Summary 190

VITICULTURE & ENOLOGY
UNIVERSITY OF CALIFORNIA DAVIS

Climate drivers of red wine quality in four contrasting Australian wine regions

By: C. Soar, V. Sadras, and P. Petrie

In: Australian Journal of Grape and Wine Research. 14:78-90. 2008

• Environment, and its inevitable season-to-season weather variations, is considered the main source of fluctuation in vintage quality within a region. In a 1992 study, the *ideal vineyard climate* was described as one with "consistently warm days –not hot- and consistently cool nights throughout the growing season, but particularly around *veraison*, when maximum carbohydrate accumulation for color formation can be achieved". But how many of us have a vineyard in an "ideal" environment? Chances are our vineyards are in what we classify as a "cool" or a "warm" environment. Then, it is no surprise that, in a *cool environment,* the worse vintages happen in the coolest years –due to incomplete ripening-; whereas in a *hot environment,* the trend is reversed and the best vintages tend to take place in the cool years.

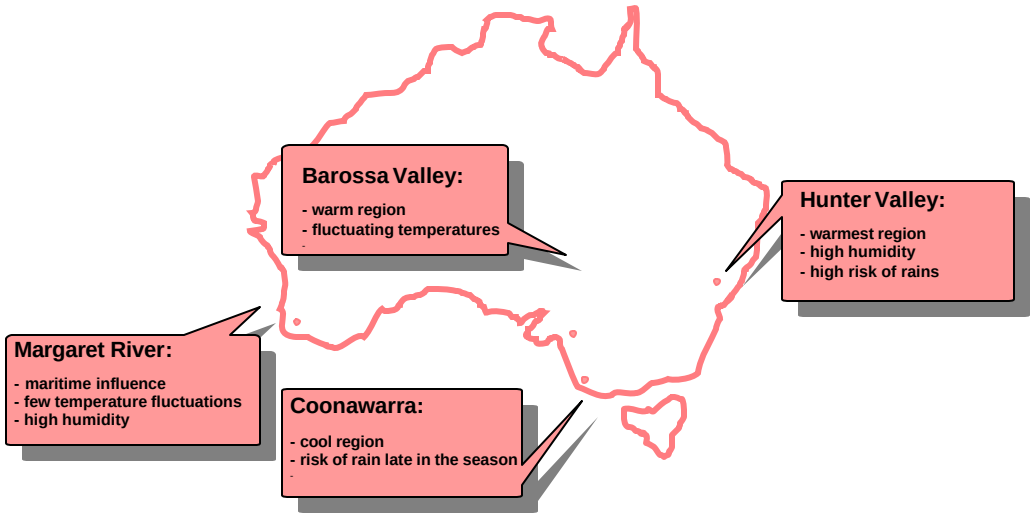
• But what are the weather parameters that drive vintage quality, and when in the season do they exert their beneficial or detrimental influence? To find the answer to this mega-difficult question, these authors obtained an extensive database of **weather parameters**, week by week, of the latest ~30 growing seasons in 4 Australian winegrowing regions. These parameters included, among others, maximum temperature, minimum temperature, humidity and radiation. They also obtained the corresponding **vintage quality scores** associated with those seasons. By carefully comparing the two, they tried to get an insight into which weather parameter values -and when in the season- were associated with good vintages, and which with poor vintages.

• How did the authors compare the weather parameters and the vintage scores? To be able to analyze the weather data, they divided it into intervals (for instance, for temperature, the intervals looked something like this: 13.0-15.9°C, 16.0-18.9°C, …, 46.0-48.9°C). Then, they found the number of days that fell into each interval when the vintage had been labeled "good" (top-ranking 25% vintages) and when the vintage had been labeled "poor" (bottom-ranking 25% vintages) . Finally, they asked themselves the question, is the number of days in each interval statistically significant between a good and a poor vintage? If the answer was yes, that was a potential "quality driver".

• **Results.** The *timing* of temperature extremes and their impact on wine quality varied strongly depending on the region:
1) **Barossa Valley**. Barossa is a region with high temperature fluctuations. Here, cooler maximum temperatures (16-22°C) and fewer days with very high temperature (>40°C), particularly early in the season (Jan-Feb, or July-Aug in the Northern hemisphere) were associated with better quality vintages.
2) **Coonawarra**: Coonawarra is a cool region with mild maximum temperatures. Here, warm –but not hot- temperatures (28-31°C) immediately prior to harvest were associated with better quality. Sunny days were also beneficial for quality.

3) **Margaret River**: Margaret River has similar maximum temperatures as Barossa but it has more maritime influence, meaning less temperature extremes and higher humidity. Here, similar to the Barossa, an excess of days with maximum temperatures early in the season (January) was detrimental to wine quality. Additionally, medium-range humidity (51-61%) early in the season was associated with better quality (both low and high humidity were associated with poorer quality).

4) **Hunter Valley**: This is the hottest region of all the regions studied, with high humidity and high disease pressure. The results for Hunter Valley were the exception. Unlike in Barossa or Margaret River, hot (>37°C), dry and sunny conditions were clearly associated with good wine quality. It was also the region for which the link between weather timing and vintage score was the largest, that is, it involved the whole growing season, rather than certain weeks around veraison or harvest.



• Some highlights from the authors' original discussion (which I highly recommend):
_ they acknowledge that vintage score is not the ideal indicator for wine quality, but recognize that better indicators are lacking. Still, they report that vintage scores from different sources have yielded consistent information.
_ they are cautious by stating that such and such temperatures "were associated with high quality", instead of "were causing high quality". This is because the various weather components were strongly correlated with each other (for instance, when maximum temperature was high, evapotranspiration and radiation were also high, and humidity and rainfall were low). Therefore, a strong association between wine quality score and a given weather variable is just that –an association- and cannot be taken as evidence of a causal effect.
_ the authors believe that the association in the Barossa between cooler years and better quality is due to the slower ripening in cooler years. Since years with slower ripening may need more sunshine hours late in the season, this would explain why high radiation and high maximum temperatures prior to harvest were also associated with greater quality in this region.
_ even though it is normally accepted that "milder day temperatures and cooler night temperatures favor good color, whereas hot temperatures hurt color development", this assumption was reversed in the Hunter Valley. The authors believe that the negative impact of rainfall and high humidity –which foster disease- are simply more critical in dictating quality in this region than the beneficial impact of milder temperatures and higher humidity –which tend to foster color and flavor.

Author: Bibiana Guerra, Editor: Kay Bogart. This summary series funded by J. Lohr Vineyards & Wines.