

Water-stain treatment in Kiwifruit

ORCHARD to MARKET

Water-stain removal from Kiwifruit, especially Hayward can be difficult to achieve. Often the results vary widely from property to property, even where the same products and same application method have been used.

This often leads to frustration and sometimes extreme measures are attempted, frequently without notable success.

A basic understanding of the nature of the problem will help ensure best possible results.

The Problem

The problem, of course is the dark stain, often running in streaks down the fruit providing a contrast of colour on the skin of the fruit making it unacceptable for export. This stain, of tannins washed out of dead tissue in the canopy and running down the fruit, is relatively easily removed by the application of a mildly acidic solution.



There have been three active ingredients

approved for use on kiwifruit, Citric acid, Lactic acid phosphate and Calcium phosphate.

All water-stain sprays use one or more of these raw materials.

The Real Problem

The real problem of course, is that kiwifruit, especially Hayward, is very difficult to wet properly because of its very dense hairs.

The water-stain is on both the hairs and skin of Hayward. The hairs are removed by brushes prior to the fruit crossing the grading table leaving the stain on the skin as the reason that the fruit is rejected for export.

The hairs on the fruit create a situation of increasing the surface area to be covered by the water-stain removal spray. The surface of the hair and the skin provide some resistance to the spread of water on the surface, rather like the beading of water on a waxed surface.

This is called "surface tension" and is the resistance of the water to spread out on a surface.

The solution

The answer to the problem is to add a chemical to the water-stain remover product to decrease the surface tension so that the skin of the fruit can be wet by the product.

These chemicals are called surface active agents and are known as "surfactants". Most of the formulated water-stain removal products have "surfactants" included in the formulation.

The effectiveness of the "surfactants" in the formulation can vary due to a very wide range of factors including the hardness (or softness) of the water.

The answer may be as simple as adding some more "surfactant". This is easily done as the "wetting agent" used for your other sprays acts as a "surfactant".

Water-stain removal products are acidic by nature and this acidity can breakdown the surfactant in the formulation as well as the added wetting agent if left in the tank for any length of time. Tank mixed spray should be used immediately. Only use freshly mixed solutions to spray your fruit.

Other factors that will improve the result are;

- a relatively high water rate, in the order of 3000 litres/ha.
- spraying both directions in each row.

Coverage is also critical, remember that your target is the fruit so there is no requirement to wet all of the leaves in the canopy as you would with an insecticide. Target the fruit only and avoid excessive runoff from the leaves to the fruit as the chemical may remove the stain from the dead leaf and run more of it onto the fruit. Water-stain removal products need time to work and are best applied one or two days prior to harvest. Their performance is often improved by light rain or a couple of heavy dews. They should be reapplied if they have been subjected to 10 to 12 mm or more of rain.

Summary

Water-stain comes from dead tissue in the canopy.

Water-stain is easily removed with an appropriate product.

Kiwifruit, especially Hayward can be very difficult to wet effectively.

The performance of water-stain removal products can be improved by the addition of a wetting agent on difficult to wet crops.

Use tank mixed chemical straight away.

Coverage of the fruit without excessive runoff from the canopy is vital.

The products need time on the fruit to work.

Reapply after 10mm or more of rain.



Best Practice Water-stain removal sprays

- use only an approved product
- use the product at recommended label rates
- use a relatively high water rate (3000 l/ha)
- spray both directions in each row
- add some wetting agent on hard to wet crops
- use tank mixed chemical straight away
- apply to the fruit only. Try not to wet the leaves excessively
- apply one to two days prior to harvest
- reapply if there has been 10 to 12mm of rain or more