NOVA SCOTIA ENVIRONMENTAL FARM PLAN

factsheet

Air-Blast Sprayer Calibration for Orchards and Vineyards

Introduction

Sprayer calibration ensures proper application rates, requires little time and can achieve substantial economic and environmental benefits. As a minimum, sprayers should be calibrated at the beginning of each growing season. This should be done more often if spraying large areas and/or when abrasive materials are used.

Pre-Calibration Checklist

1. Ensure the sprayer is in good operating condition, there are no leaks, there is adequate agitation, and the pressure gauge is working properly.
2. Ensure the tractor tachometer is working so that a consistent operating speed can be maintained.
3. Check uniformity of spray pattern and output:
   - Run sprayer at operating pressure and rpm, visually checking spray pattern from nozzles.
   - Replace worn or damaged nozzles. Connect hoses to each of the nozzles and measure the flow from each nozzle into a calibrated container. Nozzles that vary more than 5% should be replaced.
4. Information required for calibration:
   - Spray pressure
   - Travel speed
   - Required spray volume, and
   - Row spacing

Spray Pressure

Operating pressure will differ with the type of nozzles (hydraulic or shear) and the total volume of spray applied. A wide range of pressure settings can be used for disc core nozzles depending on the volume to be sprayed and desired coverage. Lower pressures can be used for dilute applications and higher pressures for concentrate. However, ceramic hydraulic style nozzles must be operated at a minimum of 100 psi (690 kpa) for optimal spray pattern. Shear type nozzles use low pressure as spray break-up is accomplished by the air-stream.

High operating pressure and abrasive spray solutions significantly increase nozzle wear. Nozzles should be checked often and replaced when necessary.

Changes in pressure affect sprayer output volumes. Once established, operating pressure should be recorded and maintained.

Travel Speed

Travel speed must be slow enough to ensure adequate coverage of foliage. In general, a travel speed of 1.5-5 km/h will give satisfactory results. The forward velocity associated with higher travel speeds may inhibit spray from entering the canopy adequately.

Spray Volume

If setting up the sprayer for the first time you will need to select a nozzle combination for a particular output (L/min/side flow rate) based on desired volume per hectare (L/ha), row spacing (m) and travel speed (km/hr).

To determine the **L/min/side** required:

$$\frac{\text{L/ha x row spacing (m) x travel speed (km/hr)}}{1200}$$

Using nozzle charts and Figure 1, select nozzles which will add up to the desired flow rate per side (L/min/side). Match the vertical distribution of spray output with the canopy volume distribution. Once the sprayer is equipped with the appropriate nozzles the actual output can be determined using the 'Sprayer Calibration Procedure'.

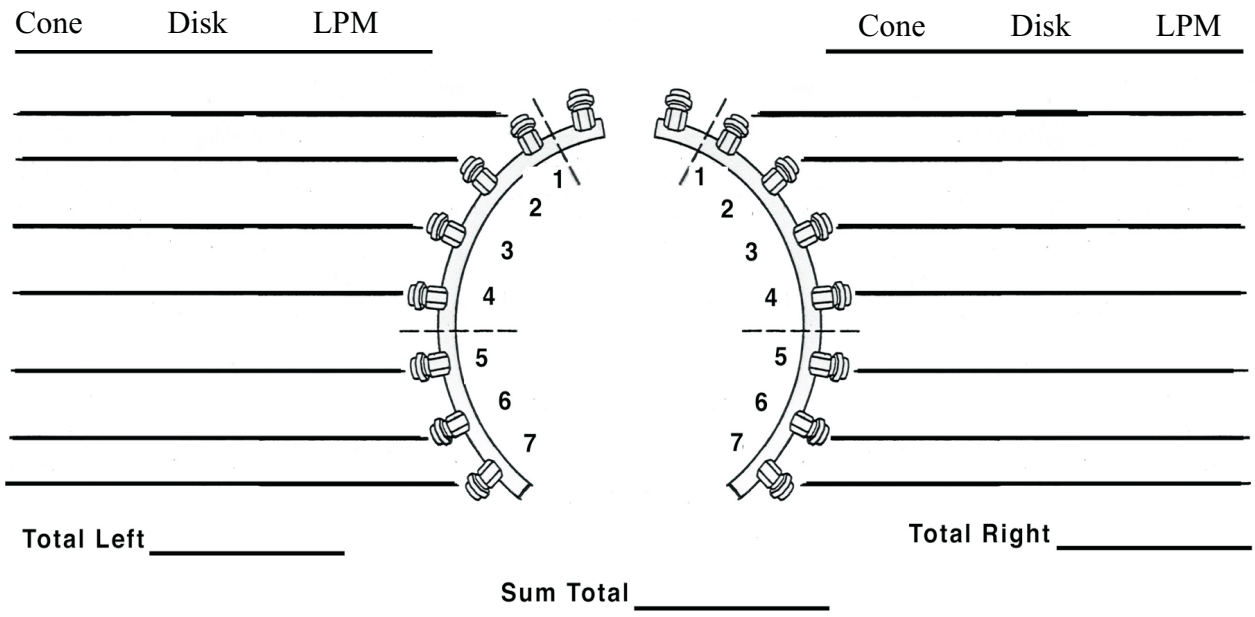

Figure 1. Nozzle selection to meet desired L/min/side flow rate (Taken from Landers 2003).

Row Spacing

The row width (m) is the effective swath width of the air-blast sprayer. For optimum coverage do not attempt to treat more than one row width with each pass. If row widths only vary slightly, use the average to calculate spray volume, making certain not to exceed product label rates. Otherwise, separate calculations should be done for each block of a different row width, adjusting travel speed and/or pressure to accommodate.

Sprayer Calibration Procedure

1. Measure a calibration course of 50 m.
2. Half fill the sprayer tank with clean water.
3. Record the time required to travel the course at the desired speed. Repeat for an average. To determine travel speed:

$$\text{Km/hr} = \frac{\text{50 m x 3.6}}{\text{avg. course time (sec)}}$$

4. Completely fill the sprayer tank at a location you can easily spray and refill without moving the equipment. Spray water for 3 minutes.
5. Using a calibrated bucket or a flow meter, accurately measure the water required to completely re-fill the sprayer.

$$\text{L/min/side} = \frac{\text{L to re-fill}}{\text{3 minutes x 2 sides}}$$

6. Using the L/min/side value calculated in Step 5:

$$\text{L/ha} = \frac{\text{L/min/side x 1200}}{\text{Row spacing (m) x travel speed (km/hr)}}$$

7. Repeat steps to verify results. Keep results of your calibration in a crop record book.

See *Tree-Row-Volume: concept, calculations and application* factsheet if utilizing this concept.

A vertical patternator is available which provides assessment of spray pattern and airflow for better spray deposition on the crop canopy effectively reducing drift.

Regular Maintenance

1. Wash the outside of the sprayer.
2. Remove and clean all screens and nozzles.
3. Rinse tank thoroughly, dispose of rinsate according to label instructions.
4. Disinfect tank when changing pesticides.

Conversions

L/ha x 0.089 = Imperial gallons/acre
L/ha x 0.4 = Litres/acre
L/ha x 0.11 = US gallons/acre

For further information contact:

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