



# Home & Garden Pest Management Guide For British Columbia

2019 Edition

## Chapter 8 Using Pesticides to Manage Pests



# Using Pesticides to Manage Pests

## Understanding Pesticides

Pesticides are products used to kill, control, or manage pests. They can be naturally occurring or synthetic chemicals. Only pesticides classified as “domestic” should be used around the home and garden.

There are different types of pesticides. The main groups of pesticides for use in or around home gardens are: bactericides which affect bacteria, fungicides which affect fungi, herbicides which affect weeds, insecticides which affect insects, miticides which affect mites, and rodenticides which affect rodents such as rats and mice. Other less common groups of pesticides are cryocides which affect algae and plant growth regulators that affect how plants grow.

Identify the pest before using a pesticide. Pesticides are poisonous or toxic to different organisms. They may be toxic or harmful to one organism but not another. For examples, insecticidal soap will kill aphids, but will not affect beetles. Bt will kill caterpillars but will not affect aphids. Pesticides that only affect one or a few pests are selective pesticides. Pesticides that affect a broad range of pests are broad spectrum or non-selective pesticides. For example, 2,4-D selectively kills many broad leaf plants but does not affect grasses, while Roundup is non-selective and kills most plants.

Some pesticides are more toxic to people or certain organisms than others. Some pesticides last longer in the environment than others. Very toxic pesticides are not sold for use in or around homes and gardens. When using pesticides, choose the least toxic option whenever possible.

Pesticides can only be used in Canada after Health Canada evaluates them and gives them a registration number. This number is displayed on the front of the pesticide label, and appears similar to: “REGISTRATION NO. 12345 PEST CONTROL PRODUCTS ACT”. Pesticides without a Pest Control Products Act registration number may not be used in Canada. The pesticide must only be used according to label directions. The plant and pest must be listed on the label. Other uses are not legal and may not be safe or effective.

Pesticides used around the home and garden should have “**Domestic**” on the front of the label. Pest control companies and people with small acreage of a commercial crop or pastures can use pesticides with “Commercial” or “Agricultural” on the label.

## Home Remedies

Many garden magazines, websites and garden experts suggest using various home made mixtures or recipes of household ingredients for pest control. **Home made products are not recommended in this guide.**

**Any product used to manage or kill pests in Canada must be registered and approved by Health Canada.** All registered products have undergone thorough testing to ensure that they are both safe for the applicator, bystander and environment; and effective when used as recommended on the label.

### Did you Know?

The sale and use of unregistered products for pest control is illegal in Canada.

Home gardeners who wish to experiment with home remedies should be aware that many homemade pesticides are not effective and may damage plants. Some home made remedies are also very hazardous or toxic to people, pets and the environment.

- Homeowners should not use their kitchen or kitchen utensils for the manufacture and storage of homemade pesticides. Some of the ingredients are not safe and should not be mixed where food is prepared. For example, rhubarb leaves, tobacco or nicotine, and some plant extracts are harmful to people.
- Never use animal manure based “compost teas” on food plants that will be consumed. The compost tea may be contaminated with human pathogens.
- Products such as kerosene or gasoline are sometimes recommended for weed control, but are highly toxic to the environment and should never be used.
- Insecticide chinks illegally imported from China for control of cockroaches can sometimes be purchased in stores or via online retailers. The ingredients in this chalk are unknown and can vary, but often include chemical insecticides not permitted in Canada.
- Remedies made from herbs and other food ingredients can sometimes be harmful to plants. For example, if vegetable oils, baking soda or herbal oils are not well diluted with water, they can burn or defoliate plants.
- Soaps have been used as insecticides for a long time. Insecticidal soap can be purchased as registered pesticide at most garden stores. This is a specific formulation known to be effective against insects and safe for plants

when used as directed on the label. Some homemade soap mixtures may burn foliage. Perfumes, fatty acids and anti-bacterial agents in dish and laundry soaps can be harmful to plants.

- Baking soda mixtures (sodium bicarbonate) are sometimes recommended for control of powdery mildew on roses and other plants. This can injure plants. Potassium bicarbonate is a similar chemical that is registered as a pest control product for commercial growers, that is less likely to cause injury.
- Acetic acid (vinegar) is sometimes used as a herbicide. There are commercially formulated mixtures of acetic acid available that are registered pest control products. Another registered herbicide based on a natural ingredient contains corn gluten meal.

## Deciding When to Use a Pesticide

Only consider using a pesticide:

- after the pest is identified,
- after you learn the best stage of the pest and time of year to manage the pest,
- after you learn and consider all the options for managing the pest,
- after you check if your municipality has a pesticide by-law prohibiting the application of pesticides for cosmetic use on residential land, and
- after you have determined if you need to first obtain a Residential Applicators Certificate (RAC) from the Ministry of Environment. This certificate is required for certain

products and uses. For more information, see “Pesticide Use in Landscapes”, page 8-6.

Always consider and try a combination of methods to manage pests. For example, use cultural methods such as improving soil nutrition and drainage as well as mechanical methods such as mulches, traps and pruning instead of, or in addition to using pesticides. This integrated approach to pest control provides more effective management than pesticides alone and can often reduce or eliminate the need for pesticides.

As a general rule, use pesticides to correct a problem and not to prevent a problem. One exception is when the same problem reappears year after year. Then a pesticide application before the pest causes serious damage may reduce the damage and the number of sprays needed later. For example, a dormant spray in early spring can reduce the number of insect and disease problems in the summer. Copper and other protectant fungicides are only effective if applied early before the disease becomes widespread.

Only use a pesticide when there are enough pests to cause significant damage. Small numbers of pests are tolerated by most plants, and help to keep beneficial predators and parasites in the garden. However different plant species often have different tolerance levels for pests. This guide indicates when it is important to control certain pests.

If you do not want to apply pesticides yourself, consider hiring a professional pest control service or landscaper. See “Choosing a Pest Control Company”, page 8-18.

## Avoiding Overuse of Pesticides

Pesticides can be used safely and effectively if you follow label directions. However, it is also important not to overuse pesticides. To avoid overusing pesticides:

- Use pesticides only when they are really needed.
- Treat only the affected area. For example, treat the patches of weeds in a lawn and not the whole lawn.
- Replace plants that have recurring pest problems with plants not affected by those pests.
- Maintain good nutrition and growing conditions so your plants are healthy and can tolerate some pests.
- Do not try to kill all insects and mites. They are food for beneficial organisms. If they are all killed, the beneficial organisms that help control them will also die or leave your garden.
- Apply pesticides at the correct time. Learn about the life cycle of the pest. For example, a dormant spray is helpful for controlling peach leaf curl disease but summer sprays are not effective.
- Measure the pesticide accurately to avoid over or under application, or use “ready-to-use” formulations that do not require mixing.

## Selecting Pesticides

- Look up the specific pests in this guide to learn which pesticides can be used for the pest. If you need more information, ask a Master Gardener, a resource person at a garden shop or nursery, or a person who sells pesticides.
- Read the label to make sure the plant and the pest problem are written on the label. For example, when looking for a fungicide to control black spot on roses, the label must say it can be used on roses to control black spot. A pesticide can only be used for what is written on the label.
- When possible, choose the pesticide that is least toxic to other organisms and has the least environmental impact.
- Choose ready-to-use formulations, when available, to avoid having to mix the pesticide.
- When treating food crops, check the days to harvest on the label. Make sure you can wait the correct time before harvesting.

## Pesticide Formulations

Pesticides are available as ready to use products (RTU) that do not need to be mixed or as concentrated products that need to be mixed. RTU pesticides are easy to use and do not need any special application equipment. Special measuring and application equipment are needed to use products that require mixing. Plus, extra care is needed to ensure the pesticide is accurately measured.

Each pesticide contains an active ingredient (the compound that affects the pest) and other ingredients that make them easy to use. The amount and type of active ingredient is listed beside guarantee on the pesticide label.

Pesticides are available in different forms. RTU (ready to use) formulations are often available. Other forms available include: dusts (D), granules (G or GR), Wettable powders (WP), emulsions (E), emulsifiable concentrates (E or EC), suspensions (SU), pellets and pressurized sprays.

## Reading the Pesticide Label

The pesticide label is the best guide to using pesticides safely and effectively. The information on the label is to help you effectively manage pests with minimum risk. **Read the label.** Read it before buying a pesticide to make sure it can be used for your pest problem. Read the label before mixing or using the pesticide and read it again before storing or disposing of the pesticide. All of this information is on the label. Use of a pesticide in a way that is not consistent with label directions and precautions is illegal. It may also be ineffective or dangerous.

## Finding Pesticide Labels on the Internet

Canadian pesticide labels are all available on the [Pest Management Regulatory Agency website](#). The online form (or the mobile device APP) can be used to search for and look up labels. Read the instructions available for optimizing searches. Since pesticides that can be used around the home and garden are classed as “Domestic”, only tick “Domestic” under Marketing Type (near the bottom of the form).

**The type of information on labels is described below:**

1. **The Registration Number.** Pesticides with a registration number have been evaluated by Health Canada. They have determined that the product can be used with minimal or low risk if you follow the directions and precautions on the label. The registration number is on the front panel of the label.
2. **Guarantee Statement.** The name and amount of the active ingredients (the chemicals in the pesticide that control the target pest), are listed by the guarantee. There may be several products with different trade names that contain the same active ingredient.
3. **Trade Name.** Each pesticide has a trade name assigned by the manufacturer. This name may not tell you what the active ingredients are. Read the guarantee to learn the active ingredients in the pesticide.
4. **Use Category.** Pesticides for use around homes and gardens are labelled “**Domestic**”. Pesticides labelled “**Commercial**” and “**Restricted**” are more hazardous and should only be used by trained applicators.
5. **Signal Words and Symbols.** The signal words *Caution*, *Warning* or *Danger* and their associated symbols indicate how hazardous the pesticide is. Pesticide labels with no signal words or symbols are least toxic, and generally safe to handle as directed.
6. **Precautions.** This part of the label describes the protective clothing, such as gloves or goggles that you should wear when using the pesticide. It also tells you how to protect yourself, children, pets and the environment.

**Symbol and Signal Words**

 <b>Caution Poison</b>	<p>The word <i>Caution</i> and a triangle symbol appear on pesticides that have a slight hazard.</p>
 <b>Warning Poison</b>	<p>A pesticide with the word <i>Warning</i> and a diamond shape is more poisonous than those with caution.</p>
 <b>Danger Poison</b>	<p>Pesticides with the word <i>Danger</i> and a stop sign on the label are very poisonous or irritating</p>

7. **Directions for Use.** Make sure the pesticide is labelled for use against the pest(s) that you are trying to control and the plants/area that it will be applied to and that the pest and the plant are at the correct stage as stated on the label. Use only the amounts recommended, and follow the directions exactly.
8. **Limitations.** The label tells how long to wait to harvest an edible plant after the pesticide is applied, this is called a Pre harvest Interval (PHI). Some labels also say how long to stay off an area after it is treated, called Re-entry Interval (REI).
9. **First Aid.** The label tells you what to do if someone is accidentally poisoned by the pesticide. Call the Poison Control Centre at 1-800-567-8911 if someone is poisoned. Be prepared to tell them the guarantee and registration number from the label.

## Pesticide Use in Landscapes

For most uses of pesticides in landscaped areas on **private** land, the Ministry of Environment now requires either a certificate (for residents) or a license (for commercial properties and service providers). This includes pesticide use on lawns, flower beds and ornamental trees and plants on such properties as single family homes, golf courses, botanical gardens and cemeteries.

Residents do not generally require a license or certificate to use pesticides on their own private land for:

- Food gardens and hobby farms;
- Pesticide use inside structures or in outside areas to control structural pests (e.g., rodents, carpenter ants, wasps);
- Forests that are not managed for timber production; and
- Areas for commercial agriculture.

Additional information on “Home Pesticide Use” can be found at the [Ministry of Environment website](#).

### Options for Residents

Residents have choices when managing pests in private landscapes. They are able to:

- Hire a licensed company to provide the service;
- Apply a Domestic class pesticide if they first obtain a Residential Applicator Certificate (RAC); or
- Use a pesticide listed on either Schedule 2 or 5. Links to these lists can be found below:
- Residents do not require a RAC for certain uses of Domestic class glyphosate. These include treating: plants that are poisonous for people to

touch (e.g., poison ivy, poison oak); invasive plants and noxious weeds listed in legislation; and weeds growing through cracks in hard surfaces such as asphalt or concrete.

### The Residential Applicator Certificate (RAC)

To obtain a RAC, residents are required to complete a [free online course](#) and pass an exam. Upon passing the exam, residents are issued a ten-year certificate.

The online course should take approximately two hours to complete and includes information on:

- Health and safety;
- Environmental protection; and
- The use of IPM when managing landscape pests.

### Schedule 5

[Schedule 5](#) is a new list of Domestic class pesticides that are considered safe for use by untrained people. Owners of private land can apply these pesticides without the need for a licence or certificate. A licence is required **to offer a service** applying pesticides for others listed on Schedule 5.

### Schedule 2

[Schedule 2](#) is an existing list of pesticides that are excluded from certain requirements in the Integrated Pest Management Regulations (IPMR). There are several reasons why a pesticide may be listed on Schedule 2, such as it is regulated in other ways or only used in very specific circumstances by highly trained individuals.

Neither a licence nor certificate is required to use pesticides listed on Schedule 2.

## Notification

There are new rules for notifying residents:

- Licensed service companies who apply pesticides on residential land are required to notify their clients and any tenants before pesticides are used on outdoor landscaped areas.
- A landlord with a RAC who plans to apply pesticides to outdoor landscaped areas must provide written notice to tenants.
- Notification must provide information on what pesticide will be used, when the application will occur and if there are any safety precautions to follow.

## Municipal Bylaws

The changes to the IPM Regulations do not override municipal bylaws. If a municipality you are living in has restrictions on the landscape use of pesticides, they must be followed.

Contact your local municipality to learn if there are bylaws regarding pesticide use in residential landscapes.

## Buying Pesticides

Licensed vendors are required to display most pesticides in a way that restricts access by customers, for example, behind a counter or in a locked cabinet.

- This requirement does not apply to pesticides listed on Schedule 2.
- This is to ensure that a certified dispenser (employed by the vendor) communicates with customers prior to the purchase of a pesticide.

When interacting with customers, certified dispensers are required to:

- Offer advice on pest management and the safe use of pesticides;
- Inform purchasers that pesticides must be used only for purposes stated on the label and according to the directions;
- Confirm that the intended use is appropriate according to the pesticide label;
- Inform the customer that a provincial licence or certificate may be required to use the pesticide; and
- Inform the customer that municipal bylaws may restrict the use of the pesticide.

Customers should expect pesticide vendors to ask them how they plan to use a pesticide before a purchase is made. This is to confirm that the intended use is appropriate.

Vendors are not required to know if there is a municipal bylaw restricting the intended use where customers live, nor do they need to know the details of any such bylaws. Customers are responsible for contacting their municipality and understanding what restrictions may be in place.

## Measuring and Mixing Pesticides (Calculating How Much to Use)

Pesticides are available as “ready-to-use” products and as concentrates that need mixing. You will need a tape measure and measuring containers to accurately measure pesticides and avoid over applying. You will also need application equipment if you are using pesticides that require mixing.

When measuring pesticides, be accurate and use level teaspoons or tablespoons, not heaping spoons. One teaspoon is equal to 5 mL. One tablespoon is equal to 15 mL.

**Never use kitchen spoons or cups that are used for food.** Have separate measuring spoons and cups for pesticides. Keep them in a locked cupboard with the pesticides, where children cannot access them. If using kitchen-style measuring spoons or cups, label them “not for food use” so they will not be mistakenly used for food.

### Ready-to-Use (RTU) Pesticides:

Ready-to-use formulations do not need any mixing and are usually safer to handle and store than concentrates. Use them according to the directions on the label.

**Liquids:** Some labels will say “spray until the foliage is wet or until run-off”. “Run-off” is when the leaves are wet and the spray has begun to drip off the leaves.

### Solids (Dusts, Powders and Granules):

The labels of ready-to-use pesticides recommend using a certain amount of pesticide on a certain area of ground. For example, use 500 grams on 10 m<sup>2</sup> or use 35 grams on 10 m of row. These labels

generally say how many grams of pesticide are in a teaspoon or tablespoon.

To determine the amount of solid pesticide to use:

### Rates for Areas

1. Measure the area to be treated. Use square metres. The area of a square or rectangle equals the width times the length. For example, if treating an area 4m by 6m the area is  $4\text{m} \times 6\text{m} = 24\text{m}^2$
2. Then calculate the amount of pesticide needed for an area. First determine how much is needed for a square metre.

For example, if the label rate says to use 500 grams on 10m<sup>2</sup>, find out how much to use on one square metre by dividing 500 grams by 10m<sup>2</sup>.

$$500\text{grams} \div 10\text{m}^2 = 50 \text{ grams on } 1\text{m}^2$$

Then multiply this amount by the size of the area you will be treating.

$$\text{For example, } 50 \text{ grams}/1\text{m}^2 \times 24\text{m}^2 = 1200 \text{ grams}$$

### Rates for Row lengths

1. Measure the row length to be treated. Use metres.
2. Then calculate the amount of pesticide needed for the row length.

First determine how much is needed for one metre.

For example, if the label rate says to use 35 grams on 10m of row, find how much to use on a metre by dividing 35 grams by 10m.

$$35\text{g} \div 10\text{m} = 3.5 \text{ grams per metre}$$

Then multiply this amount by the row length you will be treating.

For example:

$$\text{To treat } 3\text{m} \times 3.5 \text{ grams}/\text{m} = 10.5 \text{ grams}$$

## Pesticides Needing Mixing

Some pesticides must be mixed with water before use. Mix only the amount you need for the application. Do not prepare larger amounts to store for future use. The pesticide may lose its effectiveness and is a hazard to others. Avoid having left over spray by determining how much water and pesticide you need before mixing the spray.

Mix the pesticides outdoors or in a well-ventilated area.

Determine how much water to use by:

1. Filling the sprayer with water. Do not put any pesticide in it.
2. Spraying water onto the plants or area that you will be treating.
3. Measure how much water is needed to refill the sprayer. The measured amount you used is the how much water you need to mix with the pesticide.

Determine how much pesticide to use by checking the label rate. Pesticide rates are written as amount of pesticide in a certain water volume (e.g. 5 mL/L water) or amount of pesticide for a certain size area (e.g. use 30 mL/10m<sup>2</sup>).

### Rates written as amount per water volume

1. Write down the rate that is on the pesticide label.
2. Write down how much water is needed to spray the area you will be treating (see above).
3. Multiply the number of litres of water you will need by the pesticide rate for one litre.

For example, if the label rate is 5 mL/L water and you determined you need 5 litres

of water to cover the plants you want to spray, then multiply 5mL pesticide by 5 litres water.  $5\text{mL/L} \times 5\text{ L} = 25\text{mL pesticide}$

### Rates written as amounts per area

1. Write down the rate on the pesticide label.
2. Measure the area you will be spraying. Use square metres. The area of a square or rectangle equals the length X width.
3. Calculate the amount of pesticide for one square metre. (see rates per areas on page 8-8)
4. Multiply the amount for one square metre by the number of square metres you will be treating.

For example,

- a) If the rate says use 30mL/10m<sup>2</sup>
- b) And the area being sprayed is 10m X 5m = 50m<sup>2</sup>
- c) Then you need  $30 \div 10 = 3\text{mL}$  for each m<sup>2</sup>.
- d) Or  $3\text{mL/m}^2 \times 50\text{m}^2 = 150\text{mL}$  of pesticide for 50m<sup>2</sup>

When the pesticide container is empty, rinse the container and put the rinse water into the sprayer before you finish mixing the pesticide. Spray out onto the treated area.

## Helpful Pesticide Measurements

(see also “Aids to Calculation and Measurement”, Appendix II)

### Volume

- 1 tsp. = 5 mL
- 1 tbsp. = 15 mL
- 1 cup = 250 mL
- 1 litre = 1000mL

## Area

- an area 1 metre by 1 metre is equal to 1 square metre (1m<sup>2</sup>)
- weight
- 1 kg = 1000 grams

## Abbreviations for Pesticides

- mL = millilitre
- L = litre
- m = metre
- m<sup>2</sup> = square metre
- g = gram
- kg = kilogram

## The metric system

- Volume is measured in millilitres or litres. 1 litre = 1000 millilitres
- Weight is measured in grams or kilograms. 1 kilogram = 1000 grams
- Area is measured in square metres (m<sup>2</sup>)
- Length is measured in metres.

# Applying Pesticides Safely

## Protect Yourself

- Read and follow all label directions. Do not change the recommended rate.
- No person may use a pesticide in a way likely to cause an unreasonable adverse effect to human health or the environment (BC IPM Act & Regulations).
- **NEVER** eat, drink or smoke when working with pesticides. You could carry traces of the pesticide from your hands to your mouth.
- Wear waterproof gloves and boots whenever you handle pesticides. Never use leather, cloth, or lined

rubber gloves, as these absorb pesticides and cannot be properly cleaned.

- Avoid inhaling sprays or dusts. Read the label to see if a respirator is needed. Respirators for pesticides have special cartridges that prevent the pesticide from entering your lungs. Dust or paint masks do not protect you from pesticides.
- Never apply pesticides on a windy day. When spraying, stand so any light breeze blows the pesticide spray or dust away from you or any bystanders.
- Before spraying outside, close the doors and windows of your home.
- If using pesticides indoors, provide good ventilation. Leave all windows open and fans running after the application is completed, if label directions permit.
- Wash your hands immediately after using pesticides and always before eating, drinking, smoking or using the toilet.
- Stay away from the treated area at least until the spray has dried or for the time specified on the pesticide label.
- Wait before harvesting the treated plants. The label tells you how long you must wait.

## Protect Others

- Keep children's toys and pet food/water dishes away from the area where you mix and apply pesticides.
- Make sure pesticide containers are locked up while you are spraying.

- Never put bait for insects or rats, mice and other rodents where children or pets can reach it. Use a bait station.
- Before applying pesticides indoors, make sure food, dishes, toys and pet dishes are put away so they are not contaminated. Don't let any pesticides get on any surfaces that are used for food preparation.

### **Protect the Environment**

- Protect bees and other beneficial insects. Do not apply insecticides when plants are in bloom.
- Do not spray bird nests when treating trees.
- Never mix or apply a pesticide near a wellhead, drain or waterway.

### **After Applying Pesticides**

- Clean the application equipment. Drain sprayers and rinse them with water.
- Wash your hands, face and any parts of your body that may have come in contact with the pesticide.
- Clean the clothes you were wearing by washing them separately from household laundry. Use hot water and a heavy duty detergent. Hang the clothes on a line to dry. After washing heavily contaminated clothing, put the washing machine through another cycle with detergent alone to remove traces of pesticides.
- Keep records of your pesticide applications. Record the date, the pesticide used, how much you used, what you used it for and on, and whether it was effective.

## **Poisoning and First Aid**

- If someone is poisoned, provide first aid as below and call the B.C. Poison Control Centre at 1-800-567-8911. Be prepared to provide the pesticide name, active ingredient and registration number.
- If the person is unconscious, having convulsions, or having trouble breathing, call 9-1-1.
- Carefully follow the instructions of Poison Control or 911.
- If helping someone who may be poisoned, protect yourself from exposure (e.g. wear protective gloves).
- If dusts or sprays are spilled on skin or clothing, remove clothing immediately and wash skin with soap and water. Clean under fingernails if they have been contaminated. Call the Poison Control Centre for further advice. Thoroughly clean contaminated clothing before reusing.
- If pesticide is splashed in eyes, rinse eyes with a gentle stream of clean warm water for at least 5 minutes and call the Poison Control Centre.

**BC Poison Control Centre  
(B.C. Drug and Poison Information  
Centre)**

24-hour Line: 1-800-567-8911, or  
604-682-5050

Web: <http://www.dpic.org/>

## Pesticide Spills

If a pesticide is spilled, wear protective gloves and rubber boots when cleaning up the spill. Prevent the pesticide from spreading and clean it up promptly. Cover liquids with an absorbent material like kitty litter. Do not apply water to the spilled pesticide as it will spread the spill further. Place the waste materials into an empty waterproof container, seal it and write the name of the pesticide on the waste container. Dispose of the spilled material by following the label advice on pesticide disposal.

## Storing Pesticides Safely

Keep all pesticides in a locked cabinet in a ventilated utility area or garden shed.

Always store pesticides in their original container with the original labels or a suitably labelled container. Keep containers tightly closed. Never put pesticides in soft drink bottles or other containers. Children or others may mistake them for something to eat or drink.

Never store pesticide in cabinets with or near food, animal feed, seeds, cleaning compounds, or medical supplies.

Store liquid pesticides where they will not freeze.

Do not store pesticides where flooding is possible or where they may spill or leak into wells, drains or waterways.

If a container is leaking or you can't tell how old the contents are, follow the advice on safe disposal.

If possible, store herbicides away from other pesticides and fertilizers to prevent cross contamination.

## Disposing of Pesticides and Containers

### Containers

- Most Domestic pesticide labels have information on disposal of containers. Follow the label instructions.
- Destroy or dispose of empty containers immediately.
- Never reuse empty pesticide containers.
- Drain and rinse empty pesticide containers that contained concentrated pesticides. Put rinse water into the sprayer.
- Don't burn bags or boxes

### Pesticides

- Avoid disposal problems. Only buy small amounts that you can use up.
- Do not pour pesticides down drains, sinks or toilets.
- Dispose of unwanted pesticides by taking them to a **Household Hazardous Waste** collection depot.

### Where to take household hazardous waste:

Information on pesticide disposal & locations of Household Hazardous Waste depots is available from:

- the Product Care Association at 1-888-772-9772
- the Product Care ReGeneration website at [www.regeneration.ca/](http://www.regeneration.ca/)
- people/stores that sell pesticides

## **Pesticide Application Equipment**

There are many different types of pesticide application equipment. The purpose of application equipment is to distribute the correct amount of pesticide evenly over the affected area.

The type of equipment to use depends on the location (inside or outside), the pesticide formulation (granular, dust, liquid, etc.), the type of application (banding or broadcast spraying), and the type and size of the garden. You will not need application equipment if you select ready-to-use formulations for treating a few plants or small areas. For fruit trees, big ornamentals, and large areas, a compressed air or knapsack sprayer is useful.

Compressed air sprayers used for weed control should have a flat fan nozzle pattern and operate at low pressure. Those used for insecticide or fungicide applications should have a cone nozzle pattern and operate at high pressure.

Since a high pressure power sprayer may be needed to get good coverage of very large trees, consider hiring a commercial pest control company if spraying large trees. Garden hose-end sprayer attachments are not recommended because the amount they apply varies and is difficult to regulate. However, they are legal and effective when used properly.

If you need help selecting pesticide application equipment, ask a Master Gardener, Garden Centre or certified pesticide salesperson.

It is best to have one sprayer for herbicides and another for insecticides and fungicides, as herbicide residues can damage sensitive

plants. If this is not possible and only one sprayer is available, clean the hose and tank very carefully to make sure that all traces of herbicide are removed. Use a sprayer cleaning compound such as Neutrasol.

Do not use garden sprayers inside a house. If pesticides are to be used indoors, apply them with a small hand sprayer or an aerosol can.

Check the application equipment each time it's used. Make sure hoses don't leak and triggers or valves are working properly. Damaged or faulty application equipment increases the hazard to applicators, the environment and gives poor results.

If application equipment is properly maintained, it can give many years of service. Some pesticides are corrosive to metal parts, so it is important to rinse and wash out the tank with detergent or soap solution after each use. Leave the sprayer tank uncapped and up-ended during storage to allow it to dry without rusting.

### **Compressed-Air Sprayers**

Compressed-air sprayers use compressed air to force a liquid spray out of a nozzle at the end of an application wand. These common sprayers are mostly used to treat pests outdoors on lawns, gardens, ornamentals, and trees.

Compressed-air sprayers have a capacity of 4 L to 10 L. These sprayers are for spot treatments or broadcast treatments to small areas. The unit is placed on the ground or carried on the persons back and pumped by hand to compress the air inside the tank. The rate of pesticide application depends on the air pressure in the tank, how fast the person is walking, and the nozzle type or setting. For example, high pressure forces the pesticide out faster than low pressure.

The correct technique for using a compressed-air sprayer is to apply the spray at a constant pressure and at a regular speed. The sprayer should be regularly pumped up to maintain a relatively constant pressure that produces a fine spray, not a mist. If the spray is maintained at a constant pressure, the user can lower the application rate by speeding up the walking pace. Conversely, walking slower will increase the application rate.

To achieve even spray coverage over an area, the applicator should:

- walk at a regular pace
- move the wand sideways in a back and forth motion at a constant speed
- keep the nozzle height about 30 cm above the ground while using a wide angle or fan spray pattern
- overlap the edges of the spray pattern for good coverage
- apply the spray within arm's reach and not over-reach with the wand
- walk in one direction in a straight line until reaching the end of the strip, then turn around and spray the next strip treat the entire area using this back-and-forth pattern
- walk away from the sprayed area, not into it.

## **Adjusting and Calibrating Application Equipment**

### **Hose-End Sprayers**

Although most hose-end sprayers do not give an accurate dosage, you can make the sprayer work as accurately as possible by calibrating it, opening the tap fully during use, and not using any other taps on the

premises while spraying. If the sprayer has an instruction sheet on calibration, use those instructions. Otherwise, follow these calibration steps:

### **Calibrating to spray an area on the ground:**

1. Connect the garden hose to the water tap and hose-end sprayer.
2. Adjust the sprayer nozzle to the desired setting (fan shape for weeds; cone for insects).
3. Fill the hose-end sprayer bottle with water. Adding food colour will make it easier to read the measurements.
4. Mark off an area 10 m x 10 m (= 100m<sup>2</sup>) using a measuring tape, stakes, and string.
5. Turn the tap on fully.
6. Walk back and forth over the marked-off area, spraying until the area is covered. Always use the same walking speed.
7. Turn the water tap off and measure the amount of water left in the sprayer bottle. The difference between this reading and the full mark is the amount of water (pesticide) used. If the pesticide container label indicated to use 10mL/100m<sup>2</sup>, then this was the right amount. If more or less than 10 mL/100m<sup>2</sup> was used, adjust the application rate accordingly by walking faster or slower while spraying.
8. Empty the coloured water from the spray bottle and refill it with the required amount of pesticide and water to treat the infested area.

### **Calibrating to spray trees and shrubs:**

1. Fill the sprayer bottle with water to the top mark. Adding food colour will make it easier to read the measurements.
2. Connect the hose-end sprayer to a garden hose. Spray into a pail marked at one litre intervals and fill the pail to the two litre mark. Turn off the water.
3. Measure the amount of coloured water left in the sprayer bottle and divide by two to determine the amount used per litre of spray. Compare this to the recommended dosage on the pesticide label.
4. If more coloured water from the bottle was used per litre of spray than the label amount, dilute the pesticide with the appropriate amount of water when filling the bottle to spray. For example, if you used 50 mL of coloured water per litre of spray but you only want to use 5 mL of pesticide per litre of spray, add 45 mL of water for every 5 mL of pesticide put in the bottle.
5. If less coloured water from the bottle was used per litre of spray than the label amount, the pesticide you're using will not work properly in your sprayer.

### **Compressed Air or Pressure Sprayers**

Calibrate your sprayer to make sure it will apply the correct amount of pesticide. When calibrating, use water only. Do not use pesticides when calibrating. The section called "Pesticides Needing Mixing" on page 8-9 describes how to calibrate a pressure sprayer. Follow those instructions.

### **Granular Applicators**

Read the section called "Measuring and Mixing Pesticides" (page 8-8) to determine the amount of pesticide needed. Then calibrate your granular pesticide applicator (fertilizer spreader) to make sure you apply the correct amount of pesticide. To calibrate the granular applicator you must measure the amount of pesticide that comes out of the spreader over a small area and compare it to the label rate. If the label rate and applicator output are not the same the application equipment or walking pace will need adjusting.

#### **To calibrate a granular applicator:**

- A. Collect the granules that the spreader applies over a small area to help you determine if it is applying the label rate. Wear the personal protective equipment listed on the pesticide label.
  1. Either attach a plastic bag onto the spreader or put a piece of paper or plastic on the ground to catch the granules. This piece should be at least as wide as the spreader and 2 metres long. A longer piece of plastic or paper will help to measure the output more accurately.
  2. Put a small, evenly distributed amount of the pesticide in the spreader.
  3. Next, determine the correct adjustment for the spreader and/or the correct walking speed. Keeping the spreader closed, start walking approximately 3 metres in front of the paper or plastic sheet. When reaching the sheet, without changing the pace, open the spreader so that the pesticide drops onto the sheet. Close the spreader after walking 2 metres.

- B. Determine the rate of pesticide the granular applicator applied
1. Weigh the amount of pesticide that was applied on the paper in step A above. Business supply stores often sell scales that accurately weigh small amounts. Do not use the scale you weigh pesticides on for food use.
  2. Measure the width of the spreader and the length covered to determine the total area treated with the chemical (width of spreader x length travelled.) For example, if the spreader is 1 metre wide and the paper 2 metres long, an area of  $1 \times 2 = 2$  square metres was treated.
  3. Calculate the amount (g) of granules applied on 1 square metre ( $1 \text{ m}^2$ ). (Divide the amount measured in step B 1. by the area calculated in step B 2. For example, if 200 grams were applied on 2 square metres, the spreader was dropping  $200 \div 2 = 100$  grams per square metre.

C. Determine if the pesticide label rate was applied.

1. Check the label rate
2. Determine what the label rate is per square m. For example, if the label rate reads:  $5 \text{ kg}/100 \text{ m}^2$  ( $5000 \text{ g}/100 \text{ m}^2$ ) it is the same as applying  $50 \text{ g}/\text{m}^2$ .
3. Compare the label rate (C 2) to the output of the applicator. (B. 3). In the example above (B.3) the applicator is applying too much pesticide.

D. Adjust applicator so the correct amount will be applied

1. Change the applicator adjustments (see equipment instructions) or change the walking speed to adjust the output. Depending on the application equipment, walking faster should reduce the output and walking slower should increase the output.
2. After applicator adjustments are made or speed is changed, redo the test run to determine if the output is the same as the label rate. (Steps A – C above)
3. Redo the tests until the applicator applies the correct rate.
4. Record the applicator setting, pesticide name and speed used so that the calibration is easier next time.

Apply the granular pesticide evenly by going over the lawn twice. Use half the amount of pesticide each time in a criss-cross pattern. First walk lengthwise up and down the lawn, then walk back and forth across the width of the lawn. For the above example,  $25 \text{ g}/\text{m}^2$  would be applied each time.

## Dormant Spraying

Dormant spraying refers to spraying during the season of the year when deciduous trees and shrubs are leafless, and buds are in the overwintering, dormant stage. Materials applied as dormant sprays include horticultural oils (dormant oil) and lime sulphur. Horticultural oils mix with water to form a milky emulsion. After the water evaporates, a thin layer of oil is left on the tree. Any overwintering stages of insects such as eggs or pupae, when sprayed with dormant oil, will die of suffocation. When

lime sulphur is included in the dormant spray, some overwintering stages of plant diseases will also be reduced.

**Evergreens:** Horticultural oils can be used on most evergreens during the dormant season. Mixtures of horticultural oil and lime sulphur should not be used on evergreen plants, and never during the growing season. During the growing season, oils alone can be used on some plants, but at a lower rate than would be used as a dormant spray for deciduous trees and shrubs.

**Deciduous Plants:** The buds of some deciduous trees can be damaged by dormant application of lime sulphur alone or in combination with oil. To avoid problems, follow label directions as to timing, dilution rate and sensitive plant species and varieties.

### **Time to Change Your Oil?**

Horticultural oils contain emulsifying agents that allow the oil to mix with water to avoid plant burn. Landscapers and home gardeners need to shake up or stir the contents of sprayers frequently to ensure a good mixture in water. Once drums or containers of dormant oil are opened, the emulsifying agents can evaporate, resulting in plant burn if old oil is used.

If in doubt, test your oil in a clean glass jar. Add one part of oil to ten parts of water. Shake vigorously for 30 seconds and let stand for three minutes. The emulsion should remain cloudy; if the oil separates into a layer at the top, it is not safe to use.

## **Wood Preservatives**

Wood that has dried below 20% moisture will not decay if it dries off reasonably quickly. However, decay will occur if wood is in contact with the ground or contains

cracks or grooves that hold water. Wood preservatives are often added to prevent decay. Sometimes wood is pressure treated, a process that involves forcing chemical preservatives into the wood to help prevent decay or insect damage.

Alkaline copper quaternary (ACQ), copper azole and DDA carbonate are registered for use on pressure treated wood that can be used in residential situations. Residential uses could include decks, patio, landscape ties, play structures and fences. Wood preservatives used in foundations, marine pilings or utility poles will have a higher rate of chemical than residential pressure treated wood. Treated wood should not be used in contact with edible plants, or for construction of food holding containers. Treated sawdust and shavings should not come in contact with livestock or be used as bedding or litter. Do not burn treated wood. Any leftover wood should be properly disposed of at a landfill.

Creosote, used on old railway ties or utility poles is toxic to plants and animals and should never be used in gardens.

Whenever handling preserved wood, be sure to:

- Wear a dust mask and goggles when cutting or sanding wood
- Wear gloves when handling
- Wash any exposed skin areas that may come in contact with wood
- Wash hands thoroughly, after handling wood, before eating or smoking
- Wash work clothes separately from other clothing before wearing again

For more information on purchasing and using preserved wood visit <https://www.ptw-safetyinfo.ca/en/>.

## Being a Good Neighbour: Notifying Neighbours and Minimizing Drift

### Notification

People are concerned about their safety and health, the environment, possible pesticide injury to their plants and animals, and possible pesticide residues on garden produce. A home owner is not required, by law, to notify their neighbours about their intent to apply a pesticide on private land, but it is courteous. Neighbours may want to close windows and bring in or cover toys, laundry, pet dishes or lawn furniture and would appreciate advance notice.

### Minimizing Drift

Pesticide drift is the movement of spray particles from the sprayer to another target off site. Pesticides drifting off target can: upset neighbours, damage nearby plants, kill beneficial insects, reduce the effectiveness of the pesticide, and contaminate household items. Minimize drift! The person applying pesticides is responsible for minimizing drift.

To minimize spray drift:

- Calibrate and use application equipment properly. Use application equipment that is capable of reaching the entire plant with out significant overspray. If you do not have the appropriate equipment, call a professional. Commercial applicators have the necessary equipment and training to spray to the top of a tree while minimizing spray drift. Keep the sprayer close to the target (plant). Use as low pressure and as large droplet size as possible. The higher the pressure and the smaller the droplets, the more the pesticide will drift.

- Do not apply pesticides when children, pets or people are nearby
- Only apply pesticides when weather conditions will not contribute to drift. Weather conditions which favour drift are high temperatures, low humidity and high wind conditions. Early mornings and late evenings generally have better spraying conditions with lower wind speeds.
- Use spray products which are less likely to drift. The formulation of the pesticide affects the likelihood of the pesticide to drift. Dust and liquid formulations are more likely to drift than granulars.

## Choosing a Pest Control Company

If you have a pest problem that you do not want to deal with on your own, you may decide to hire a professional pest control company. When choosing a pest control company get answers to the following questions:

### 1. *Is the company licensed?*

Companies that apply pesticides for a fee must have a current Pesticide User Service License issued by the B.C. Ministry of Environment. One exception is that companies only applying pesticides scheduled “Excluded” by the Ministry of Environment do not need a license. Pesticide applicators working for licensed companies have applicator certificates and know how to apply pesticides safely. Ask to see the applicator’s certificate and company’s license number before you hire them. People hired to manage pests must use integrated pest management. This is explained in the Chapter 3, “Integrated

Pest Management”. The [Ministry of Environment web](#) site lists companies with Pesticide User Service Licenses.

2. *Is the company willing and able to discuss the pest problem and treatment proposed for your home or garden?*

Select a pest control company that makes sure the pests are identified and that there are enough pests to warrant control. The company should tell you about different options for controlling the pest and how you can minimise future pest problems. If a pesticide is to be applied, they should tell you about the pesticide and special instructions to reduce your exposure (such as removing pets and moving toys).

3. *Does the company have a good record?*

Check with other people to see if they were satisfied with the service or check on-line reviews.

4. *Does the company guarantee its work?*

Ask how they guarantee their work (e.g. money back guarantee or guarantee to return until the problem is gone). Are there any restrictions or conditions on the guarantee?

5. *Is the company affiliated with a professional pest control association or does it have a pest management accreditation?*

Professional associations keep members informed of new developments in pest control methods, safety, and regulations. When a company chooses to join a professional association, it indicates a concern for quality.

You and the company of your choice should develop the contract together. Your safety concerns should be noted and reflected in the choice of control methods used. These

concerns may include allergies, sensitivities, age of occupants (infants or elderly), resident pets, and treatment near wildlife and fish. Wise consumers get bids from two or three companies and look at quality more than price.

If you hire a pest control firm to do the job, ask the company to use the least toxic method available that will be effective. And remember to evaluate the results after the company has done their work.