Benchmarking Sangiovese vineyards in the King Valley

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Introduction
Sangiovese is a flagship variety in the King Valley in NE Victoria, Australia. A key objective of the study, commencing in 2014 and encompassing 25 vineyards, is that viticulturists in the King Valley understand the parameters that influence Sangiovese grape and wine quality and which viticultural practices can be implemented to manipulate those parameters.

Material and Methods
The Sangiovese blocks are located at altitudes between 250 and 435 m with a diverse range of aspects and slopes. Vines were planted between 6 and 26 years ago comprising various clones. As in previous benchmarking studies\(^1\) canopy traits were assessed at veraison and pre-harvest for vine balance, cane lignification, leaf health and cluster exposure. Data loggers (Tinytag, Hastings, Port Macquarie) in the bunch zone recorded temperature hourly from mid-December to harvest. Soil temperature probes (TinytagPlus, Hastings) were installed at 100 mm depth. Irrigation and rainfall were monitored and soil moisture was recorded by Enviro Scan Solo (Sentek) probes. Pielotioles were analysed by Vintessential (Dromana). Berry Sensory Assessment (BSA)\(^1\), was undertaken and grape chemical analyses were performed by AWRI (Adelaide). Small lot wines were made by Pizzini and Dal Zotto Wines. King Valley Wines performed post ferment chemical wine analysis. Seven-month-old wines were assessed in a group meeting following each vintage (Fig. 1).

**Fig. 1** Wine sensory assessment 2015 at Christmont Wines

Results and Discussion
Detailed irrigation management optimised water use by decreasing soil water content in the post-flowering to pre-veraison period followed by targeting irrigation scheduling to prevent water stress, (red area) or overwatering (blue area) (Fig. 2).

**Fig. 2** CS08 Sentek soil moisture graph (active root-zone sensors from 20 cm = 50 cm = 100 cm depths summed)

Differential canopy management was adopted with open canopies E/S and leaf cover W/N (Fig. 3).

**Fig. 3** East- (left) and west- (right) facing canopy at veraison

Assessing temperature logger results for average degree hours below 15 °C and above 35 °C showed a high percentage of degree hours in the beneficial bracket between 15 °C and 35 °C in between veraison and harvest (Fig. 4).

**Fig. 4** Percentage of bunch zone degree hours in beneficial temperature bracket (ST=white stone layer under-vine).

Vine balance improved over the 3 years (Fig. 6) mostly through bunch removal at veraison. As an alternative, in the 2015/16 season, 4-6 leaves were removed around the inflorescences at flowering in trial plots of 4 vineyards (Fig. 5) to reduce bunch weight and improve quality as had been recommended from 3 years of trials with Italian Sangiovese\(^6\).

**Fig. 5** Vine with basal leaves removed at flowering (left)

The early leaf removal improved vine balances with respect to the adjacent controls through reduced bunch weights (Fig. 6, hatched).

**Fig. 6** Vine balance assessed on 20 shoots per block

Early leaf removal also resulted in an improvement in the BSA ratings, mainly for pulp aroma and skin maturity (Fig. 7).

**Fig. 7** Berry Sensory Assessment 2016

Grape chemistry revealed in all 3 years that grapes with highest anthocyanins came from vines with no heatloads before and after veraison and bunch weights per shoot of 300 g or below. Grape samples with very high tannins (>7 mg/g FW) had in each year low YAN, high total phenolics and immature seeds, pointing to a stress response. The group with 6-7 mg/FW had a higher percentage of degree hours in the beneficial bracket, yields per vine < 5 kg, good vine balances low bunch weights per shoot and ripe seeds and skins. They had various clones, planting densities, berry weights and Baumé. Brunello clones were all in the high tannin bracket despite slightly higher bunch weights. Early leaf removal (LR) reliably improved tannin concentrations (Fig. 8).

**Fig. 8** Tannins in 2016 (Brunello type clones in bold)

Benchmarking these crucial parameters in a large number of vineyards led to improved vineyard management techniques.

Wine chemistry and sensory assessment confirmed the effect of practice change on grape and wine quality.

The group events had an inspiring effect on the Sangiovese producers of the King Valley encouraging discussion and the adoption of new technologies.

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References