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Information Note: Pesticide Application Methods and Areas of Use

Canada 



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The primary objective of Health Canada's Pest Management Regulatory Agency (PMRA) is to protect human health and the environment by minimising the risks associated with the use of pest control products. In determining whether a certain pesticide can be registered for a particular use, the PMRA considers all aspects of the proposed use, including where it is used (the use site) and how it is applied. This is because the amount of pesticide to which an individual may be exposed depends on a number of factors, including the application method, where it is applied and how much is applied in a given area. For example, applying a product by a tractor mounted boom sprayer results in different exposures than applying the same product by airplane. A product can be registered for a specific use only if that use does not pose any unacceptable risks to applicators or to bystanders.

This document provides general information on how and where pesticides (e.g., insecticides, herbicides and fungicides) may be used and how applicator and bystander exposures can be minimized.

Use Sites

In Canada, the agriculture sector is the main user of pesticides. However, there are many other use sites-forestry, greenhouses, aquatic sites, soil or structural fumigants, industrial vegetation, outdoor residential areas, inside residences and other buildings (e.g., warehouses) and mosquito control. Given the range of pesticide use sites, applications may be performed with a wide range of equipment. The method of application is selected based on factors such as the target pest, the site of application, the specific pesticide to be used as well as the cost and efficiency of alternative methods.

Application Equipment typically used for pesticide application may be divided into six general categories:

- ground sprayers
- applicators for solid formulations
- aerial sprayers
- fumigation equipment
- foggers
- chemigation

The following is an overview of the more common types of pesticide application equipment and some of the areas in which they are typically used.

Ground Sprayers for Liquids

Airblast Sprayers

Airblast sprayers are most often used on orchard crops, grapes and some berry crops. Airblast sprayers have nozzles placed in a very high speed air stream produced by a fan. The air stream propels the very fine spray droplets to the target. In addition, the air stream creates leaf movement, allowing better coverage of insecticides and fungicides.



Boom Sprayers

Boom sprayers have multiple nozzles spaced over the length of the boom. Tractor mounted booms sprayers are generally used to broadcast liquid pesticides over large areas such as agricultural crops or golf course turf. Field sprayers may have tank sizes ranging from 500 to 4000 litres and boom widths ranging from 6 to 36 metres.

Hand-held Sprayers

Handwand sprayers are light weight and hand operated. Their name is derived from the long metal extension that ends in an adjustable nozzle. A hose attaches the "wand" to a small portable tank or larger, stationary one. These sprayers can vary widely in type and pressure capability. The most commonly seen handwands are compressed-air sprayers. They may be used in a variety of settings such as spot herbicide application on turf or along roadsides, indoor crack and crevice treatments or greenhouses.

Backpack Sprayer

A backpack sprayer has a spray tank that fits comfortably on the back like a knapsack. The applicator pumps the sprayer handle to build up pressure in the tank and applies the product through a small hose / single nozzle assembly. Some backpack sprayers are battery or gas powered. The usual tank capacity is about 15 litres so that the tank weight is not excessive to the handler. Backpack sprayers are commonly used to treat small areas and may be used for spot herbicide application such as on turf or along roadsides and in greenhouses.

Applicators for Solid Formulations

Granular Spreader

Granular spreaders are available to broadcast pesticide granules over an entire field surface or in bands that correspond to crop rows. Application equipment may use gravity or a positive metering mechanism to regulate the flow of granules. Small, hand-operated granule dispersal equipment (e.g., push rotary spreaders) may be used to treat smaller areas such as in landscaping.

Dust Applicators

Equipment used to apply products as a dust range from simple shaking devices to power dusters. Dusts may be applied to indoor residential (crack and crevice) and outdoor residential (ornamental) settings or, in some cases, in greenhouse or agricultural settings.

Aerial Sprayers

Fixed wing aircraft and helicopters may be used for applying pesticides either as a solid or liquid (including ultra low volume spray). Fixed wing aircraft may be preferred when there are large, continuous areas that may be sprayed with a minimum number of turns. Helicopters are useful for treating discrete or isolated patches.

Fumigation

A fumigant is a pest control product that, at a specific temperature and pressure, can exist in the gaseous state in sufficient quantities to be lethal to a pest organism. Fumigants may move through air spaces between soil particles (soil fumigation) or



through air in structures (space fumigation). Space fumigation generally requires the gas be contained within the treatment area for a specified period. Following treatment, aeration takes place under controlled conditions until fumigant levels have dropped below specified levels.

When soil is fumigated, liquid fumigants may be applied using equipment similar to small field sprayers; however, spray nozzles are replaced with hose shanks that inject the liquid fumigant into the soil where it will volatilize.

Fogging Equipment

Outdoor foggers or space sprayers can be mounted on a truck or aircraft and used to form a cloud of small droplets that are suspended in air. This application method is often used to control adult mosquitoes and black flies. Two types of ground equipment are used for space sprays.

- Thermal foggers use heat to vaporize the insecticide into a highly visible dense fog. Diesel is often used as a carrier. Although used in the past, thermal fogging has been largely replaced by non-thermal fogging in Canada and the United States.
- Ultra low volume (ULV) sprayers, also known as "cold foggers", use concentrated insecticides with no carrier. Cold fogging produces small droplets of insecticide using special nozzles to break up the liquid droplets. As the droplets are microscopic in size, the spray area is increased, making it possible to effectively use very low application rates of the insecticide.

Fogging equipment may also be used indoors, such as in greenhouses, warehouses and farm buildings. A range of stationary/automatic or hand-held equipment is available for low volume applications.

- Mist blowers produce very fine droplets by air blast generation. As air is the major carrier, the concentration of the pesticide in the spray mixture may be high.
- Thermal foggers use heat to break up the pesticide into fine droplets. These products are usually formulated at low concentrations in an oil-based carrier.
- Ultra low volume or ultra low dosage (ULV/ULD) equipment reduces the volume by reducing the use of water or any other liquid carrier. Pesticides must be specially formulated for this application.
- Electrostatic equipment uses air to atomize or form spray droplets; the charged droplets are attracted to plants.

Chemigation

Chemigation is the application of chemicals, such as pesticides and fertilizers, to crops through an irrigation system (e.g., sprinkler, flood, furrow, drip or trickle) by mixing them with the irrigation water.



What Can Be Done to Reduce Exposure During and After Pesticide Applications?

Any unnecessary exposure to pesticides should be reduced or eliminated. Pesticide applicators can minimize exposure to themselves and others by carefully following all application instructions and precautionary statements on the product label.

It is good practice to minimize the presence of bystanders in the area while pesticides are being applied and immediately after. When a worker re-entry interval (the time after application at which re-entry to the treated area does not raise concerns regarding risk) is specified on the product label, it must be respected. Re-entry intervals are not specified for products applied in residential areas as it is not considered feasible to restrict entry into these spaces. As such, these products are only registered if they do not pose unacceptable risks to those working or playing in the treated area immediately after application. However, to minimize any unnecessary exposure to pesticides, it is still good practice to wait until the product has dried before re-entering the treated area to work or play.

Fogging operations for mosquito control are sometimes conducted in residential areas. The following actions will reduce exposure in such situations.

- Whenever possible, remain indoors when spraying is taking place and close all windows and doors.
- Bring laundry, toys and pets indoors before spraying begins.
- Cover swimming pools when feasible.
- Cover outdoor tables and play equipment or rinse with water after spraying is finished.
- Wash homegrown fruits and vegetables with water before cooking or eating them.
- Cover ornamental fish ponds to avoid direct exposure.

Currently, the product most commonly applied for mosquito control using fogging equipment is malathion.