



# Use of Misters for Locust Control

October 2010

## Introduction

Contrary to some beliefs, the use of misters for locust control is not prohibited. However, the risk of spray drift, and consequent off-target damage, from this type of equipment must be carefully considered. Amongst other things, insecticide spray drift poses a risk to livestock, human health, and beneficial insects including honeybees, fish and crustaceans.

Misters are a useful but imprecise way of applying pesticides to large areas quickly. They produce fine droplets and rely on wind to drift the pesticide. The prevailing weather conditions and the nature of the surrounding area need to be considered carefully.

Chemical users must always exercise a duty of care when applying insecticides. The argument that locust control is an “emergency” situation does not over-ride the requirement for chemical users to apply insecticides responsibly.

## Duty of Care

Under the *Agricultural and Veterinary Products (Control of Use) Act 2002* a person must, when using an agricultural chemical product, take all reasonable and practicable measures to prevent or minimise:

- Actual or potential contamination of land, animals or plants outside the target area
- Actual or potential harm to the health or safety of human beings within or outside the target area
- Other unintended actual or potential environmental harm within or outside the target area.

## Product Labels

READ THE LABEL before using an insecticide. It may contain statements related to application by misters. Labels also contain precautionary statements about drift management and avoiding off-target damage.

The following information is general advice based on the label directions of products that are registered for locust control. Check the label for the particular product that you are using.

- **Carbaryl:** DO NOT apply under meteorological conditions or from spraying equipment which could be expected to cause spray drift onto nearby plants, adjacent crops, croplands or pastures.
- **Chlorpyrifos:** Spray drift may occur under adverse meteorological conditions or from certain spray equipment. DO NOT allow spray to drift onto sensitive areas including, but not limited to, natural streams, rivers or waterways and human dwellings... Options for minimising drift to sensitive areas include not spraying within a certain distance of sensitive areas when the wind is blowing towards them or ensuring that drifting spray will be intercepted by a catching surface such as a row of shelter trees, and unsprayed row of orchard trees, or hail netting.
- **Diazinon:** Mister is included in the application methods listed on the label. The label has statements on –
  - Protection of Livestock
  - Protection of Wildlife, Fish, Crustaceans and Environment
- **Fenitrothion: *Misters and air assisted application.*** DO NOT apply without a buffer zone of AT LEAST 100m at rates of 350 mL/ha and below and AT LEAST 300m where rates are greater than 350 mL/ha when applied upwind of sensitive areas including (but not limited to) natural streams, rivers, waterways, human dwellings or neighbouring properties.
- **Fipronil:** Label has statements on –
  - Protection of Crops, Native and other Non-Target Plants
  - Protection of Livestock
  - Protection of Wildlife, Fish, Crustaceans and Environment

- **Maldison:** Mister is included in the application methods listed on the label. Label has statements on –
  - Protection of Livestock
  - Protection of Wildlife, Fish, Crustaceans and Environment
- **Metarhizium:** Label has statements on –
  - Protection of Bees
  - Protection of Wildlife, Fish, Crustaceans and Environment

## Operation of misters

- Angle the blower tube 45° upwards and 45° backwards
- Wind speed should be steady and between 5 and 20 km/hr
- Wind direction should always be at 90° to the direction of travel, so that the spray will always drift downwind.
- DO NOT use misters on hot (over 30°C), dry, windy days
- Turn upwind, turn the air-spout over and switch the spray off when turning at headlands
- Wear respirator, overalls, boots and hat while spraying and gloves while calibrating.

## Calibration of misters

It is important to check filters, nozzle, nozzle output and pump before each spraying day and to always use clean water.

- Check engine output. The fan speed should be greater than 5,500 rpm.
- Check the forward spraying speed. The forward speed is governed by the roughness of the paddock, but is normally in the range of 8 to 16 km/hr. Use the tachometer on the vehicle to judge the speed. Carry out a run over 100 m in a set time and note the revolutions needed to do that speed. Calculate speed by the following formula:  

$$\text{Speed (km/hr)} = 360 \text{ divided by No. seconds to travel 100 m}$$
- Do the calibration with a 50/50 water/spraying oil or water/diesel mix for low volume (LV) formulations, or diesel for ultra-low volume (ULV) formulations. Do *not* calibrate with insecticide in the tank.
- Decide on the application rate and the spraying speed you want, and estimate the swath width. Adjust the output of the mister to give the correct flow rate according to the following formula:

- Mister output (L/min) *minus* Application rate (L/ha) *multiplied by* Forward speed (km/hr) *multiplied by* Swath width (m) *divided by* 600
- Measure the mister output by removing the outlet hose and jet from the air-spout, running the machine for a minute and measuring the output in a measuring cylinder or jug.
- Check the swath width, using strips of oil-sensitive paper for ULV formulations or water-sensitive paper for LV formulations, laid down in the paddock at 10 m intervals as in Figure 1. Start up the mister, and drive 30 to 50 m past the test strips on the upwind side at the desired spraying speed.

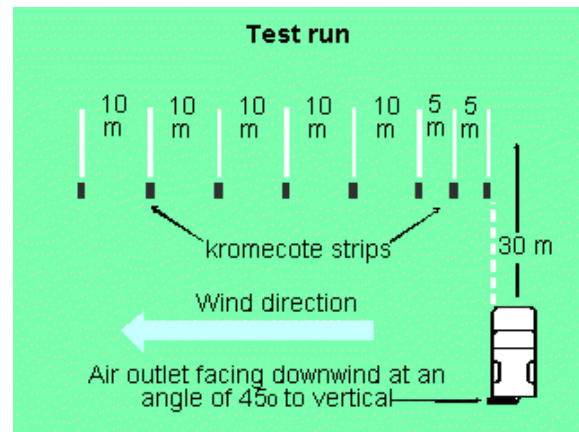


Figure 1. Mister test run (Source: Hardi Spraying Equipment Pty Ltd WA)

Examine the paper strips and count the number of droplets in an area of 1 sq. cm on each of the strips, using a magnifying glass. The ideal number is 20 to 30 drops per sq. cm. Measure the distance between the first and last strip that show the ideal number of droplets. This is the swath width to be used in the calibration formula.

Remember that the swath width is dependent on the wind speed and the chemical formulation. Because of the variability of coverage, it is better to have slightly narrower swaths to ensure effective locust control.

The distance between each run should overlap the previous swath, mainly because of the tapering off of droplet size and number as distance from the nozzle increases. Taking this effect into account, the recommended swath widths are as follows:

- ULV formulations: 40 to 80 m
- LV formulations:
  - EC and flowable liquids - 20 to 45 m
  - Wettable powders - 20 m

## Further Information

- [www.pir.sa.gov.au/locust](http://www.pir.sa.gov.au/locust)

# Calibration of Misters and Boomless Jets

Check filters, nozzle, nozzle output and pump before each spraying day

Always use clean water

## 1 To calibrate

1.1 Measure swathe width of the mister .....m

1.2 Fill and measure tank with clean water and mark the water level

1.3 Measure length of a dummy spray application run .....m

1.4 Top up, and measure, spray tank to the level in 1.2 .....L

## 2 Area treated

2.1 Multiply the swathe width (1.1) x distance travelled (1.3) to give the area treated in

square metres .....m x .....m = ..... m<sup>2</sup>

2.2 Divide 2.1 by 10,000 (square metres in a hectare) to give hectares treated in dummy run .....ha

## 3 Coverage per hectare

3.1 Divide volume used (1.4) by area treated (2.2)

..... L ÷ ..... ha = ..... L/ha

## 4 Coverage by spray tank

4.1 Divide tank volume (1.2) by coverage/hectare (3.1)

.... L ÷ ..... L/ha = ..... ha/tank

## 5 Amount of insecticide to be added to spray tank

5.1 Multiply insecticide application rate from label by coverage (4.1) to give the

amount of insecticide to be added to a full tank

..... ml/ha x ..... ha/tank = ..... mL/tank

5.2 Divide mL/tank (5.1) by 1000 (mL in a litre) to give the amount of insecticide to add to the tank in litres

..... mL ÷ 1000 (mL per litre) = ..... L

# Calibration of Misters and Boomless Jets - example

Check filters, nozzle, nozzle output and pump before each spraying day

Always use clean water

## 1 To calibrate

- 1.1 Measure swathe width of the mister 9 m
- 1.2 Fill and measure tank with clean water and mark the water level
- 1.3 Measure length of a dummy spray application run 500 m
- 1.4 Top up, and measure, spray tank to the level in 1.2 10 L

## 2 Area treated

- 2.1 Multiply the swathe width (1.1) x distance travelled (1.3) to give the area treated in square metres  
 $9 \text{ m} \times 500 \text{ m} = 4500 \text{ m}^2$
- 2.2 Divide 2.1 by 10,000 (square metres in a hectare) to give hectares treated in dummy run 0.45 ha

## 3 Coverage per hectare

- 3.1 Divide volume used (1.4) by area treated (2.2)  
 $10 \text{ L} \div 0.45 \text{ ha} = 22.2 \text{ L/ha}$

## 4 Coverage by spray tank

- 4.1 Divide tank volume (1.2) by coverage/hectare (3.1)  
 $400 \text{ L} \div 22.2 \text{ L/ha} = 18.0 \text{ ha/tank}$

## 5 Amount of insecticide to be added to spray tank

- 5.1 Multiply insecticide application rate from label by coverage (4.1) to give the amount of insecticide to be added to a full tank  
 $270 \text{ ml/ha} \times 18.0 \text{ ha/tank} = 4860 \text{ mL/tank}$
- 5.2 Divide mL/tank (5.1) by 1000 (mL in a litre) to give the amount of insecticide to add to the tank in litres  
 $4860 \div 1000 \text{ (per litre)} = 4.86 \text{ L}$

### Disclaimer

Use of the information/advice in the Fact Sheets is at your own risk. Primary Industries & Resources South Australia, the South Australian Research and Development Institute and their employees do not warrant or make any representation regarding the use or results of the use of the information contained herein as regards to its correctness, accuracy, reliability, currency or otherwise. The entire risk as to the results from the implementation of the information/advice which has been given to you is assumed by you. All liability or responsibility to any person using the information/advice is expressly disclaimed by PIRSA, SARDI and their employees.