

# Addressing exposure of Chardonnay in Queensland vineyards

By Ursula Kennedy<sup>1</sup>

The winegrape growing regions of Queensland are climatically distinct from the majority of other Australian winegrowing regions. Queensland hosts the most northerly and some of the highest altitude vineyards in Australia which are, therefore, subject to high ultra-violet (UV) radiation exposure, higher than any other grapegrowing region in Australia (<http://www.arpansa.gov.au/uvindex/models/index.cfm>; <http://www.bom.gov.au/jsp/ncc/climate/averages/uv-index/index.jsp>).

Furthermore, Queensland winegrowing regions frequently experience high heat loads in the summer, which can be detrimental to winegrape quality. In particular, sun exposure in white winegrapes may result in increased phenolic concentration (Macaulay and Morris 1993), and berry shrivel and browning (Tarara *et al.* 2000)

## The project

To address the impacts that these climatic factors may have on winegrape quality, an extension project is being carried out over the 2009-10 growing season to demonstrate to Queensland grapegrowers the impact of manipulating fruit exposure on winegrape quality.

Demonstrations were set up on vineyards located in the Granite Belt, South Burnett and Scenic Rim with growers invited to inspect the sites prior to harvest. The Granite Belt site was set up as a more robust replicated demonstration and was also assessed for a number of vine measures at veraison, while fruit from this site was harvested for chemical analysis and small lot wine production for future sensory assessment. Chardonnay and Shiraz were the varieties chosen for this project, being two of the most widely-planted varieties in Queensland.

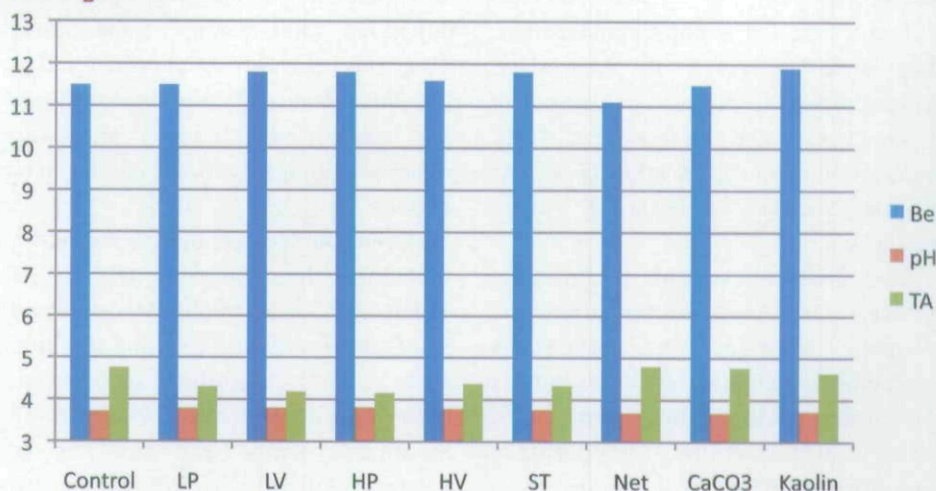


Figure 1. Harvest analyses on Chardonnay juice.

The project was conducted on vines more than five years old, on own-roots and trained to a VSP trellis. Fruit exposure techniques applied in this project included leaf removal from the fruitzone on either the most easterly (low - L) or on both sides of the canopy (high - H), done at pea size (P) and at veraison (V), 50% shoot removal (ST), throwover bird net (Net), application of commercial 'sunscreens' products (calcium carbonate and kaolin clay) and a non-manipulated VSP 'control' (C). At the time of writing in mid-February, the Shiraz was still awaiting harvest, thus Chardonnay results only are presented here.

## Grower feedback

Growers were invited to give their opinions as to the appearance of the fruit and general vine health during the pre-harvest site inspections and these were collated. The overall impression by growers was that the worst sunburn was seen in fruit with little canopy or leaf cover - these being the leaf removal and shoot-thinned treatments. Little difference in severity of sunburn was seen between pea size and veraison leaf removal treatments. A point of interest at the Granite Belt site was the apparent greater severity of sunburn on fruit situated on the more easterly side of the canopy. Anecdotal evidence suggests this may be due to afternoon cloud cover

typical in the region. Fruit treated with commercial sunscreen sprays still showed signs of sunburn where exposed to direct sunlight, however, fruit was in good condition where partially shaded. Overhanging foliage appeared to give protection from sunburn in all treatments, with fruit from the control and bird-netted vines having the greatest amount of leaf cover and the lowest degree of sunburn. Those who tasted fruit commented on better acid and flavour balance on unexposed fruit, with more exposed and sunburnt fruit showing over-ripe and 'cooked' fruit flavours and lack of acidity.

## Vine measures and fruit analysis

Leaf areas were assessed at veraison and, as expected, showed a decrease in leaf area for all vines that had undergone leaf removal and shoot-thinned vines when compared with controls, whereas netted vines and those with sunscreen products applied were slightly higher in leaf area. At harvest, bunch weights were assessed. Bunches from leaf removal treatments and netted vines had lower harvest weights than the control vines, while fruit from netted vines and those with sunscreen products applied had slightly heavier bunches.

Replicates were pooled at harvest and samples of juice were taken post-pressing

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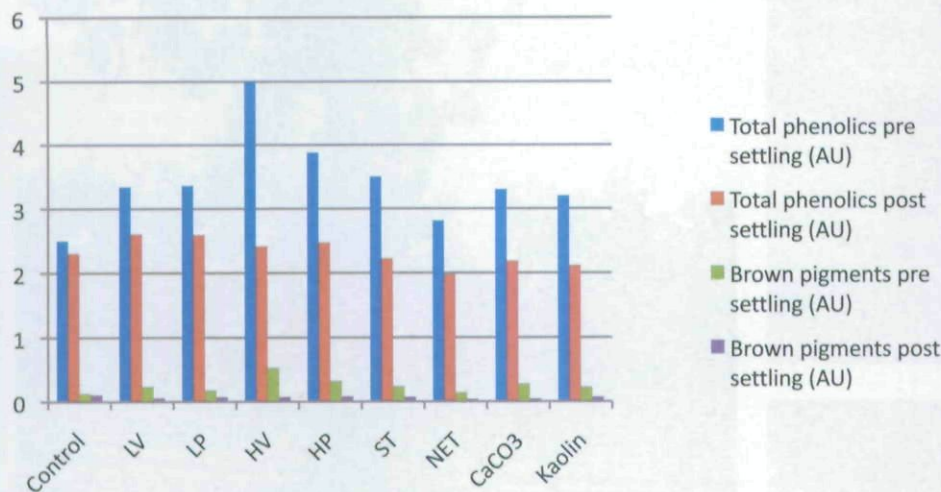


Figure 2. Spectral measures on Chardonnay juice pre- and post-settling.

and analysed for TSS, pH and titratable acidity. Fruit from all leaf removal and shoot-thinned vines was higher in pH and lower in TA than the control, with all but the vines with leaves removed from the eastern side at veraison also higher in TSS than the control. Results for the netted and sunscreen vines were varied (Figure 1).

Spectral measures were also carried out to assess total phenolics and brown pigments pre- and post-juice settling. The HP and HV treatments, followed by LP and LV, showed the highest levels of phenolics and brown pigments pre-settling. However, in all treatments, settling resulted in a decrease in juice total phenolics and brown pigments, with levels in the H and L treatments lowered to only marginally higher than other treatments (Figure 2).

It should be noted that the block on which this demonstration was carried out showed considerable variability at harvest, with a degree of vine defoliation most likely brought about by very hot conditions that prevailed between veraison and harvest (Stanthorpe MJT 2010 = 28.9°C; 2009 = 26.9°C; 2008 = 24.7°C; average 1938-2009 = 27.4°C; [www.bom.gov.au](http://www.bom.gov.au)). It is hoped to repeat this trial in future seasons on a more uniform site to assess the impacts of these treatments in varying seasonal conditions.

## Conclusion

The 'take home' messages from this project so far point to the importance of limiting exposure of Chardonnay in a

climate such as Queensland in a hot season, such as 2009-10. Exposure in the 2009-10 season resulted in berry sunburn, loss of acidity and development of over-ripe and cooked flavours, increase in berry total phenolics and potential for browning. Practices such as leaf plucking and shoot-thinning are not advised, being an increased cost to vineyard management with potential deleterious impacts on fruit quality. Bird netting does not appear to be damaging to fruit in this season, however, and may actually assist in protecting fruit from exposure, while commercial sunscreens are not necessarily beneficial where fruit is highly exposed. These treatments, however, may be advantageous to fruit ripening and quality in cooler seasons and in seasons of high disease risk.

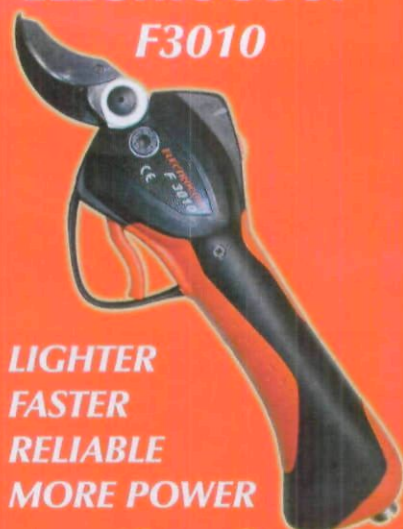
## Acknowledgements

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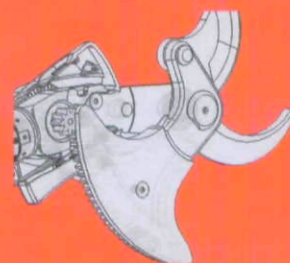
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