Geo-climatic zoning of vineyards in the Macedon Ranges

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Introduction
The Macedon Ranges vineyards are amongst the highest in Victoria at altitudes between 400 and 800 m. They produce high quality cool climate wines.

The aims of this project are to:
1. Describe each of the 28 vineyards with respect to their temperature signatures to enable site adapted vineyard management practices.
2. Determine geo-climatic zones in order to demonstrate the diversity and potential of the region therewith enabling to market the very special sub-regional attributes and to point to potentially promising new vineyard sites.
3. Observe the effect of a changing climate on day and night temperature profiles from budburst to harvest over several vintages to be able to mitigate climate change.

Material and Methods
Vineyards (mainly white varieties) received electronic data loggers (Tinytag Gemini, Hastings, Port Macquarie) of which one was attached to the canopies post the vine canopy at the height of the bunch zone1 (Fig. 1) in November. Temperatures were recorded hourly and investigated from 15. December to veraison and veraison harvest. To eliminate the effect of various canopy structures and enable easily logging a second logger was placed in most vineyards in July into a wooden box nailed to a post, south facing at 1.40m above ground (Fig. 2). Data from 1. August to 15. December, and on to harvest were recorded. Cumulative degree hours from a base of 0°C were calculated for all periods as well as average degree hours in order to enable comparison of vineyards with different days of hangtime.

A report, which also contained all diurnal temperature graphs, was supplied to each participant with information on their code number.

Results and Discussion

The climatic conditions of these cool climate vineyards, which have a predominance of cool nights, were in all seasons particularly well characterised through their average degree hours below 15°C and above 35°C (Fig. 3) and after veraison (Fig. 4). This information enabled vineyard managers to – if so desired – decrease bunch zone heat loads with under-vine vegetation or to increase grape warmth with dark soil or mulches.

The Macedon Ranges vineyards could be grouped into 5 zones according to their hot and cold signatures (Fig. 3) and from their average degree hours (degree hours base 0°C / days of observation) (Fig. 4). Loggers in boxes eliminated annual variations in bunch zone canopy density and logger exposures.

Vineyards in the Northern part of the GI were warmest, the vineyards South of Mt Macedon were colder pre-veraison and warmer pre-harvest, Western vineyards (sheltered by the Dividing Range from the cold SW wind) were warmer before veraison than later in the season, and vineyard temperature signatures in the Central area very much depended on airflow from mountain ridges. Finally, vineyards at High altitudes of 650-900 m were coldest all year.

These climatic zones largely determine the portfolio of wines in the subregions and point to promising sites for new vineyard developments for high value cool climate wine styles.

References