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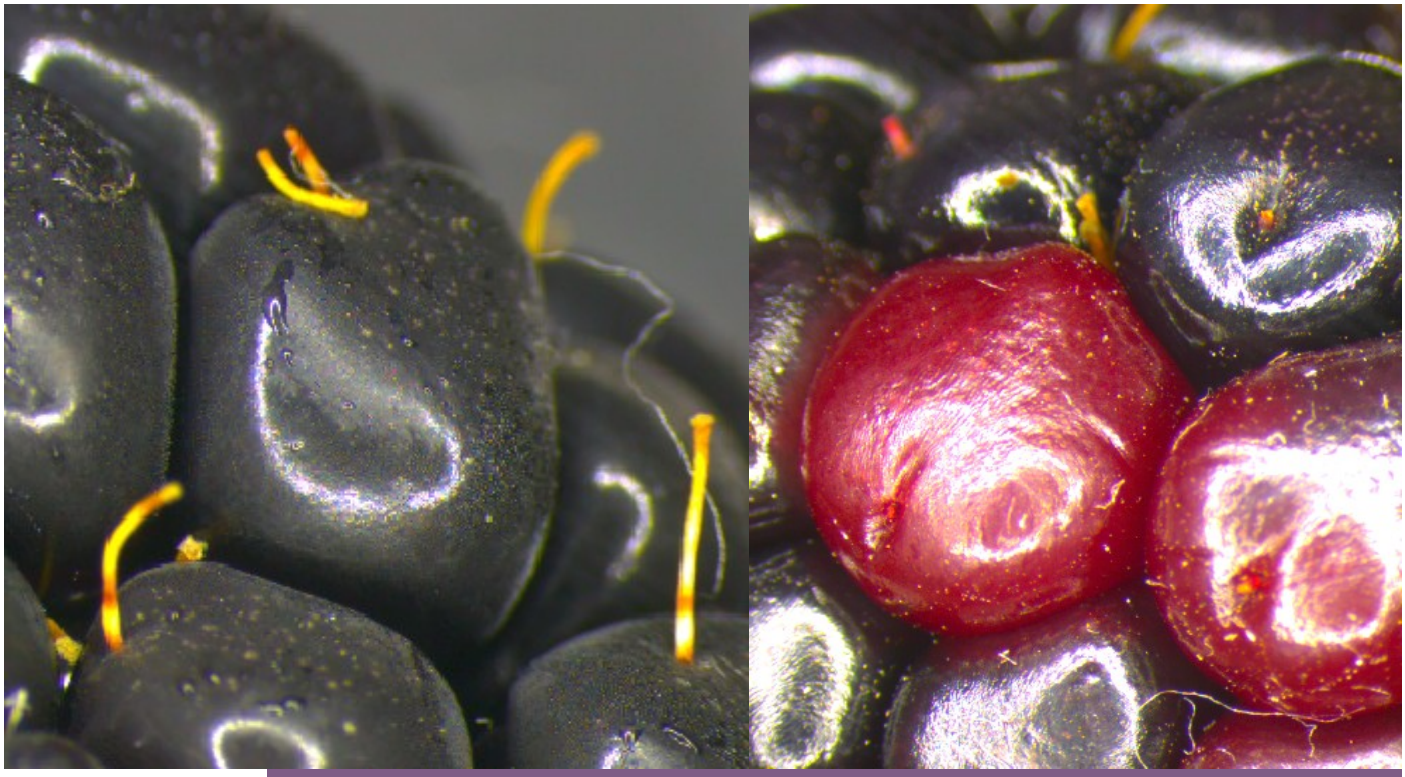

Perennial Horticulture Fact Sheet

Managing Red Drupelet Disorder

Key Points

- Physical damage during harvest and shipping is the main cause of red drupelet disorder; but fruit is more prone under certain conditions
- High nitrogen fertigation during harvest can significantly increase the amount of fruit with red drupelet disorder post-harvest
- Fruit core temperatures exceeding 23C at harvest significantly increase the amount of red drupelet post-harvest
- Harvest times, techniques, and shipping conditions can be manipulated to reduce incidence of red drupelet disorder
- A step-cooling process reducing the rate of cooling post-harvest has been effective in reducing incidence of the disorder

Introduction

Red drupelet disorder (RDD), sometimes referred to as drupelet reversion or reddening, is a physiological disorder of blackberry fruit. Individual drupelets that appear uniform in colour with the rest of the fruit at harvest revert to a red colour following cool storage. Although there are a number of other causes for blackberries to change colour including UV damage, freeze damage, leakage, and insect damage, RDD is thought to be independent of these. Drupelet disorder can affect up to 50% of a crop and is one of the least understood postharvest problems in blackberry fruit production.

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TIA is a joint venture of the University of Tasmania and the Tasmanian Government

Underlying Physiology

The underlying mechanism responsible for the disorder is a degradation of the anthocyanin pigments which give blackberry fruit their colour. This happens when the cells of the fruit are damaged at harvest or during transport, and is exacerbated by certain environmental conditions such as rapid changes of temperature after damage.

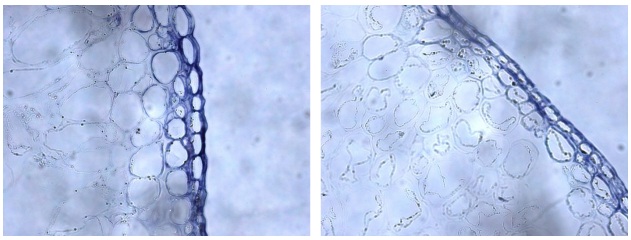

Image 1: Healthy blackberry cells (left) compared to damaged cells in drupelets affected by red drupelet disorder (right)

Harvest and Post-harvest Conditions

Environmental conditions such as temperature, humidity, and plant water status at harvest may influence expression of RDD. Fruit which has a higher skin temperature at harvest is significantly more prone to developing red drupelet post-harvest.

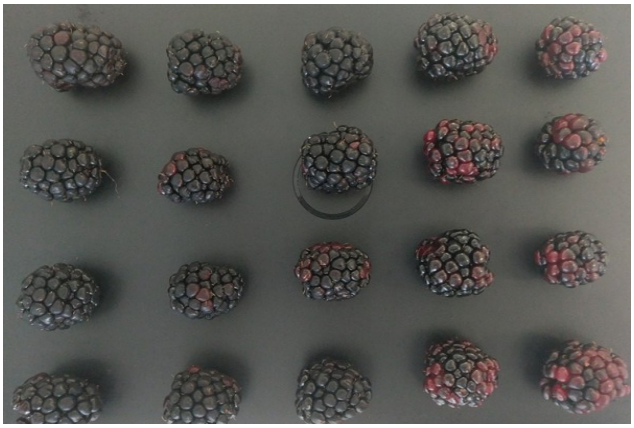

Image 2: Fruit harvested at increasing skin temperatures (left to right)

Rate of Cooling

The rate at which fruit is cooled post-harvest has also been shown to play a role in the expression of the disorder. Fruit which is cooled at a slower rate in a 'step-cooling' process had significantly lower incidence of red drupelet in one trial. It is thought that rapid temperature change following physical damage to the fruit can affect weight loss and physiological responses.

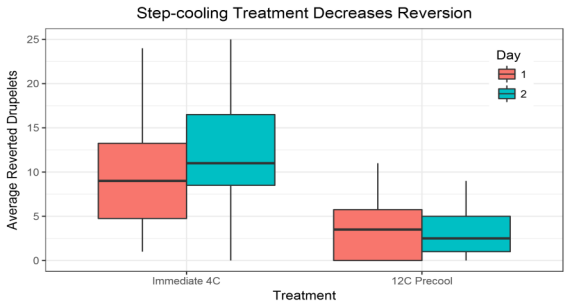

Figure 1: Results from a two day trial comparing storage techniques on RDD incidence

Nitrogen Fertigation

The project has included a two-year field trial looking into the effects of nitrogen fertigation rates on post-harvest expression of the disorder. The results of this study include:

- High nitrogen application rates during harvest produced higher rates of red drupelet disorder
- Higher nitrogen rates also produced larger fruit for parts of the season, and higher overall yields

Ongoing Work

Work is ongoing to shed further light on the physiology of the disorder, as well as assessing potential management techniques to reduce incidence.

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Hort Innovation
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