

# Exploring canopy management as a tool to improve wine quality using whole of block experimentation

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## Whole of block on-farm trials were first introduced into vineyards in 2002 as part of research into the management of vineyard variability.

Here, we describe a canopy management experiment established after vintage 2004 in a 6.0 ha block in the Coonawarra region planted with Shiraz. The objective was to perform a spatially-based comparison between the usual canopy management (control; 45-50 buds) and a canopy which was severely pruned (35 buds) and then twice shoot thinned during the season (SPST) with the goal of improving grape and wine quality. The experimental design follows the row structure of the block with one row of control alternating with two rows of the SPST treatment; the experiment covered 55 rows (Figure 1a).

At vintage 2005, two different wines were produced in the local winery for evaluation of treatment differences. Prior to vintage 2006, *k*-means clustering of remotely sensed imagery (PCD) acquired at veraison in 2005 and 2006 and yield monitor data (2005) was used to delineate two potential performance classes (PPC) within the block (Figure 1b). Small-scale winemaking was then conducted in 2006 to establish wine quality differences between treatments as well as between the two PPCs. Five wines were made from grapes representing the following areas and treatments: Control in the higher and lower PPCs; SPST in the higher and lower PPCs; and a 'block average' control treatment derived from a mixed sample of fruit picked in equal proportions from both the lower and higher PPCs. A fruit quality assessment of the grapes was conducted by the winemaker in 2006 at the same time that the grapes for the small-scale wine making were picked (Table 1).

Contrasting treatment effects were seen in 2005 and 2006. Tasting of the 2005 wines by the winemaker resulted in better scores for the SPST wines, whereas in 2006, no treatment effects were seen in the wines in spite of SPST grapes being scored better. There were, however, differences between the wine scores for the different PPCs in 2006 (Table 1).

Sensory analysis in 2006 showed that significant differences mainly occurred between the wines of the lower and higher PPCs rather than between the treatments (Figure 2).

One possible reason for the contrasting results in 2005 and 2006 could be the higher rainfall during the period leading into vintage in 2006 (Figure 3) reducing the differences between fruit from the two treatments.

While these results are inconclusive in regards to treatment effects, they clearly show the benefit of knowledge about vineyard variability and its possible influence on experimental outcomes. Whole of block experiments and associated spatial analysis enable more knowledge to be gained from experiments than would be possible with traditional plot based experimental designs. With continued collection of spatial data in subsequent years (remote sensing, yield mapping, etc...), a better delineation of PPCs should be possible leading to improved decision making about both differential canopy management and targeted harvesting.

### ACKNOWLEDGMENTS

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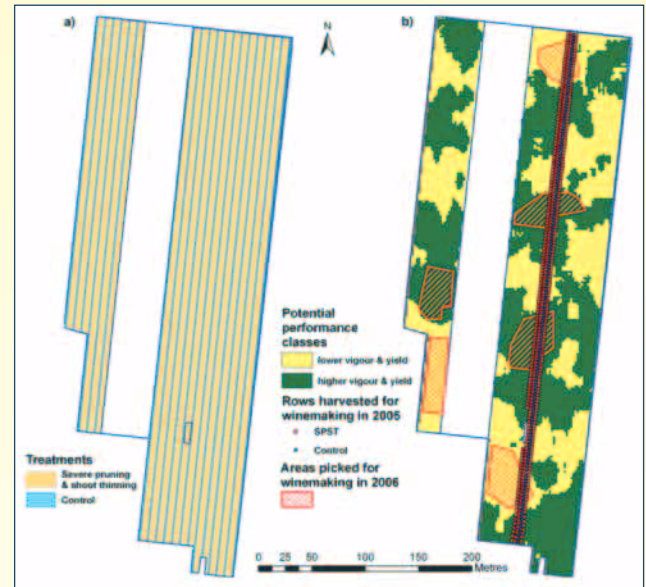


Figure 1: Experimental layout (a) of the Coonawarra on-farm trial; and (b) sampling areas for wine making in 2005 and 2006 overlying PPCs.

	Control		SPST	
Wine 2005	4		3+	
Grapes 2006	Low PPC	High PPC	Low PPC	High PPC
Wine 2006	4+	5+	3+	4+
	4+	5+	4+	5+
	5+			

Table 1: Winemaker's scores for wines in 2005 and 2006 and for grapes in 2006 (1 = best, 5 = worst).

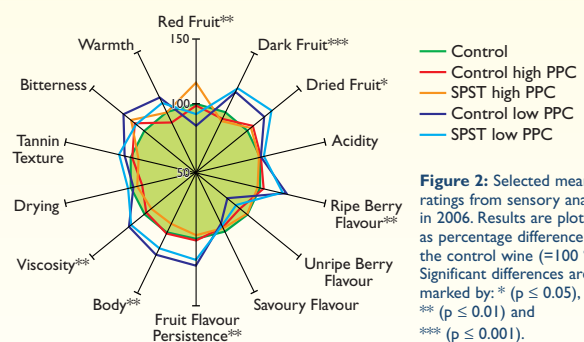


Figure 2: Selected mean ratings from sensory analysis in 2006. Results are plotted as percentage difference from the control wine (=100%). Significant differences are marked by: \* ( $p \leq 0.05$ ), \*\* ( $p \leq 0.01$ ) and \*\*\* ( $p \leq 0.001$ ).

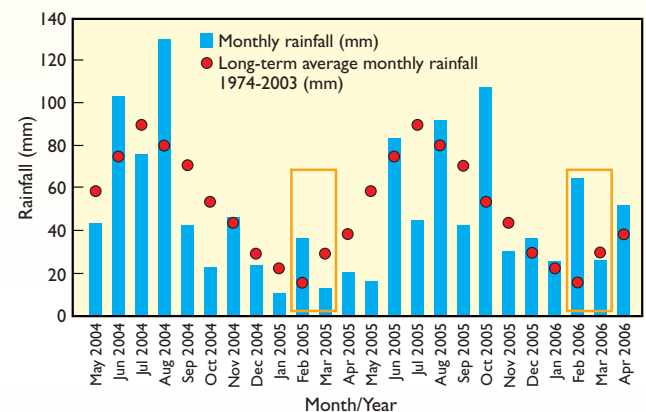


Figure 3: Monthly rainfall May 2004 to April 2006 in comparison to the long term average (1974-2003) for Coonawarra.

