From vine to wine – 10 years of benchmarking 25 Pinot noir vineyards of the Mornington Peninsula, Australia
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The benchmarking method of Mornington Peninsula Pinot noir MV6 clone (as devised by GrapeLinks in 2004) consisted of veraison assessments of active leaf area and number of bunches per 20 shoots, degree of cane lignification, leaf health and foliage cover over bunches on each side. After fruit load per shoot had been determined pre-harvest, vine balance (cm² of active leaf/g fruit) was calculated. It usually ranged between 13 and 20. Vines were reasessed pre-harvest for fruit exposure and canopy conditions. Temperatures in the bunch zone were recorded hourly from 16.12. to veraison and veraison to harvest by Tinytag data loggers (Hastings, Port Macquarie, NSW).

In 2010, grape front and back surface temperatures from 10 berries across 10 clusters were monitored hourly using a Therm-A-Twin Infrared Thermometer (Pyro-sales, Padstow, NSW). The dataloggers reflected – with about 3 °C accuracy – the cluster surface temperatures of canopy embedded Pinot noir grapes on a warm summer day.

Calculation of degree hours in a representative bunch zone of each vineyard from fruitset to veraison and veraison to harvest proved to be a more effective tool to describe grape growing conditions in the vineyards over the region than climatic characterisations or MUs from regional weather stations.

Ten years of measurements showed that the vineyard’s geo-climatic positions on the Peninsula had a large influence on the cold hours of bunchzones, whereas heatloads were additionally subject to canopy and undervine conditions (Figs. 1 and 2).

Geo-climatic zones were characterized more according to average degree hours below 15 °C (Fig. 1) than by heatloads (Fig. 2). A detailed contour map was produced (Fig. 3) showing vineyard positions and zone colours with respect to the mountain ridge and both water bodies.

Phenology was unsuitable to characterise geo-climatic zones (Fig. 5).

The percentage of degree hours bunches spent in the beneficial bracket for Pinot noir (15 – 26 °C) (Fig. 4) was in all years higher for the Eastern vineyards due to the shielding from cold westerly airflow by the mountain ridge and some being very close to Westernport Bay. Northern vineyards did very well in cold and mild years. Amongst the Central vineyards M30 has an easterly aspect, which contributed to a high percentage in the beneficial bracket. Highlying vineyards scored better in warmer years. The season 2014/15 was exceptionally mild.

Langton’s wine scores of Mornington Peninsula Pinot noirs reflected the ripening season’s bunchzone temperatures, in particular the cold hours, however the extensive benchmarking data of vine health and balance, undervine and canopy management showed that there is a potential to grow grapes in beneficial temperature conditions in all seasons using well adapted management practices°.

Fig. 1: Average degree hours under 15 °C during the ripening period in Northern, Central, Highlying and Eastern vineyards and Langton’s annual Pinot noir wine scores.
Fig. 2: Average degree hours above 35 °C during the ripening period. Outliers mark accidentally exposed loggers.
Fig. 3: Geo-climatic position of participating vineyards.
Fig. 4: Percent of degree hours at 15 – 26 °C in bunchzones of northern, Central, Highlying and Eastern vineyards. The length of the ripening period influenced average degree hours in the beneficial bracket only in the warmest and coolest sites.
Fig. 5: Phenology of Pinot noir vineyards in 2013/14, a warm year. Vineyards with wet soils (5, 35) had long pre-flowering periods.
Grape and five month old wine samples were analysed by Vintessential Laboratories (Dromana, VIC). In a hot (2013) and very cold (2011) summer it was harder to get high grape colour, irrespective of geo-climatic zone (Fig. 6).

Fig. 6: Grape anthocyanin concentrations in Northern, Central, Highlying, Eastern vineyards and Langton’s scores. Anthocyanins in young wines (Fig. 7) were highest in the hot years 2007 and 2009 irrespective of zone.

Fig. 7: Five-month old wine anthocyanin concentrations in Northern, Central, Highlying and Eastern vineyards.

This long-term study has shown that bunchzone temperature management can be a very important tool to maintain the outstanding Pinot noir grape and wine quality of the Mornington Peninsula in the predicted highly variable climate of the future.