed in the facility and an estimate of the quantities normally held. A copy of this inventory should be kept in an easily accessible location away from the storage area. Include copies of the MSDSs (when available) for the pesticides at the facility.
2. Ensure the fire department knows that pesticides are stored or displayed within the retail facility and the approximate quantities present.
3. Post a warning sign on all entrances to areas where large quantities of pesticides are stored.
4. Ensure the local fire department has vehicle access to areas where pesticides are stored.
5. Ensure combustible waste is not allowed to accumulate in the area where pesticides are stored or displayed.
6. Ensure the area where pesticides are stored/displayed complies with all applicable laws and regulations including the Occupational Health and Safety Act, Workplace Hazardous Materials Information System (WHMIS) Regulations, Occupational Safety General Regulations and National Fire Code.
7. Ensure emergency phone numbers are posted in a visible and accessible location.
8. Get advice from the local fire department about adequate fire equipment for the facility (e.g., sprinkler systems)
9. Install a smoke alarm or detector.
10. Have a drainage system or dikes in place so that run-off can be directed away from any nearby bodies of water.

11. One or more 4a20bc dry chemical fire extinguishers should be placed in and around the pesticide storage or display area. **NOTE: AN INDIVIDUAL WITHOUT PROTECTION SHOULD NOT FIGHT A FIRE INVOLVING PESTICIDES. USE OF AN EXTINGUISHER IS ONLY FOR CONTROLLING FIRES NEAR THE PESTICIDE DISPLAYS OR STORED MATERIALS.**

#### **In The Event of a Fire**

1. Call the nearest fire department immediately. Make it clear that pesticides are on the property.
2. Clear the area of people and animals and evacuate them upwind of the fire.
3. When fire fighters arrive on the scene, remind them that there are pesticides in the building.
4. Provide fire fighters with MSDSs and other information in your emergency response folder
5. Report all fires involving pesticides to Nova Scotia Environment.
6. Advise fire fighters to use as little water as possible.
7. Control all run-off water.
8. Call adjacent land owners.

#### **In The Event of a Fire**

A fire or accident that has resulted in bodily injury to an employee must be reported to Nova Scotia Department of Labour and Advanced Education Occupational Health and Safety Division at 1-800-9LABOUR (1-800-952-2687) within seven days of its occurrence.

### **After a Fire has Occurred**

1. Rope off the area and prevent entry of unauthorized individuals.
2. Report adverse health effects of anyone involved in the fire.
3. Dispose of any debris according to provincial regulations.
4. Evaluate runoff areas for environmental impact.
5. Determine causes of the fire and address the problem.

### **Theft**

Help prevent theft by keeping pesticides securely stored. The owner of the facility may be liable in the event of an accident. If large quantities of pesticides are stolen, advise the police and provincial regulatory authorities.

### **QUESTIONS FOR SELF STUDY**

1. What is the key to safe and effective emergency response?
2. When might a pesticide spill occur?
3. Where can you find information that will help you respond to an emergency involving a specific pesticide?
4. Should pesticide contaminated clothing be washed with the regular household laundry?
5. Why are fires involving pesticides dangerous?

### **After a Fire has Occurred**

### **Theft**

### **Questions for Self Study**

## **Answers**

1. Being prepared is the key to safe and effective emergency response. This involves developing emergency response plans and ensuring staff are familiar with them and their role in the event of an emergency.
2. Pesticide spills can occur during the receiving and unloading of shipments, when stocking shelves, or at any time when containers are accidentally dropped, torn or damaged.
3. The pesticide label and the MSDS.
4. No.
5. Because pesticides may be flammable, explosive and/or produce highly toxic fumes when they burn.

## Learning Objectives for Chapter 10:

## Learning Objectives

- **Understand the responsibility that the vendor has to the customer.**
- **Appreciate why a vendor should maintain good public relations.**
- **Know factors affecting public relations.**
- **Know how to improve public relations.**
- **Realize the importance of dealing effectively with the public.**
- **Learn how to maintain a good relationship with the public**

Vendors know that good customer service means providing what individuals need and expect on a consistent basis. Customers have a wide variety of choices in the home garden marketplace. Ensuring customer satisfaction goes right to a vendor's bottom line. According to statistics from the United States Consumer Affairs Department, it costs five times more to get a new customer than to retain an old one. Providing good service keeps customers coming back - and bringing their friends.

Home gardeners and homeowners are often confused about how to select and use pesticides. Most customers appreciate knowledgeable, well-trained staff that know their products and can answer questions. Using the information in this manual to train retail staff is one way to provide good customer service.

Some people may have difficulty understanding or interpreting label information. A vendor of domestic pesticides has a responsibility to help customers understand label information and

## Introduction

select the proper pesticide for a given pest problem. As well, a vendor may need to help the customer determine the application rate, provide instruction on how to handle the pesticide safely, or give advice on how to properly dispose of empty containers.

## **PROFESSIONALISM**

## **Professionalism**

Professionalism refers to how a vendor handles the responsibilities of their job, interacts with customers, and deals with other people, including concerned citizens and groups.

### **The Importance of Professionalism**

For a vendor of domestic pesticides, professionalism on the job will:

- enhance credibility,
- improve public trust,
- reinforce customer confidence,
- help to create an informed public,
- provide for better understanding of public concerns and misconceptions, and
- facilitate dealing with complaints or difficulties arising from pest control activities.

Factors that affect how customers and the public perceive pesticide vendors and the services they offer include vendor knowledge, attitude, work habits/activities, and communications.

## **CUSTOMER SERVICE**

## **Customer Service**

Some of the key questions that determine how the public perceives you as a vendor, your staff, and the service that is provided are:

- Are you knowledgeable about the products you sell?
- Are you able to communicate effectively with the public?
- Do you use proper terminology when talking to customers?
- Are you approachable?
- Do you conduct your work activities in a professional manner?

## **Knowledge**

## **Knowledge**

Vendors should know and understand:

- regulations that apply to pesticide vendors and their customers,
- the information on the label and how to interpret it, and
- resources (people, publications, organizations, etc.) that could provide additional information to customers.

Being knowledgeable about one's job is very important. Vendors should upgrade their knowledge by attending seminars and training sessions, reading pertinent literature, and visiting local government pest management web sites. Being familiar with common local pests and current information about the control of specific pests enables vendors to better assist their customers. Also, being aware of legislation that may affect you as a vendor, or your customers who are using and disposing of pesticides, is also helpful. Add value to your products by providing information to your customers regarding safe handling, storage and disposal of pesticides.

Continually updating pesticide and pest management knowledge helps vendors to assist customers to select the product that best suits their needs and to advise them on how to use it correctly. However, if the answer to a question is not known, say so, do not guess. If possible, suggest where a customer may find the answer to their question. (e.g., websites, publications, etc.)

## **Attitude**

## **Attitude**

Responding to the public in a positive, courteous manner will help to improve public perception of any retail outlet and the service that is provided. As professionals, vendors should be willing to spent time with their customers to assist them to select an appropriate product and explain its proper use.

Demonstrate a good attitude by:

- responding quickly and effectively to requests for information, complaints, concerns, or emergencies;
- being credible (e.g., honest, courteous, polite, and

- respectful of others) at all times;
- only selling pesticides for registered uses;
- refusing to work unsafely;
- considering bystanders/neighbors concerns regarding the outlet operation;
- being conscientious and alert; and
- staying within your area of expertise.

### **Work Habits/Activities**

Conduct your work activities professionally by:

- being environmentally safety conscious and human safety conscious and following safety practices;
- advising others to handle and apply pesticides responsibility, according to the label and the other safety guidelines;
- using clean, well-maintained equipment;
- avoiding unethical sales gimmicks; and
- setting a good example for your customers.

### **Communication**

Communicate with the public by:

- listening to the public's concerns and trying to understand and appreciate their viewpoint;
- being honest, frank, open, and cooperative;
- speaking clearly with sincerity;
- avoiding misguided statements; and
- distributing only factual information.

### **QUESTIONS FOR SELF STUDY**

It is always important to maintain a good public image as a pesticide vendor. Here are some things to consider:

1. Always be courteous. First impressions can often be long-lasting.
2. Listen to the question. Let the person know that you understand the basis for his or her concern.

### **Work Habits/Activities**

### **Communication**

### **Questions for Self Study**

3. Be prepared. Vendors should know what materials are being sold, and their basic characteristics.
4. Have an answer. Be as informed as possible about the products you sell and the common pests in the area your store serves. But, don't guess. A customer will appreciate sales staff who can say "I don't know but here's where you can find out" or better yet "I'll help you find out".
5. React quickly. Problems may come up during the busiest times, dealing with them as promptly as possible may make the difference between a simple solution or a complicated, expensive one.

### **QUESTIONS FOR SELF STUDY**

### **Questions for Self Study**

1. What type of advice should a vendor be prepared to provide to a customer ?
2. What factors influence how the public and customers perceive the vendor?
3. How should a vendor respond if they are not sure of the answer to a customer's pesticide question?

## Answers

1. A vendor of domestic pesticides should be able to help customers understand label information and select the proper pesticide for a given pest problem. As well, a vendor may need to help the customer determine the application rate, provide instruction on how to handle the pesticide safely, or give advice on how to properly dispose of empty containers.
2. Vendor knowledge, attitude, work habits/activities and communication skills.
3. The vendors should indicate that they are not sure of the answer to the question and offer to direct the customer to where they can find the answer.

**Note: The pesticide label and the information in this manual will enable vendors of domestic pesticides to answer most common customer questions.**

## APPENDIX 1

### CONTACTS FOR PESTICIDE INFORMATION

**Questions or comments about the Domestic Pesticide Safety Manual should be directed to:**

Nova Scotia Environment  
PO Box 442  
Halifax, Nova Scotia  
B3J 2P8  
Donald Burns, Pesticide Specialist  
Telephone: (902) 424-3170 or  
Fax: (902) 424-0503  
E-mail: [burnsdj@gov.ns.ca](mailto:burnsdj@gov.ns.ca)

**Questions about pesticide regulation in Canada or pesticides registered for use in Canada should be directed to:**

Health Canada  
Pest Management Information Service  
2720 Riverside  
Drive, Ottawa,  
Ontario  
A.L. 6606D2  
K1A 0K9

Telephone: 1-800-267-6315 within Canada  
Fax: (613) 736-3798  
Email [pminfoserv@hc-sc.gc.ca](mailto:pminfoserv@hc-sc.gc.ca)  
Website: <http://www.hc-sc.gc.ca/cps-spc/pest/index-eng.php>

## CONTACTS FOR OCCUPATIONAL HEALTH AND SAFETY

This manual provides an overview of some of the occupational health and safety laws in effect in Nova Scotia which are relevant to the retail sale of domestic pesticides. It is not intended to replace reading the acts and regulations or seeking advice from a lawyer or a health and safety expert. Amendments may be made to acts or regulations after the publication of this document. Refer to the most recent official version of acts and regulations.

### **For additional information about occupational health and safety contact:**

NS Department of Labour and Advanced Education  
Occupational Health and Safety Division

Safe workplaces are created by people who care. Your health and safety in the workplace is protected by Nova Scotia's *Occupational Health and Safety Act* and Regulations. We are a key part of Nova Scotia's Workplace Safety and Insurance System. Our staff promote, coordinate, administer, and enforce occupational health and safety for you.

Our Goal: *To establish and enforce clear standards to reduce occupational injury and illness.*

### **Contact us:**

General Inquiries and Reporting

Toll-free: 1-800-952-2687 (24 hours)

Halifax Metro: 902-424-5400 (Monday to Friday 8:30 a.m. - 4:30 p.m. only)

E-mail: [ohsdivision@gov.ns.ca](mailto:ohsdivision@gov.ns.ca)

### **Occupational health and safety information can also be found at the following web sites:**

Occupational Health and Safety Division

Publications

<http://www.gov.ns.ca/lae/healthandsafety/>

This site includes OH&S Act and regulations as well as reference guides to the act and regulations. Reference guides are documents that give explanations of specific sections of the Occupational Health and Safety Act and certain regulations.

FREE On-Line OH&S Act and WHMIS courses from the NS  
Community College <http://access.nsc.ca/safety/>

## **ADDITIONAL SOURCES OF INFORMATION**

### **USING THE INTERNET FOR PEST MANAGEMENT INFORMATION**

A wealth of pesticide and pest management information is available on the internet, making it an extremely valuable resource for pesticide vendors and garden center staff. You should be aware that the pest management information found on most sites has been researched and developed for specific geographic areas and climate conditions. Unless you are using a website of local origin (e.g., your own province or the Atlantic Region) these conditions may not be present in your area and the pest may behave differently or not be present at all. Specific pest identification and management information is best obtained from local sources.

### **LOCAL WEBSITES**

#### **Nova Scotia Environment**

<http://gov.ns.ca/nse/pests/>

Site includes information on preventing pest damage in home lawns, hiring a lawn care company, and pesticides safety. Non-essential legislation requirements, etc.

### **NATIONAL WEBSITE**

#### **Pest Management Regulatory Agency (PMRA) of Health Canada**

<http://www.hc-sc.gc.ca/cps-spc/pest/index-eng.php/>

This bilingual site contains regulatory information and the pest notes factsheet series and other useful information. A searchable database of registered product labels can be found in the “Applicants and Registrants” page which is linked to the main page.

The two websites listed have a great deal of information that is available to the domestic vendor and the homeowner.

## APPENDIX 2

**The attached copies of the Non-essential Pesticides Control Act and the Exceptions to Prohibitions on Non-essential Pesticides Regulations have been provided for your convenience. For further information, especially as it concerns the allowable list of pesticides and the excepted use list you should visit the Nova Scotia Environment website:**

**<http://gov.ns.ca/nse/pests/non-essential.pesticides.asp>**

# **Non-essential Pesticides Control Act**

## **An Act to Prohibit the Sale and Use of Non-essential Pesticides**

### **Short title**

1 This Act may be cited as the Non-essential Pesticides Control Act. *2010, c. 6, s. 1.*

### ***Interpretation***

2 In this Act,

(a) "inspector" means any person who is appointed as an inspector by the Minister, and includes any municipal or town police officer and any member of the Royal Canadian Mounted Police;

(b) "Minister" means the Minister of Environment;

(c) "pesticide" means a pesticide as defined in the Environment Act. *2010, c. 6, s. 2.*

### ***Act binds Provincial and federal Crown***

3 (1) This Act binds Her Majesty in right of the Province, Her Majesty's corporations, agents, administrators, servants and employees and Government agencies.

(2) This Act binds Her Majesty in right of Canada and Her Majesty's corporations, boards, commissions, agents, administrators, servants and employees.

(3) For greater certainty, the persons referred to in subsections (1) and (2) are subject to prosecution and other remedies under this Act.

(4) This Act does not apply to a person who uses, sells or supplies a pesticide for

(a) forestry activities;

(b) agricultural activities; or

(c) a golf course. *2010, c. 6, s. 3.*

### ***Prohibition on use***

4 (1) In this Section, "lawn" means a plot of grass that is maintained at a regular and approximately uniform height through periodic and regular mowing, other than as the result of agricultural activities, and includes any associated walkway.

(2) Except as prescribed by the regulations, no person shall use or cause or permit the use of a pesticide in, on or over a lawn.

(3) After April 1, 2012, except as prescribed by the regulations, no person shall use or cause or permit the use of a pesticide in, on or over an outdoor tree, shrub, flower or other ornamental plant.

(4) Subsections (2) and (3) do not apply if the pesticide used is on the list of allowable pesticides established by the Minister under Section 6. *2010, c. 6, s. 4.*

#### ***Prohibition on sale***

5 (1) Except as prescribed by the regulations, no person shall sell, supply, or offer for sale a pesticide labelled for use on lawns or labelled for use on turf.

(2) After April 1, 2012, except as prescribed by the regulations, no person shall sell, supply, or offer for sale a pesticide labelled for use on an outdoor tree, shrub, flower or other ornamental plant.

(3) Subsections (1) and (2) do not apply if the pesticide used is on the list of allowable pesticides established by the Minister under Section 6. *2010, c. 6, s. 5.*

#### ***List of allowable pesticides***

6 (1) The Minister may establish a list of allowable pesticides.

(2) The exercise by the Minister of the authority contained in subsection (1) is regulations within the meaning of the Regulations Act.

(3) The Minister shall provide public notification at least three months before removing a pesticide from the list of allowable pesticides and shall, at the same time, provide information concerning the reason for the removal. *2010, c. 6, s. 6.*

#### ***Inspector deemed peace officer***

7 An inspector, in carrying out duties pursuant to this Act, has and may exercise in any part of the Province all the powers, authorities and immunities of a peace officer as defined in the Criminal Code (Canada). *2010, c. 6, s. 7.*

#### ***Right of entry and inspection***

8 For the purpose of ensuring compliance with the Act and the regulations, an inspector, subject to Section 9, may, at any reasonable time,

- (a) enter and inspect any land or premises;
- (b) make such examinations and inquiries and conduct such tests as the inspector considers necessary or advisable;
- (c) require the production of documents and remove them temporarily for the purposes of copying;
- (d) inspect, take samples and conduct tests of samples, including tests in which a sample is destroyed;
- (e) make any reasonable inquiry of a person, either orally or in writing;
- (f) exercise such other powers as are prescribed by regulation; and
- (g) exercise such powers as are incidental to the powers set out above. *2010, c. 6, s. 8.*

#### ***Private dwelling place***

9 Notwithstanding anything contained in this Act, an inspector may not enter a private dwelling place or any part of a place that is designed to be used and is being used as a permanent or temporary private dwelling place except

- (a) with the consent of the occupant of the place; or
- (b) pursuant to an order under Section 10 to enter and inspect, or under the authority of a search warrant. *2010, c. 6, s. 9.*

#### ***Order to enter and inspect***

10 (1) Notwithstanding anything contained in this Act, where a justice is satisfied on evidence under oath by an inspector that

- (a) there are reasonable grounds to believe that it is appropriate for the administration of this Act for the inspector to do anything set out in Section 8; and
- (b) the inspector may not be able to carry out duties under this Act effectively without an order under this Section because
  - (i) no person is present to grant access to land or premises that is locked or is otherwise inaccessible,

(ii) a person has denied the inspector access to land or premises or there are reasonable grounds for believing that a person may deny the inspector access to land or premises,

(iii) a person has prevented the inspector from doing anything set out in Section 8 or denied the inspector access to any thing as a result of which the inspector is unable to do anything set out in Section 8,

(iv) there are reasonable grounds to believe that a person may prevent an inspector from doing anything set out in Section 8, or may deny the inspector access to any thing as a result of which the inspector may be unable to do anything set out in Section 8,

(v) it is unpractical, because of the remoteness of the land or premises to be inspected or because of any other reason, for the inspector to obtain an order under this Section without delay if access is denied, or

(vi) there are reasonable grounds to believe that an attempt by the inspector to do anything set out in Section 8 without the order might defeat the purpose of that Section or cause an adverse effect,

the justice may issue an order authorizing the inspector to do anything set out in Section 8 that is specified in the order for the period of time set out in the order.

(2) The period of time referred to in subsection (1) may not extend beyond thirty days after the date on which the order is made, but the order may be renewed for any reason set out in subsection (1) for one or more periods each of which is not more than thirty days.

(3) An application pursuant to subsection (2) may be made before or after the expiry of the period.

(4) An order under this Section may be issued or renewed on application without notice. *2010, c. 6, s. 10.*

### *Use of assistants*

11 An inspector, in carrying out any duties or exercising any powers under this Act, may be accompanied by one or more persons considered by the inspector to be necessary to enable the inspector to carry out those duties and exercise those powers. *2010, c. 6, s. 11.*

### *Limitation period*

12 A prosecution for an offence under this Act may not be commenced more than two years after

(a) the date on which the offence was committed; or

(b) the date on which evidence of the offence first came to the attention of an inspector or the

Minister,

whichever is later. *2010, c. 6, s. 12.*

### *Offences*

13 A person who

- (a) contravenes this Act or the regulations;
- (b) knowingly provides false or misleading information pursuant to a requirement under this Act to provide information; or
- (c) hinders or obstructs an inspector who is exercising powers or carrying out duties, or attempting to do so, pursuant to this Act,

is guilty of an offence. *2010, c. 6, s. 13.*

### *Penalty*

14 (1) Subject to subsection (2), a person who contravenes Section 4 or 5 is liable on summary conviction to a fine of not more than twenty-five hundred dollars.

(2) A person, partnership, limited partnership or corporation, authorized or entitled to carry on a trade, occupation, profession, service or venture with a view to a profit, that contravenes Section 4 or 5 is liable on summary conviction to a fine of not more than fifteen thousand dollars.

(3) Where a corporation contravenes this Act or the regulations, a director or officer of the corporation who authorized, permitted or acquiesced in the contravention is also guilty of an offence and liable on summary conviction to the penalties set out in subsection (1), whether or not the corporation has been prosecuted or convicted.

(4) Where an offence under this Act is committed or continued on more than one day, the person who committed the offence is liable to be convicted for a separate offence for each day on which the offence is committed. *2010, c. 6, s. 14.*

### *Court orders relating to penalty*

15 (1) Where a person is convicted of an offence under this Act, in addition to any other penalty that may be imposed pursuant to this Act, the court may, having regard to the nature of the offence and the circumstances surrounding its commission, make an order

- (a) prohibiting the offender from doing anything that may result in the continuation or repetition of the offence;
- (b) directing the offender to take any action the court considers appropriate to remedy or prevent

any adverse effect that results or may result from the act or omission that constituted the offence;

(c) directing the offender to publish, in the prescribed manner and at the cost of the offender, the facts relating to the conviction;

(d) directing the offender to notify any person aggrieved or affected by the conduct of the offender, of the facts relating to the conviction, in the prescribed manner and at the cost of the offender;

(e) directing the offender to post a bond or pay money into court in an amount that will ensure compliance with any order made pursuant to this Section;

(f) on application to the court by the Minister within three years after the date of conviction, directing the offender to submit to the Minister any information with respect to the conduct of the offender that the court considers appropriate in the circumstances;

(g) directing the offender to perform community service;

(h) directing the offender to pay to the Minister the costs incurred by the Minister in carrying out the investigation of the offence;

(i) requiring the offender to comply with any other conditions the court considers appropriate in the circumstances for securing the good conduct of the offender and for preventing the offender from repeating the offence or committing other offences.

(2) Where a person contravenes an order made pursuant to clause (1)(c), the Minister may publish the facts in compliance with the order.

(3) Where the Minister incurs publication costs pursuant to subsection (2), the costs constitute a debt due to the Government.

(4) An order made pursuant to subsection (1) comes into force on the day on which it is made or on any other day specified in the order and continues in force for the period specified in the order. *2010, c. 6, s. 15.*

### **Regulations**

16 (1) The Governor in Council may make regulations

(a) prescribing any matter that this Act authorizes to be prescribed by the regulations;

(b) prescribing penalties in respect of offences created under this Act;

(c) respecting any matter or thing the Governor in Council considers necessary or advisable for the administration of a system of administrative penalties;

(d) respecting the powers and duties of inspectors, including prescribing additional powers and duties;

(e) respecting records regarding the sale of pesticides;

(f) defining any word or expression used but not defined in this Act;

(g) respecting any matter or thing the Governor in Council considers necessary or advisable to effectively carry out the intent and purpose of this Act.

(2) The exercise by the Governor in Council of the authority contained in subsection (1) is regulations within the meaning of the Regulations Act. 2010, c. 6, s. 16.

### *Effective date*

17 This Act comes into force on such day as the Governor in Council orders and declares by proclamation. 2010, c. 6, s. 17.

Proclaimed - November 30, 2010

In force - April 1, 2011

## **Exceptions to Prohibitions on Non-essential Pesticides Regulations**

**made under Section 16 of the**

*Non-essential Pesticides Control Act*

**S.N.S. 2010, c. 6**

**O.I.C. 2010-427 (November 30, 2010, effective April 1, 2011), N.S. Reg. 184/2010**

### **Citation**

**1** These regulations may be cited as the *Exceptions to Prohibitions on Non-essential Pesticides Regulations*.

## **Definition of “Act”**

**2** In these regulations, “Act” means the *Non-essential Pesticides Control Act*.

## **Exceptions to prohibition on use of pesticide on lawn**

**3 (1)** The circumstances set out in this Section are prescribed as exceptions to the prohibition in subsection 4(2) of the Act.

**(2)** A person may use or cause or permit the use of a pesticide in, on or over a lawn, as defined in subsection 4(1) of the Act, for 1 or more of the following purposes:

(a) to destroy, prevent or control a species of animal that bites, stings, is venomous or carries disease;

(b) to destroy, prevent or control a species of fungus or species of animal that may negatively affect a building, structure or machine if the pesticide is used in the vicinity of the building, structure or machine;

(c) to destroy, prevent or control an alien invasive species, other than a plant species, that may negatively affect the health of humans, the environment or the economy.

**(3)** A person may use or cause or permit the use of a pesticide containing glyphosate in, on or over a lawn, as defined in subsection 4(1) of the Act, for 1 or more of the following purposes:

(a) to destroy, prevent or control a species of plant that is poisonous to humans by touch;

- (b) to destroy, prevent or control a species of plant that may negatively affect the physical state of a building, structure or machine, but only if the pesticide is used in the vicinity of the building, structure or machine;
- (c) to destroy, prevent or control an alien invasive plant species that may negatively affect the health of humans, the environment or the economy.

#### **Exceptions to prohibition on selling or supplying pesticide labelled for use on lawns or turf**

- 4 (1)** The circumstances set out in this Section are prescribed as exceptions to the prohibition in subsection 5(1) of the Act.
- (2)** A person may sell, supply or offer for sale a pesticide labelled for use on lawns or labelled for use on turf if all of the following conditions are met:
- (a) the use of the pesticide is permitted under Section 3;
  - (b) any person to whom the pesticide is sold or supplied is provided with written information about the circumstances under which the pesticide is permitted to be used as set out in Section 3;
  - (c) the pesticide is sold or supplied through a person who holds a Class I certificate of qualification (Vendor's Certificate) issued under the *Pesticide Regulations* made under the *Environment Act*;
  - (d) before the pesticide is sold or supplied, the pesticide is located or secured in a manner that prevents it from being accessed directly by the public.

## **Exceptions to prohibition on use of pesticides on outdoor tree, shrub, flower or other ornamental plant**

- 5 (1)** The circumstances set out in this Section are prescribed as exceptions to the prohibition in subsection 4(3) of the Act.
- (2)** After April 1, 2012, a person may use or cause or permit the use of a pesticide in, on or over an outdoor tree, shrub, flower or other ornamental plant for one or more of the following purposes:
- (a)** to destroy, prevent or control a species of animal that bites, stings, is venomous or carries disease;
  - (b)** to destroy, prevent or control a species of fungus or species of animal that may negatively affect a building, structure or machine, but only if the pesticide is used in the vicinity of the building, structure or machine;
  - (c)** to destroy, prevent or control an alien invasive species, other than a plant species, that may negatively affect the health of humans, the environment or the economy.
- (3)** After April 1, 2012, a person may use or cause or permit the use of a pesticide containing glyphosate in, on or over an outdoor tree, shrub, flower or other ornamental plant for one or more of the following purposes:
- (a)** to destroy, prevent or control a species of plant that is poisonous to humans by touch;
  - (b)** to destroy, prevent or control a species of plant that may negatively affect the physical state of a building, structure or machine, but only if the pesticide is used in the vicinity of the building, structure or machine;

- (c) to destroy, prevent or control an alien invasive plant species that may negatively affect the health of humans, the environment or the economy.
- (4) After April 1, 2012, a person may use or cause or permit the use of a pesticide in an outdoor tree if the pesticide is applied through injection.

**Exceptions to prohibition on selling or supplying pesticide labelled for use on outdoor tree, shrub, flower or other ornamental plant**

- 6 (1) The circumstances set out in this Section are prescribed as exceptions to the prohibition in subsection 5(2) of the Act.
- (2) After April 1, 2012, a person may sell, supply or offer for sale a pesticide labelled for use on an outdoor tree, shrub, flower or other ornamental plant if all of the following conditions are met:
- (a) the use of the pesticide is permitted under Section 5;
  - (b) any person to whom the pesticide is sold or supplied is provided with written information about the circumstances under which the pesticide is permitted to be used as set out in Section 5;
  - (c) the pesticide is sold or supplied through a person who holds a Class I certificate of qualification (Vendor's Certificate) issued under the *Pesticide Regulations* made under the *Environment Act*;
  - (d) before the pesticide is sold or supplied, the pesticide is located or secured in a manner that prevents it from being accessed directly by the public.

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