CRC for Viticulture
Pesticide application fact sheet 7

Cooperative Research Centre for Viticulture

How to determine chemical rates in viticulture

With the move towards concentrate (low volume) spraying and a new chemical label format it has become clear that there can be some difficulty in determining chemical rates and water volumes required for spraying vines. In this fact sheet the procedure that should be followed to determine water volumes and chemical rates is briefly outlined beginning with definitions of spray application terminology.

Terminology used in spray application

Dilute label rate
The product concentration given on the label for dilute spraying - expressed as grams or millilitres per 100 litres of spray - **A *lethal dose* is applied if the dilute label rate is used in a volume that thoroughly wets the vine canopy**

Application rate
The amount sprayed out per hectare or per 100 metres of vine but it is not the amount of chemical deposited on the vine - Application rate = label rate X water volume eg. 200 g/100L x1000 L/ha = 2 kg/ha

Coverage
Percentage (%) of target surface covered by deposits

Dilute water volume
Volume of water required to 'thoroughly wet' a particular vine canopy

Dose
The amount of chemical deposited on a target surface such as a leaf or berry but it is not the amount of chemical sprayed out per hectare - *Lethal dose* is the amount of chemical that needs to be deposited to control a pest or disease

Point of run off
Also known as 'thoroughly wet' and refers to coverage achieved where the majority of the canopy is covered in droplets so that some join together and run off foliage or bunches

Effective pesticide application - coverage and dose

Effective pest and disease control requires both:

- Adequate **coverage** of the vine canopy
- Sufficient **dose** of the chemical to effectively control the pest or disease

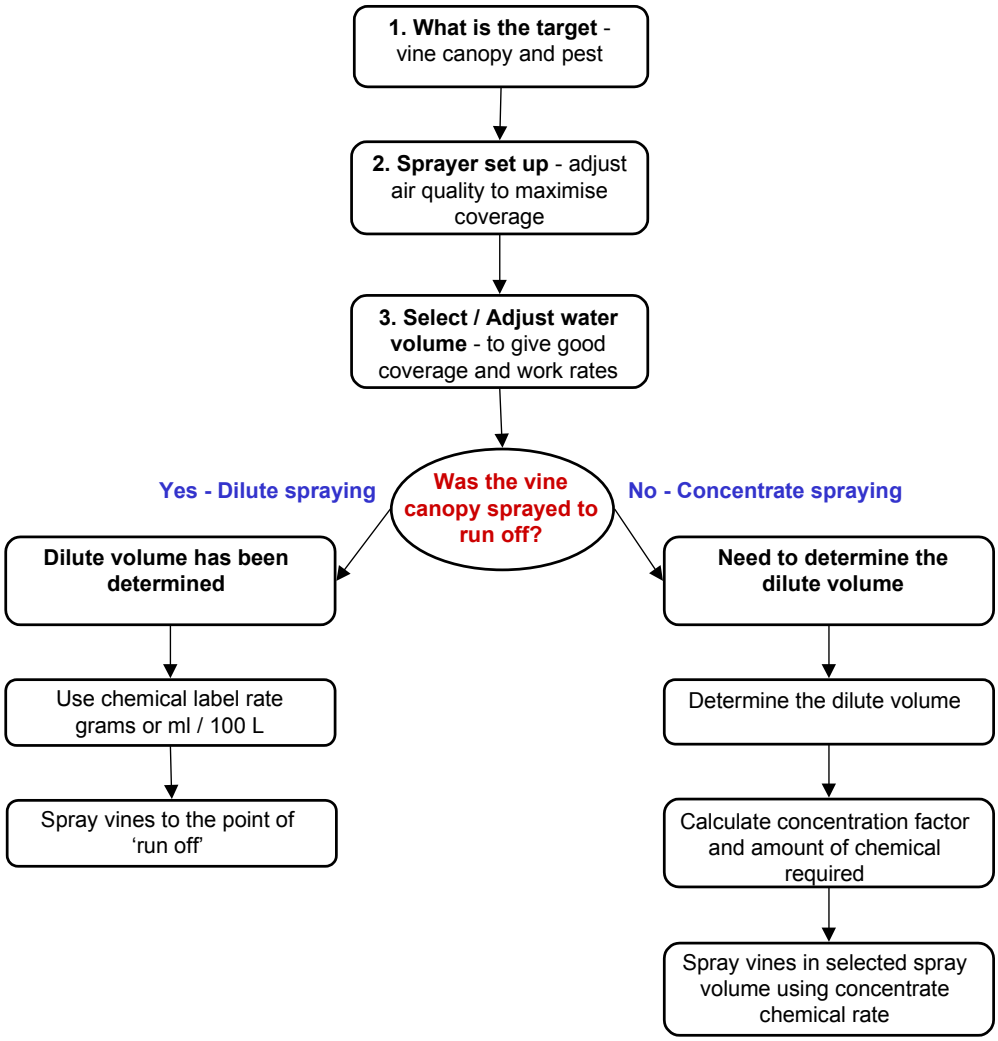
The critical steps in achieving spray coverage and dose required are:

1. Identifying the spray target (biological and application target)
2. Adjusting the sprayer set up to match air output to the canopy being sprayed
3. Selection of spray water volumes
4. Determination of the dilute water volume for the canopy being sprayed
5. Calculating chemical rates required based on the dilute volume

If each one of these steps is performed correctly then the chemical spray program being implemented should be effective. Although it is important to apply the right water volumes and chemical rates to a canopy it should be remembered that this will not control a disease unless good coverage has been achieved.

Increasing spray volumes and chemical rates will not improve coverage unless the sprayer set up is correct

Sprayer set up and spray volume adjustment for achieving coverage and dose



Correct timing and targeting of applications is of critical importance in getting effective control (See *Pesticide fact sheet 1*). The first step in achieving this is identifying the pest or disease and understanding its life cycle ie. It's biology, ecology and behaviour. From this information the application target (or where the spray has to be placed to kill the pest or disease) is determined, a chemical with the appropriate characteristics selected and application technique adjusted to suit the target.

Sprayer adjustment and evaluation is carried out next to maximise coverage throughout the canopy being sprayed (See *Pesticide fact sheet 5*). This involves determining the best spray quality (droplet size) and air quality (air volume, speed and direction) for that particular spray target. At the same time spray water volumes are adjusted to ensure good coverage. Once the spray coverage has been optimised a decision is made as to whether the vine canopy has been sprayed to the 'point of run off' ie. it has been thoroughly wet (See *Pesticide fact sheet 8*).

If this is the case then the spray volume used is the 'dilute volume' for the application meaning that spraying can commence by using the chemical label rate and ensuring that vines are sprayed to run off ie. dilute spraying. If the vine canopy has <u>not</u> been sprayed to run off then the 'dilute volume' must be determined (*See Pesticide fact sheet 9*) so that the concentrate chemical rate to be added to the spray tank can be calculated for concentrate spraying (See *Pesticide fact sheet 10*).

Further information

- *Spray Application Viticulture: Research to Practice*® is a training package that can be fine-tuned to suit regional requirements and includes workshops, short courses and a comprehensive manual.

- D. Manktelow (2000). *Getting pesticide application right: spray volume, deposition and chemical rate requirements for grape canopies.* Australian Grapegrower & Winemaker, November, p.46-47.