Red Winemaking Practices at Balnaves of Coonawarra

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This article presents the philosophy behind Balnaves' approach to red winemaking rather than a description of the actual techniques used or a step-by-step method. To this end, it discusses many of the assumptions made about red wine and red winemaking and considers how these assumptions determine the techniques that we use. It is worth emphasising that this is an approach developed for Coonawarra fruit, but it can be more or less successful elsewhere. The approach at Balnaves is one that focuses on colour, tannin structure and palate weight as the primary winemaking objectives. It assumes that fruit flavour and aroma production is proportionately linked to tannin and colour synthesis. Therefore, good flavour, aroma and overall balance in the wines will eventually emerge following selection made on the basis of structure and tannin. First, there is a need to examine what are believed to be the attributes of good wines.

A assumptions about outstanding red wines

Outstanding red wines have great structure and mouthfeel. They need not be huge, although this is a legitimate assumption. Australian style; however, all good wines communicate to the taster the impression of strength and character and also, importantly, the impression of balance. These qualities arise as much from the tannin structure and mouthfeel as from the fruit flavours.

Wines with strong tannin structure will age longer and retain youthful fruit characters longer, and this is a mark of quality. This assumption could be wrong. There are more elegant styles, for example the Lindeman/Rouge Homme or earlier Redman Coonawarra wines, that often age very well in the absence of obvious strong tannin structure. However wines such as Penfolds G range or Wynns 'John Riddoch' Cabernets support the approach that a strong tannin structure helps the wine to age.

Outstanding red wines have great complexity of aroma and flavour. Very intense wines with few flavours, such as those that are very pepperminty or green bean-like, while interesting, often lack the complexity to be enjoyable for drinking rather than tasting. Outstanding wines have complex aromas and flavours that are not easily definable, so something different is perceived each time we smell or taste the wine. These complex characters fall into the spectrum of coffee, leather, smoky, spice, or mineral flavours, rather than fruity aromas or flavours. These more complex characters are often derived from the influence of tannins either from the seeds, skins or from the oak used.

Good red wines come from good fruit. This point is important and is understood by all winemakers. However the best fruit must be identified and not blended with lesser fruit. In our experience, it is very difficult to determine wine quality, especially tannin quality, by fruit tasting. Therefore, fruit of individual blocks is fermented in the smallest batches possible and quality judgments are delayed until there is a finished or near-finished wine. The history of the wine quality that has been produced by a vineyard block is sometimes more useful than the tasting of the fruit.

A assumptions about the viticulture of red wines

Riper fruit generally gives better quality tannins and structure. This is especially true in cool climates. Both tannin quantity and tannin quality improve with ripeness. Ripe tannins contribute to the sensation of palate weight and volume, while unripe tannins give a green, astringent feel with an impression of thinness. However, if grapes are left on the vine for too long or start to shrivel, the improvement in tannin quality can be overshadowed by the fruit flavours becoming overripe, and moving into the dried fruit, jammy, or port-like flavour spectrum. High alcohol levels, of 15.0% (v/v) or more, can unbalance the wine and mask the quality of the wine structure.

Stressed wines will produce more tannin colour and flavour. Controlled stress from fruit set onwards produces smaller berries that have a larger seed to juice volume ratio and a larger skin to juice volume ratio. It also switches on tannin synthesis earlier in the season. What is sought is the formation of small berries with thick skins and mature (lignified) seeds. The ratio of skin and seed to juice volume should be large. A vintage, this ratio will be adjusted by removing juice if the ratio is thought to be too low. Too much stress will create wines with sweet/sour characteristics, that have both dried fruit flavours and green, methoxytyrazine, 'bean-like' flavours at the same time, often combined with bitter tannins. This can be a problem with some of the old dry-grown blocks in Coonawarra in a hot year.

It is hoped that the Tannin Project will provide some real data to answer questions about tannin synthesis. Do good blocks produce the same phenolics at a faster rate than poor blocks, or do they simply start colour and phenolic synthesis earlier in the season, or do they produce different, more complex phenolics?

Grape tannins are better than added tannins. This is not so much a comment on the particular tannins but an awareness that, if there is not a high level of natural tannin, then there will be not enough fruit strength to balance any added tannin.

Stalk tannins are only useful if the stalks are ripe (lignified). Unripe stalks that are included in the ferment will have a deleterious effect on the wine, producing a green, sappy, astringent backbone to the wine. However, ripe stalks can add very interesting coffee, olive and roasted characters to the wine.

A assumptions about red winemaking

Where good colour and tannin is found, there is also good aroma and flavour, even if it is hidden or closed in the early stages. This is the fundamental assumption when selecting wines on the basis of structure, palate weight and strength. A high tannin level, and added tannin especially, will 'eat up' the fruit.
reduce the bleaching effect of post fermentation SO2 additions.

Figure 1. Profile of phenolic extraction.

Balnaves adds 50-100 mg/L SO2 to all red ferments at picking. This arrests wild yeast growth, but it principally aids extraction of phenolics. We assume that this happens by disruption of skin cell membranes. Maintaining a minimal level of total SO2 in the wine during fermentation appears to reduce the bleaching effect of post fermentation SO2 additions.

Outstanding parcels of red fruit colour up quickly and look very good early in ferment. The timing of this process will depend on the fermentation temperature but generally, by about 4-2°Bé, a good parcel will be deeply colour and rich in tannins. This appears to be due to the higher concentration of these colour, flavour and tannin molecules in better fruit. Boulton et al (1995) reported that studies at Davis have shown that half of the final phenolic concentration is achieved by the end of the second day of fermentation. Our observations support this, although the halfway point appears to be at around 4-2°Bé. It is therefore possible to identify good parcels at this stage and direct them with some confidence to barrel fermentation or to longer maceration.

The profile of phenolic extraction

This profile (Figure 1) shows the rate of anthocyanin extraction rising early in fermentation with the rate of extraction of skin-derived tannin and seed-derived tannin increasing as the alcohol level rises. Seed tannin becomes more and more influential with longer maceration on skins.

With long maceration of ripe fruit, we see a trade off with loss of colour and mid palate flavour being exchanged for richness and increasing palate length. Long maceration of greener fruit appears to mask methoxypyrazines or bind them up in some way, and so such maceration can be beneficial for flavour modification. Long maceration of wines, for 4-6 weeks on skins, changes these simple ‘beany’ or ‘herbaceous’ primary characters into more olive/smoky secondary aromas and flavours.

When pressed earlier in this profile, Balnaves augments the tannin content, by either direct addition or by fermentation in new oak, to maintain the stability of the colour and to maintain a strong tannin structure. It is considered to be important to the long-term colour stability of the wine that there is a source of larger tannins available during the early stages of fermentation to stabilise the anthocyanins that are being extracted.

The alcohol level plays a critical role in the extraction of both skin and seed tannins. An alcohol level between 13 and 14% (v/v) extracts the maximum available tannin, so levels below this will be less effective. To achieve this alcohol level, picking is as late as possible and all reds are adjusted into this range with juice concentration if they are not there naturally.

The last few pumpovers, at maximum alcohol level, extract important quantities of tannins. Because of this, pressing is not until at least 0°Bé, unless the wine is to be barrel fermented.

Warm fermentation and maceration temperatures enable maximum tannin extraction. To maximise extraction of phenolics, all red ferments are run up to 26-32°C and are then maintained, where possible, at this temperature while they macerate on skins. Red fruit is warmed prior to fermentation to ensure a short lag-time and to ensure that the maximum fermentation temperature reaches this desired range. The faster rate of tannin extraction in warmer ferments may provide stabilising tannins early in ferment.

Barrel fermentation can replace tannins that are normally extracted with longer maceration. Addition of oak tannins to the ferment, in the form of new oak barrels, will give a better, more stable colour and replace the tannins that would be extracted from the skins and seeds with longer maceration times.

Barrel fermentations can produce wines with up front richness and strength, with fruit/oak complexity, but without the loss of as much fruit character as would occur with long maceration. Balnaves barrel ferments parcels that show good extract and palate weight at 1-2°Bé. This technique is very successful with Shiraz fruit, and from Cabernet fruit it produces a product that has good mid palate strength that can be blended with longer maceration wines that have less middle but longer, more interesting tannin structures.

Vinimatic fermenters are ideal for red fermentations destined for barrel ferments, due to the faster initial phenolic extraction rate in a vinimatic compared to a static fermenter. In this way we can get good colour, tannin, and fruit extraction along with 1-2°Bé of sugar for barrel fermentation. Wines that are in static fermenters in our cellar usually do not get enough colour until they are dry.

Complete pump-overs are central to maximum tannin extraction. Balnaves rack and return for pump-overs. Red fermentations are vigorously manually returned, with someone on top of the tank directing the wine onto the cap to ensure that each grape is washed with the increasingly alcoholic wine. Shiraz and Merlot fermentations are also pumped down at the same time as the return. To achieve the maximum potential quality outcome for a parcel of fruit, each berry must make its contribution to the ferment. Channelling in the cap, or dry hotspots in a submerged cap, due to flattening pressure, will diminish the quality of the final wine.

During fermentation, racking off all wine moves the wine immediately next to the skins away and so aids extraction from the skins, maintaining a concentration gradient out of the skins and seeds and into the wine.

If a majority of the available tannin is extracted into the wine before pressing, then we have these extractives to work...
with later on. Once the wine is pressed, any tannin flavour or colour still in the skins is lost to the winemaking process. Boulton et al (1995) report that, in studies with Californian reds, only 20–30% of measurable phenolics were extracted into the wine. Balnaves approach is to optimise conditions for extraction to achieve higher figures than these.

An explanation of oxygen's role in winemaking is included:

Oxygen can be used to influence tannin structure. Once tannins are extracted and present in the wines, aeration is one of the main techniques to modify the tannin structure to the desired feel. Aeration is used at Balnaves, usually at racking, to speed up polymerisation of aggressive tannins. Further addition of tannin can be useful, to soften harder or greener or aggressive tannin structures, along with aeration and the input of oak tannin over 12 months. This is all done by taste.

**Conclusion**

The winemaking philosophy at Balnaves is to:

- Separate the best quality parcels by small lot fermentation of individual blocks.
- Extract the maximum possible colour, flavour and tannin during fermentation and maceration by optimising all of the conditions for extraction.
- Balance the fruit and tannin structure in the wine by blending components made in different ways and by subsequent working on the wine before and during barrel maturation.
- Make wines, overall, with individual character, strength and structure that will reward cellaring.

**References**