

Integrated Pest Management Program - IPM Manual for Home & Garden Pests in B.C. - Chapter 4

Integrated Pest Management

IPM Manual for Home and Garden Pests in British Columbia

Chapter 4: Equipment, Application and Pesticide Use Calculations

Learning Objectives

When you have completed this chapter, you should be able to:

1. Describe the different types of pesticide application equipment, including how they work and where they should be used.
2. Explain why it is important to maintain equipment and how to do it.
3. Explain the terms describing application rates found on pesticide labels.
4. Determine the amount of a pesticide needed for a job, using ratios and metric calculations.
5. Help customers with area and mixing calculations and give them tips for uniformly applying pesticides.

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Introduction

It is important for anyone applying pesticides to:

- use the most appropriate equipment for the job
- know how to use the equipment correctly
- know how to calculate the quantity of pesticide required

The dispenser can help customers by providing them with information outlined in this chapter.

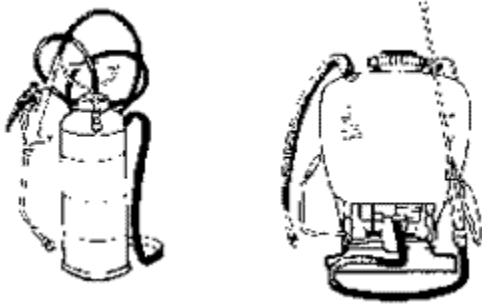
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Types of Application Equipment

When choosing equipment, make certain that it will deliver the pesticide in a manner consistent with the information on the label and with safety considerations. For example, high tree spraying should be done with high volume equipment, not a hand-held trigger sprayer. Also, while a compressed-air sprayer may be used outdoors, it is risky to use indoors as it is easy for unskilled applicators to apply too much pesticide. The dispenser should be able to demonstrate to the purchaser how the equipment works. The following list describes the equipment that is likely to be used for Domestic pesticides.

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 sprayers are mostly used to treat pests outdoors on lawns, gardens, ornamentals, and trees. If used indoors the user must take great care not to apply too much pesticide. Surfaces should be just covered with a fine mist, not a wet or dripping coating. Two types of air sprayers are shown here.



Hand held 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 and pumped by hand to compress the air inside the tank. When pressurized, the tank is carried in one hand while the wand with the nozzle is carried in the other hand. The rate of pesticide application depends on the air pressure in the tank, how fast the user 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 user 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

If customers have no experience with this type of sprayer, they should be advised to practice, using only water in the tank, until they feel confident they can maintain an even application pattern.

Hose-end Sprayer

With this type of system, a container with a nozzle and a hose fitting is filled with concentrated liquid pesticide. This is screwed onto the end of a hose and, when the water is turned on, the flow mixes the concentrated pesticide with the water to produce a pesticide spray. These sprayers are only used for treating outdoor areas such as lawns, gardens, and ornamentals. The key disadvantage of this type of sprayer is that it is hard to apply the pesticide at the correct rate. The rate of delivery varies with changes in water pressure and any clogging of the nozzle makes the system even more inaccurate. Calculating the correct amount of a pesticide concentrate to add to a hose-end container is very difficult.

Trigger Pump or "Squirt Gun" Sprayer

These are small, hand-held sprayers, which usually contain less than 4 litres of ready-to-use pesticide. The user sprays the pesticide by hand squeezing a button or lever that is usually attached to the top of the container. Larger containers are designed to be carried in one hand, while, in the other hand, the user squeezes a spraying nozzle attached to the container by a length of tubing. These sprayers are used for small areas and for spot treatments indoors and outdoors.

Pressurized Container (Aerosol)

These small, non-reusable hand-held pressurized containers hold ready-to-use pesticides in quantities of less than 1 L. Aerosol sprays are not meant to fill the air with vapour, only to apply a layer of fine droplets to surfaces. They are used to treat small, localized pest problems, both indoors and outdoors. Aerosols must be applied carefully to avoid reflecting the pesticide back to the user, which can happen when a high pressure spray hits a solid surface.

Dust Applicator

Dust applicators may be designed as part of the pesticide container, or they may be a separate piece of equipment. Container designs include squeezable plastic cylinders with shaker holes in the lid or a simple nozzle on top. Specialized dust applicators range from large dusters, with bulb pumps, to small, squeeze dusters used for dusting in crevices and holes.

Note: Vendors selling dusts for indoor use should stock dust applicators.

Spreaders

Spreaders are large pieces of equipment used outdoors to apply granular products (usually herbicide/fertilizer combinations used on lawns). There are drop action spreaders and rotary spreaders. In drop spreaders, the granules fall out of a hopper,

through slots or holes, as the spreader is pushed along. Rotary spreaders fling the granules from a rotating wheel under the hopper as they are pushed. With a rotary spreader, consecutive passes should partially overlap in a criss-cross pattern to obtain even coverage. Care must be taken to ensure the granules are not thrown outside the intended treatment area as lawn herbicides will damage or kill shrubs and bedding plants.

The material in the spreader must fall out at a regular rate. The spreader should be clean to prevent clogging of the holes. Some spreaders should only be opened while walking at a regular rate. Opening this type of spreader before starting to walk can cause an excess amount of pesticide to fall out on the spot, which may burn or damage the turf. It is important to maintain a regular walking pace to ensure a uniform application rate.

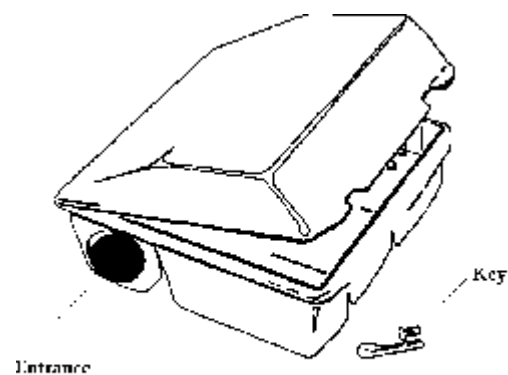
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Special Equipment

Bait stations and other special equipment are used indoors or outdoors in specialized situations. For example, rodenticide baits should only be used in child-proof bait stations. The bait is placed inside and the bait station is closed and secured to keep children and pets from getting to the rodenticide.

Note: Vendors selling rodenticide baits should stock tamper-proof bait stations and strongly advise the customer to use them.

Bait stations are also used for metaldehyde slug bait to prevent pets and wild animals from eating the bait, which is highly attractive to them. The bait stations can be home-made or purchased.



An Example of a Bait Station

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Equipment Maintenance

It is important to maintain the application equipment to ensure that pesticides are applied effectively. Always make sure that the equipment is not clogged, leaking or otherwise poorly maintained, which can give uneven results as well as present a safety hazard.

The person applying pesticides should do the following:

Check Equipment: Before use, check the nozzle, pump, and other parts to make sure they are working properly and are not leaking or clogged.

Clean Equipment: After use, the equipment should be cleaned. Thorough cleaning prevents corrosion and build-up of caked or gummy pesticide residues. Clean the equipment in an isolated area away from people and well away from streams, ponds, drains, or ditches to ensure pesticide residues are not carried into water.

Note: It is advisable to keep a separate sprayer, designated for herbicides only, and not to use herbicides in the same equipment used for insecticides or fungicides. This is because even a trace of some herbicides can damage sensitive plants. Washing the equipment thoroughly is always advised, but is not a guarantee that there are no traces of herbicide present.

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Application Rate

The application rate is the amount of pesticide applied to a unit area. The rate(s) and method that will give the desired results are stated on the pesticide label. The application rate depends on:

- how much of the active ingredient is in the mixture (the concentration)
- how much of the mixed pesticide is applied to the target site or plants

Applying either too much or too little of the pesticide to the target site can cause problems.

Over Application: Too much pesticide can be applied to a site if there is more concentrate used in the mix than there should be (it is not diluted correctly), or if too much of the mixture is applied in one place. Over applying a pesticide may:

- damage the area treated
- damage or kill plants and other non-target organisms
- increase hazard to the applicator
- produce excess residue on harvested produce

Using more pesticide than stated on the label will also cost the applicator more money.

Under Application: Using less pesticide than specified on the label, by using incorrect measuring or mixing or by poor application techniques, may:

- make re-treatment necessary
- allow a pesticide resistant pest population to develop from pests that were not killed by the low rate

The label usually gives specific information on how to mix the pesticide to the correct concentration. For example, mix 30 ml of pesticide in 5 L of water and apply to 100 m². The label may also describe how to apply the material to the target.

Application Rate Terminology

Spray to Wet Surface: When the label says to "spray to wet surfaces," such as carpets, baseboards, or plant leaves, this means that enough pesticide is applied to cause the surface to be damp or wet to the touch, but not to cause the pesticide to run, drip, or puddle.

Spray to Drip: A label may indicate a pesticide is to be "sprayed to drip" or "spray to run off." This means that the spray droplets run together and start to drip off the plants. Spraying should be stopped just as the pesticide first begins to drip off the plants.

Light Dusting: Dusts should be applied in a very fine layer. A "light dusting" means just enough to barely see a dusty effect. This does not mean the dust is thick enough to obscure the surface. Thick dust repels insects and when applied to plants, also stops sunlight from the reaching leaves.

Broadcast Treatment: When a pesticide is applied evenly over an entire area it is termed a "broadcast treatment." An example is treating an entire lawn for a broad-leaved weed infestation using a selective herbicide.

Spot Treatment: A "spot treatment" is just what it sounds like. The pesticide is applied to small, specific areas, such as individual plants or areas less than 15-20 cm² in size. For example, a lawn with a light infestation of broad-leaved weeds could be spot-treated with herbicides. The herbicides would be applied just to the individual weeds rather than treating the whole lawn.

When Customers Cannot Handle the Pest Problem

Some customers do not have the expertise to deal with pest control problems. This may be especially true if the pest population may cause a health problem (for example, a large rodent infestation in a home or serious structural damage from termites). Customers may not know enough about the pest biology, inspection methods, application methods or safety considerations. Some customers may not be able to read the label well enough to know how to use the pesticide or may not be physically able to carry out the work. In such cases, the dispenser should advise customers that it would be best for them to use a pest control service company. These companies are listed under "Pest Control" in the Yellow Pages of the telephone book. A policy for making such recommendations to customers should be developed and discussed with staff at each pesticide vendor outlet.

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Pesticide Use Calculations

Introduction

Dust or granular pesticides, and many liquid pesticides, are sold in formulations that are ready to use without further mixing. It is relatively easy to calculate how much to buy or use of such products. Pesticide concentrates, which must be diluted with water before use, require an extra calculation step. Calculations for diluting concentrates are described later in this section.

Pesticide dispensers should be able to assist customers with two types of pesticide use calculations.

You should be able to determine:

- how much pesticide the customer should buy
- how much pesticide concentrate to add to a spray tank to make a certain quantity of a spray mixture

These calculations can only be made after it has been decided which pesticide will be used. This is because you must read the label to find out the application rate given for the specific pest, plants or site to be treated. The calculations required for these questions generally involve metric units and ratios. Dispensers should be familiar with both of these.

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Metric Units

Label rates use metric measures for length, area, weight and volume. The dispenser should be familiar with the following metric units:

- length is measured in metres (m)
- area is measured in square metres (m²)
- weight is measured in grams (g) or kilograms (kg)
- volume is measured in litres (L)

Dispensers must know the following relationships:

$$1 \text{ kg} = 1,000 \text{ grams (g)}$$

$$1 \text{ L} = 1,000 \text{ milliliters (ml)}$$

Dispensers should be able to convert from Imperial measures to metric measures.

Table 3. Conversion from Imperial to Metric Measures

| Imperial Measure | Times Conversion Factor | Metric Measure |
|-------------------------|--------------------------------|-----------------------------------|
| Feet | x 0.305 | = metres (m) |
| Yards | x 0.91 | = metres (m) |
| Square feet | x 0.093 | = square metres (m ²) |
| Teaspoon | x 5 | = milliliters (ml) |
| Tablespoon | x 15 | = milliliters (ml) |

Ratio Calculations

Most pesticide use calculations involve ratios. For example, to determine how much pesticide to add to a spray tank or how much to apply to a specific area.

A simple method of solving a ratio problem is to use cross-multiplication.

Ratio Calculations

Ratio calculations are easy when you understand the steps:

Example 1: General Example

6 apples cost \$1.20
How much do 20 apples cost?

Step 1. Set up the ratio:

Set up the ratio with the unknown factor on the top. This is the shortest way to do the calculation.

$$\frac{\$?}{20 \text{ apples}} = \frac{\$1.20}{6 \text{ apples}}$$

Think of this as: "\$? is related to 20 apples as \$1.20 is related to 6 apples"

Step 2. Cross-multiply:

$$\frac{\$?}{20} = \frac{\$1.20}{6}$$

$$\$? = \frac{\$1.20 \times 20}{6} \text{ (read this as: "multiply \$1.20 by 20, then 6 divide that result by 6")}$$

$$\$? = \$4.00$$

The cost of 20 apples = \$4.00

Example 2: Using Ratios to Calculate Amount of Pesticide Required

A label says to mix 250 ml of liquid pesticide concentrate per 1 L of spray. How much product do you add to a spray tank to make 1.5 L of spray?

Hint: In this case the unknown factor is ? ml needed to make a 1.5 L quantity. The known ratio is the ratio of 250 ml to 1 L as stated on the label

$$\text{The equation for cross-multiplying is: } \frac{? \text{ ml}}{1.5 \text{ L}} = \frac{250 \text{ ml}}{1 \text{ L}} \text{ (Remember: 1 L = 1000 ml)}$$

$$? \text{ ml} \times 1000 \text{ ml} = 250 \text{ ml} \times 1500 \text{ ml}$$

$$? \text{ ml} = \frac{250 \times 1500}{1000}$$

? ml = 375 ml of product is needed to make 1.5 L of spray

Most calculations in this section will be done by the ratio method. Not all steps were shown in calculations. Anyone having difficulty with the math in this section should seek assistance from an instructor, tutor, or someone who has an applicator certificate.

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Calculating How Much Pesticide to Buy

A common question asked by customers is how much pesticide do they need to buy for a pest problem. To answer this question, the dispenser needs to know:

- the number of plants to be treated
- the area to be treated
- the number of treatments required per year

If the customer has some information on the size of the area to be treated, the dispenser should be able to help calculate how much pesticide is needed.

If the customer does not have this information then it won't be possible to calculate the amount of pesticide required. In this case, it is best to recommend the smallest size container, preferably of a ready-to-use product, rather than a concentrate that requires mixing.

There are two ways that pesticide labels describe how much pesticide to use. They are "amount per area" (apply 250 ml per 100 m² of lawn) and "spray to wet" (use 50 ml in 4 L of spray). Examples are given for calculating how much pesticide is needed for each type of treatment.

Area of a Treatment Site

The first calculation that may be required is the size of the treatment area. By knowing how to calculate the size of a square, rectangle or triangle, the size of any treatment area can be calculated.

A very accurate way to measure the area is by using a tape measure. Another practical way to measure is by counting the number of paces it takes to walk the side of the area. On average, 1 long pace usually equals 1 m (this is easily checked against a measuring tape before pacing off the distance).

Area of square or rectangle = length X width

Example: A lawn is 10 m long and 6 m wide.

What is the area of the lawn?

Area = length X width
Area = 10 m X 6 m
Area = 60 m²

Example: A lawn is 10 m long and 6 m wide. What is the area of the lawn?

Area of triangle = $\frac{\text{length X width}}{2}$

Example: The length of the triangle-shaped area is 4 m and the width is 3 m. What is the area of the triangle?

Area = $\frac{\text{length X width}}{2}$

Area = $\frac{4 \text{ m X } 3 \text{ m}}{2}$

Area = $\frac{12 \text{ m}^2}{2} = 6 \text{ m}^2$

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Calculations for Ready-to-use Pesticides

For products sold already mixed to the correct concentration, such as ready-to-use sprays and granular or dust products, it is simple to calculate the amount required.

Amount per Area: Some pesticide labels state how much pesticide should be applied per area. For example, 250 ml per 100 m² for a liquid spray or 2.5 kg per 100 m² for a granular product. If the customer knows the area to be treated, calculating the amount to buy is relatively easy using a simple ratio calculation.

How Much Pesticide to Buy?

Example 1. Liquid Spray

The treatment area is 400 m². The application rate is 250 ml per 100 m².
What is the total amount of pesticide required to treat 400 m²?

$$\frac{? \text{ ml}}{400 \text{ m}^2} = \frac{250 \text{ ml}}{100 \text{ m}^2}$$

$$? \text{ ml} = \frac{250 \text{ ml X } 400 \text{ m}^2}{100 \text{ m}^2}$$

$$? \text{ ml} = 1,000 \text{ ml}$$

1,000 ml of pesticide is needed to treat 400 m². (Note: 1,000 ml equals 1 L).
The customer would need one, 1 L container or two, 0.5 L containers.

Example 2. Granular or Dust Application

The label says to apply 2.5 kg per 100 m². The treatment area is 50 m² in size. What is the total amount of product required to treat the entire area?

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

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

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

1.25 kg of pesticide is needed to treat 50 m².

Note: You must look at the "net contents" size of the pesticide containers. If the net contents of the pesticide container is 0.5 kg, your customer would need 3 containers (0.5 + 0.5 + 0.5 = 1.5 kg). If the customer wants to make two applications in a season twice as many containers are needed.

"Spray to Wet" Surface: Some product labels say to spray individual plants, trees or structures. They might state "spray lightly" or "to run off," but may not give the expected area a certain amount of pesticide will cover. These instructions are on ready-to-use products, as well as on some products that must be diluted before use. How much to buy then depends on the number of plants or the area to be treated. This requires some experience and judgement on the part of the dispenser to assist in estimating the amount required.

In general, do not recommend concentrates for relatively small treatments. A customer may find it best to try the ready-to-use option first and to come back for a concentrate product if the ready-to-use product fell far short of covering the treatment area. Most customers have small yards and gardens, therefore, by discouraging them from buying too much pesticide you help them avoid the risks of storing chemicals around their home.

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Calculations for Pesticide Concentrates

When a pesticide concentrate is used, it is essential that the customer can calculate the correct amount of concentrate to mix with water in a sprayer.

Most pesticide labels give the application rate in the form of a dilution ratio, such as apply 15 ml per 1 L of water. A few may give the application rate in terms of the amount per area, such as apply 250 ml per 100 m².

Different calculations are required for these two types of label instructions, as follows:

Calculating Dilutions: The label may specify adding a certain amount of pesticide concentrate to make a quantity of spray. The user must calculate how much concentrate should be used to make up the total quantity of spray needed. For example, many garden sprayers hold 4 L, therefore, the following example shows how to calculate the amount of concentrate needed to make 4 L of spray.

Calculating Dilutions

Example:

The label says mix 15 ml in 1 L of water. The spray tank is 4 L in size. How much concentrate should be added to make 4 L of spray in the tank?

$$? \text{ ml} = \frac{15 \text{ ml} \times 4 \text{ L}}{1 \text{ L}}$$

$$? \text{ ml} = 60 \text{ ml}$$

60 ml of pesticide should be added to make 4 L of spray. Note: there are 15 ml to a tablespoon, so you need:

$$\frac{60 \text{ ml}}{15 \text{ ml per tablespoon}} = 4 \text{ tablespoons}$$

Calculating Amount Per Area: If the label says how much pesticide to apply per area, such as 250 ml per 100 m², you first need to know how much area your sprayer will cover. This is called calibrating the sprayer.

There are several ways to determine the area a sprayer will cover. For small sprayers, the easiest way to do this is to spray out a tankful of plain water to uniformly cover an area. Then measure the area. For example, if you covered an area of 20 x 6 m, your sprayer covers 120 m².

Note: A more detailed method, suitable for any size of sprayer, is given in Home and Garden Pest Management Guide for BC, produced by the Ministry of Agriculture, Food and Fisheries. Dispensers might want to recommend that a customer buy this book. Copies are available from [Crown Publications Inc](#), 521 Fort St., Victoria, as well as from local bookstores and garden centres.

The following example shows you how to calculate the amount of concentrate to add to a 4 L sprayer that you have determined will cover 120 m²:

Calculating Amount Per Area

Example:

The label application rate is 250 ml concentrate per 100 m². The sprayer coverage is 4 L per 120 m².

How much concentrate must be added to the spray tank to apply to 120 m²?

Hint: In this example the key ratio is the ml of concentrate per m² since you already know that you will use the entire 4 L of spray to cover the desired area. This can be calculated using ratios:

$$? \text{ ml concentrate per } 120 \text{ m}^2 \text{ is equal to } 250 \text{ ml concentrate per } 100 \text{ m}^2.$$

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

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

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

The answer is that 300 ml of concentrate should be added to a 4 L spray tank to cover 120 m².

A few labels give the application rate as the amount of concentrate to mix in a certain quantity of water to cover a given area. For example, the label may say to apply 50 ml of concentrate in 10 L of water to cover 100 m². In this case the sprayer must be adjusted to apply as close to 10 L of water per 100 m² as possible. If the sprayer doesn't hold 10 L, then the first calculation is to use a ratio to find out how much area the sprayer should cover at the correct rate.

How Much Area Will a Sprayer Treat?

Example:

The rate should be 10 L of spray per 100 m². The sprayer holds 4 L. How much area should be covered by a 4 L sprayer at the correct application rate of 10 L per 100 m²?

$$\frac{? \text{ m}^2}{100 \text{ m}^2} = \frac{4 \text{ L}}{10 \text{ L}}$$

$$? \text{ m}^2 = \frac{100 \text{ m}^2 \times 4 \text{ L}}{10 \text{ L}}$$

$$? \text{ m}^2 = 40 \text{ m}^2$$

The 4 L sprayer should be adjusted so that one tankful of spray covers 40 m². Then work out how much pesticide to add to the 4 L sprayer using a dilution calculation as above.

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Uniform Application

It can be difficult to uniformly cover a large area with spray, granules, or dust at the required application rate. A way to check this is to divide up the treatment area into smaller areas (for example, 10 m²). It is important to uniformly cover each 10 m² area with the right amount of pesticide, before going on to the next 10 m² area. Measuring out only enough pesticide to treat each 10 m² section further ensures the correct amount is used.

If a sprayer tank has volume measurements clearly marked on it (usually in 1 L divisions), it is easy to monitor the quantity of spray as it is being used to check that the correct amount is being applied.

Adjusting Output of Sprayers or Granular Applicators

To ensure a pesticide is applied at the correct rate, it may be necessary to adjust the output of the application equipment. For example, it is a good idea to check sprayer adjustments while using plain water in the sprayer until the correct amount is delivered.

If the application equipment is putting on too little or too much pesticide for the area, adjustments can be made as follows:

If the output is too low, for example, you want to apply 10 L of pesticide per 100 m², but actually use up only 6 L to cover 100 m², then you can:

- move the sprayer or spreader more quickly by walking faster
- decrease the air pressure in a compressed air sprayer
- close down the nozzle opening or release gate

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STUDY QUESTIONS

Answers are provided [here](#).

1. Describe the correct technique for using a compressed air sprayer.
2. What is one way to ensure that the material in a granular spreader is applied at a regular rate?
3. Why must pesticide application equipment be cleaned and checked before and after use?
4. What is the main disadvantage of using a hose-end sprayer to apply pesticides?
5. List four problems with over-applying pesticides.
6. Define "broadcast treatment". What is a "spot treatment"?
7. What is the difference between the application terms "spray to drip" and "spray to wet surface"?
8. A customer wants to treat a lawn that is 12 ft by 18 ft. How many m² is this?

9. An area to be treated is 8 m long and 7 m wide. During a test of the sprayer, the applicator used 0.5 L of spray to wet the surfaces. The test area was 2 m by 2 m. How much spray would be needed to treat the entire area (8 m x 7 m) at this rate?
10. A pesticide label says to use 15ml of concentrate per L of spray. How much pesticide concentrate would be required for the treatment area in question #9?
11. Another pesticide label says to apply 250 ml of liquid concentrate to 100 m² of treatment area. How much liquid concentrate would be required to treat the area in question #9?
12. Yet another pesticide label says to apply 1.5 kg per 100 m². How much of this pesticide would be required for treating the area in question #9?
13. Calculate the total amount of pesticide needed for question #9 if two treatments will be made in one year:
- a) using the pesticide from question #10
 - b) using the pesticide from question #11
 - c) using the pesticide from question #12
14. Calculate the number of containers required from question #13:
- a) using the total pesticide from #13 (a), if the container size is 80 ml
 - b) using the total pesticide from #13 (b), if the container size is 150 ml
 - c) using the total pesticide from #13 (c), if the container size is 1 kg
15. A pesticide label says to apply 250 ml per 100 m², using a compressed air sprayer. A gardener tries the sprayer on a 5 m² test area, and uses 15 mL of spray. Is the application rate correct? If not, what can the gardener do to change the application rate to comply with the label instructions?

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