

CRC for Viticulture

Pesticide application fact sheet 8



Dilute and concentrate spraying

When using new chemical label directions that only provide a 'rate per 100 litres' the water volume required to spray a vine canopy to run off, or dilute volume, **must always be determined** before a chemical rate can be calculated (See *Pesticide fact sheet 9*).

This is the cornerstone of the new label directions because it sets the amount of product that must be applied to a particular canopy whether by dilute or concentrate spraying.

Dilute spraying (high volume): the vine is sprayed to the point of run-off (thoroughly wet), using the dilute chemical rate of g or mL/100 L from the label.

Concentrate spraying (low volume): the vine is sprayed with a water volume that is less than that required for dilute spraying to the point of run-off, while applying the same amount of chemical (kg/ha) that would have been applied if dilute spraying.

Dilute spraying

When dilute spraying, the ml or g per 100 L chemical rate from the label is mixed in the spray tank and the foliage is sprayed to the point of run-off. Application should be to a level of coverage just before the point at which the spray starts to run off the plant surface. Spraying to this point will maximise the amount of product applied, avoid wastage and reduce possible unwanted contamination to the environment.

When dilute spraying higher water volumes are used during the season in comparison to concentrate spraying and a wider range of droplet sizes are produced by spray equipment. Spray volumes are also increased through the season to closely match vine canopy growth.

What is the 'point of run off'?

The term 'to the point of run off' or 'thoroughly wet' is actually quite difficult to describe. It is usually defined as the point at which spray starts to run off the surface of a leaf or bunch but this point can be difficult to identify. Further complications arise because not all parts of the canopy being sprayed will have the same coverage at any one time. In most cases outer leaves closest to the sprayer nozzles will capture more droplets than leaves in the centre of the vine and the aim of setting up the sprayer is to even out the coverage throughout the canopy.

It is clear that we are not talking about a specific point but rather an overall level of wetness throughout a particular canopy and some estimation will be required.

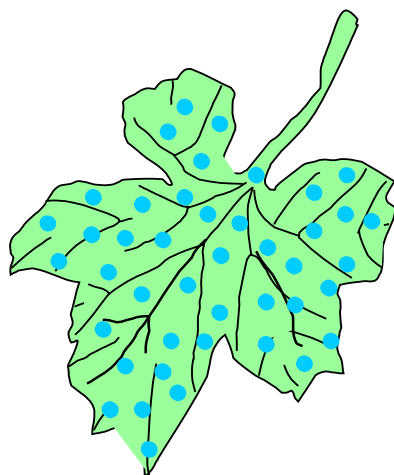
The 'point of run off' can most simply be defined as the point where most droplets on outer foliage of a vine canopy begin to join together with 'some' pooling at the edge of leaves and run off. But this point has only been reached once the sprayer has been set up to ensure even coverage of inner foliage and bunches ie. an even coverage of droplets should be visible inside the canopy.

In estimating the point of run off and level of wetness in a vine canopy the following factors should be considered:

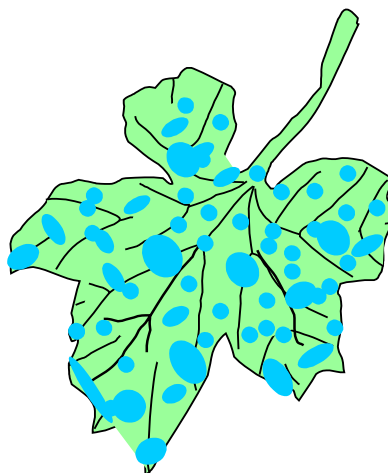
- ❑ The point of run-off should be estimated based on the evenness of canopy wetness ie. a balance between different levels of coverage across the canopy
- ❑ Leaves near the sprayer will usually show signs of run off before the inner parts of the vine canopy that may never reach this point
- ❑ Aim to adequately cover the inner canopy before run off begins on outer canopy by correctly adjusting spray equipment
- ❑ Run off has not been reached if spray is dripping from outer leaves but the inner canopy is mostly dry

- ❑ Droplet sizes used for spraying will have an influence on estimating the point of run off ie. it is more difficult to 'thoroughly wet' a vine canopy using fine droplets
- ❑ When targeting bunches the point of run off should be based on the level of wetness and coverage on berries
- ❑ The use of water sensitive papers may help in estimating when the point of run-off has been reached

Comparison of levels of coverage and wetness at the point of run off in a vine canopy



Spray coverage on foliage inside canopy at the 'point of run off'



Spray coverage on outer leaves of canopy at the 'point of run off'

Concentrate spraying

Concentrate spraying is a relatively recent development. It refers to the application of a pesticide in a water volume that is less than the volume required for dilute spraying to the point of run off.

But the same amount of chemical (kg/ha) is sprayed that would have been applied if dilute spraying had been used. For this to be achieved, the concentration of product in the spray mixture must be increased proportionally, as the volume of water is decreased (See *Pesticide fact sheet 10*).

Sprayers used for concentrate spraying generate spray clouds of fine droplets with a relatively narrow size spectrum. With a more effective conversion of spray mixture to useful droplets (by reducing the proportions of large and very fine droplets) the volume of spray mixture needed to achieve coverage of plant surfaces is reduced.

Spray volumes used for concentrate spraying are selected to ensure **good coverage** and a **reasonable work rate**. These are increased through the season as the canopy grows to ensure coverage is maintained as foliage area increases. Dilute and concentrate sprays can be applied by most spray equipment used in viticulture although the highest water volumes produced by air shear sprayers are unlikely to be sufficient for late season dilute spraying.

Sprayer set up (air volume, speed and direction) and appropriate droplet sizes to ensure sufficient coverage at low water volumes are the key components to effective concentrate spraying.

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.
- L. Radunz (2000). *New label directions for vine chemicals*. Australian Grapegrower & Winemaker, August, p.43-45.
- Label Directions for Spraying Vine Canopies. Bayer CropScience August 2003