Technical notes

Trees and vines: can different types of local vegetation contribute to wine flavour?

Introduction

Previous research at the AWRI showed that eucalyptus trees growing near vineyards can result in 'minty' or 'eucalypt' flavours in red wine (Capone et al. 2011, 2012), with the proximity of eucalyptus trees having a major effect on the concentration of eucalyptol, the main compound responsible for these flavours. Fruit grown closest to eucalyptus trees gave wine with the highest levels of eucalyptol, while fruit grown further than 50 metres from the same trees resulted in wines with low concentrations of this compound. Aerial movement of aroma compounds from trees to grapevines was an important source, but the biggest effect was due to the presence of leaves and bark in ferments. Even a very small amount of tree material in a harvest bin gave remarkably high amounts of eucalyptol in the wine. It is common for eucalyptus leaves to be trapped within grape bunches, making them difficult to completely avoid in harvested grapes.

Some practices suggested to wine producers who wish to minimise 'eucalypt' flavour include hand-harvesting rows close to eucalyptus trees, paying particular attention to the removal of any leaves present in bunches and using sorting tables or harvesters designed to remove 'matter other than grapes' (MOG). Following on from this work on eucalyptus trees, AWRI researchers have been investigating whether other types of trees commonly found near vineyards can have a similar effect.

Vineyards situated close to three common windbreak species: radiata pine (*Pinus radiata)*, she-oak (*Casuariana cunninghamiana*), and Monterey cypress *(Cupressus macrocarpa)* were selected. The three main vineyards studied were a Pinot Noir vineyard in the Adelaide Hills with a radiata pine windbreak, a Shiraz vineyard at Langhorne Creek with a windbreak row of she-oaks and a Cabernet Sauvignon vineyard in the Yarra Valley close to plantings of Monterey cypress (Figure 1). Experiments were conducted to assess whether significant flavour could be transferred into wine by leaf material in the harvested fruit, or by aerial transfer from the nearby trees to the vines/fruit. Air sampling of volatiles close to the trees was conducted, as was chemical analysis of leaf material from the three types of trees.

In the 2016 vintage, wines were made from grapes picked from the rows closest to the trees and from rows furthest away. An additional set of ferments was conducted with the fruit from the rows furthest from the trees plus added leaf material from the trees. Similar to the

previous studies with eucalyptus trees, it was noted that some bunches from vines close to the trees clearly contained pine needles or other tree material. Wines were made using research-scale, standardised and replicated winemaking, and ten months after bottling the volatile aroma compounds were quantified and sensory analysis was conducted.

Sensory evaluation

The Pinot Noir from the Adelaide Hills site, close to the radiata pine trees, was intended for use as sparkling wine base by the producer. The grapes were picked early in the season for this trial, and made into wine using conventional red winemaking practices, resulting in alcohol levels of approximately 8% v/v. The results of an initial blind sensory evaluation with eight experienced judges indicated that there were no 'pine-like' or 'herbal'/'green' aromas or flavours evident in any of the wines. This absence of tree-related aromas or flavours may have been due to the early harvest date, although it could be argued that any 'pine-like' flavour might have been easier to discern in this unripe style of wine, due to its more neutral flavour profile. The lower alcohol may have also resulted in less extraction of volatiles from any plant material present in the ferments. For the Shiraz wines made from grapes from the Langhorne Creek vineyard close to the she-oak trees, there was also negligible apparent sensory effect caused by the trees.

For the Yarra Valley vineyard planted near Monterey cypress trees, there was a strong indication from preliminary assessments that the wine made from the fruit closest to the trees had a 'herbal'/'pine-like' aroma and flavour. This set of wines was submitted to the highly experienced and trained AWRI sensory descriptive analysis panel who rated the intensity of defined attributes of both winemaking replicates in triplicate, with no knowledge

Figure 1. The Yarra Valley vineyard adjacent to Monterey cypress trees that was sampled as part of this study.

of the identity of the sample set. The wines made from the grapes grown closest to the trees had the highest ratings for 'eucalypt'/'pine' aroma and flavour attributes, and interestingly were also rated highly in 'blackcurrant' aroma and flavour. It's possible that the sensory panel may have been using the term 'blackcurrant' to describe a green note in the wines. The wine made from grapes sampled farthest away from the trees was rated lowest in these attributes, while the addition of foliage material from the trees to these grapes resulted in intermediate ratings for these attributes in the wines. Figure 2 shows the results for the 'eucalypt'/'pine' attribute.

An earlier AWRI sensory assessment of 2015 vintage wines made by the owners using fruit from this vineyard also indicated a 'green', 'stalky', 'leafy' character in wine made from fruit from rows close to the Monterey cypress trees.

Conclusion

This work found that there can be an important flavour contribution to red wines from Monterey cypress trees planted close to vineyards. She-oak and radiata pine trees, however, had no clear sensory impact. Monterey cypress, which is a common windbreak species in Victoria, is a tree that producers might therefore consider in the same light as nearby eucalyptus trees. Hand harvesting rows close to the trees and avoiding MOG are potential strategies for controlling sensory characters derived from these trees.

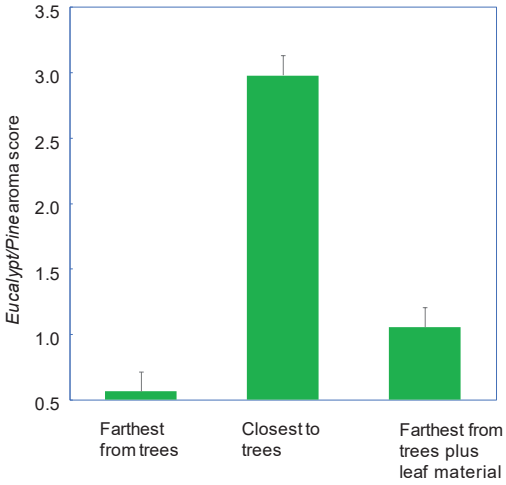

Figure 2. Mean sensory rating for the 'eucalypt'/'pine' aroma attribute for the Yarra Valley Cabernet Sauvignon wine made from grapes picked furthest from the Monterey cypress trees, wine made from grapes picked closest to the trees, and wine made from grapes picked furthest from the trees with the addition of Monterey cypress leaf material.

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