




Accolade
Wines

Tasmanian Sparkling Wine

Brock University-CCOVI

MAY 2014

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**Group Sparkling
Winemaker
Accolade Wines**

Essential Australian Culture (1)
Winning against the old colonial masters in sport.




Accolade
Wines

Essential Australian Culture (2) Australian Football League



New World Sparkling Winemaking

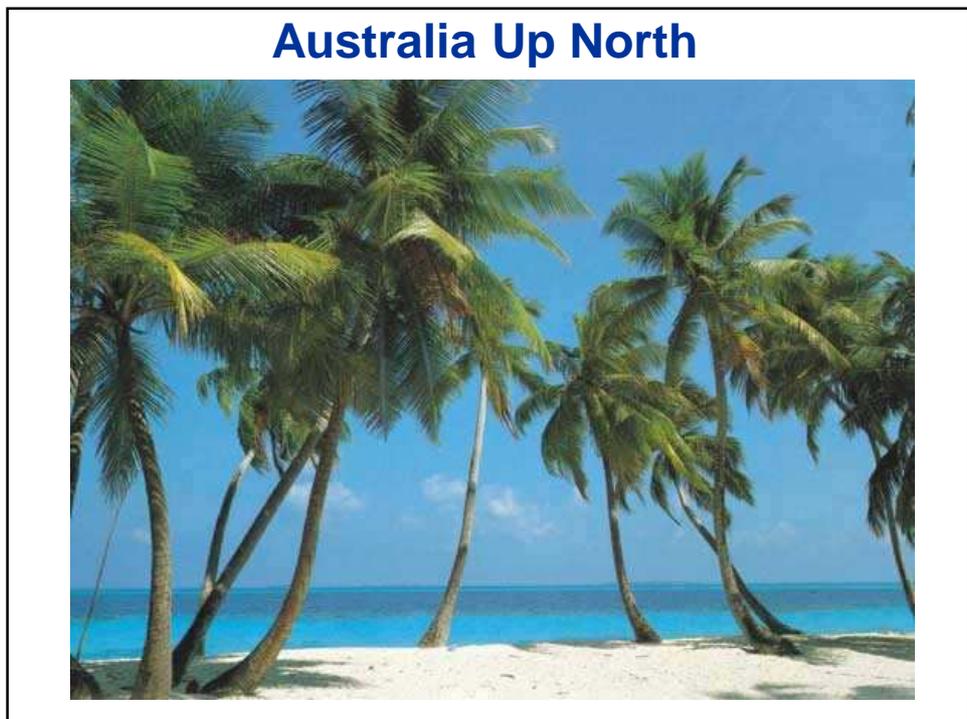
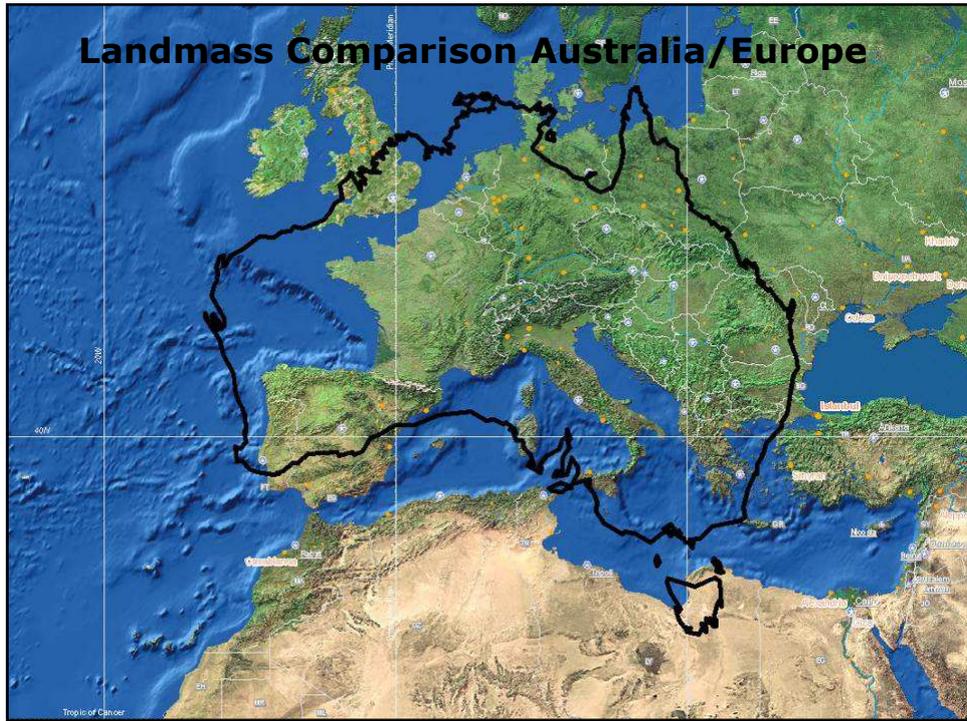
"The basis of creating any sparkling wine involves selecting from all the possible characters that are driven by viticulture and oenology and combining them piece by piece to form the wine style as desired by the winemaker.

In the absence of long term local history and regional legislation these combinations are almost innumerable but each one will have some significance in the character of the final wine. These options available to the winemaker may extend from the fundamentals of variety and terroir right through to the fine tuning via pre-release winemaking additives. It is the winemaker's responsibility to recognise how to manipulate all these aspects to shape the final product.

In many new world winemaking countries there is immense diversity of climate and soil such that the opportunities for such alternative styles can range from the sweet and fruity Muscat driven types from the warmer sites through to the complex and mature wines from Chardonnay, Pinot noir and Pinot meunier of the cool climate regions."

In this presentation we will focus on the cool climate region of Tasmania, the most southerly state of Australia.





Australia Down South



Key Factors Driving Wine style

- Terroir; climate, geography, geology
- Variety /Clone/Rootstocks , blending proportion
- Viticulture; canopy management , crop yield and irrigation
- Harvest; fruit maturity and harvest method
- Juice handling; extraction rate/press type, oxidative /non oxidative, finings
- Primary fermentation; juice clarity, yeast type/ fermentation rate
- Bulk storage vessel, stainless steel, oak (old/new) and proportion
- Malolactic fermentation; proportion, bacterial type
- Bulk wine maturation; reserves
- Blending; varieties, regions
- Base wine stabilisation; bentonite, finings
- Secondary fermentation; yeast type, temperature
- Maturation on lees; time, temperature
- Bottle fermentation, transfer and traditional methods
- Expedition liqueur; sugar/acid balance, SO₂ , oak , spirit
- Closure ; cork maturation, inert closure



Tasmania

For sparkling winemakers Tasmania offers a diversity of sites for viticulture in a cold and mostly maritime influenced climate .

The viticultural and winemaking practices have matured and the region has established a reputation for producing Australia's most exciting premium sparkling wines .

These wines have great elegance of structure and longevity and now many winemakers are maturing certain styles for extended time on yeast lees. These examples exhibit great complexity and a vibrancy that makes them truly exceptional .

In this presentation we will review the following aspects of Tasmania:

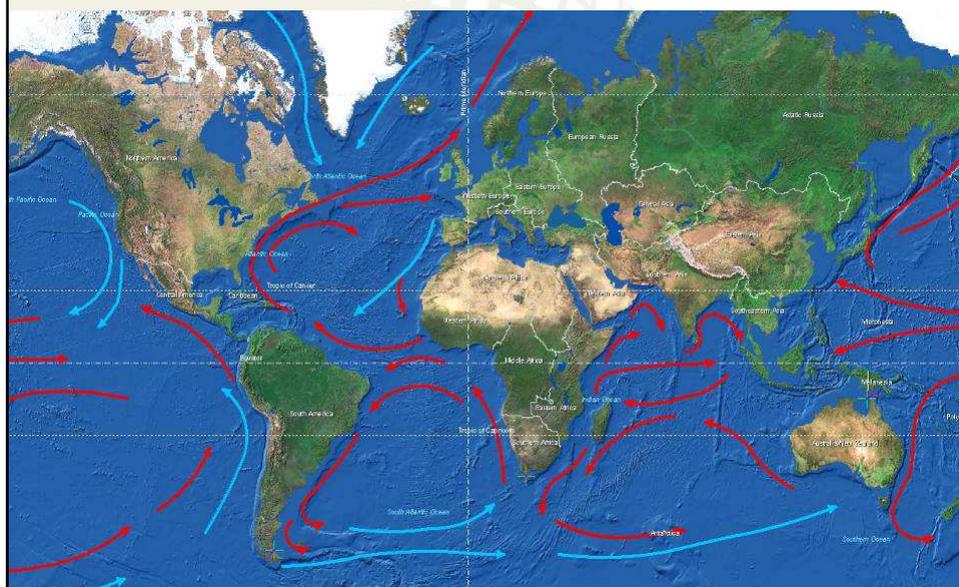
- Viticultural/winemaking statistics
- Some climatic data
- Key viticulture and winemaking practices

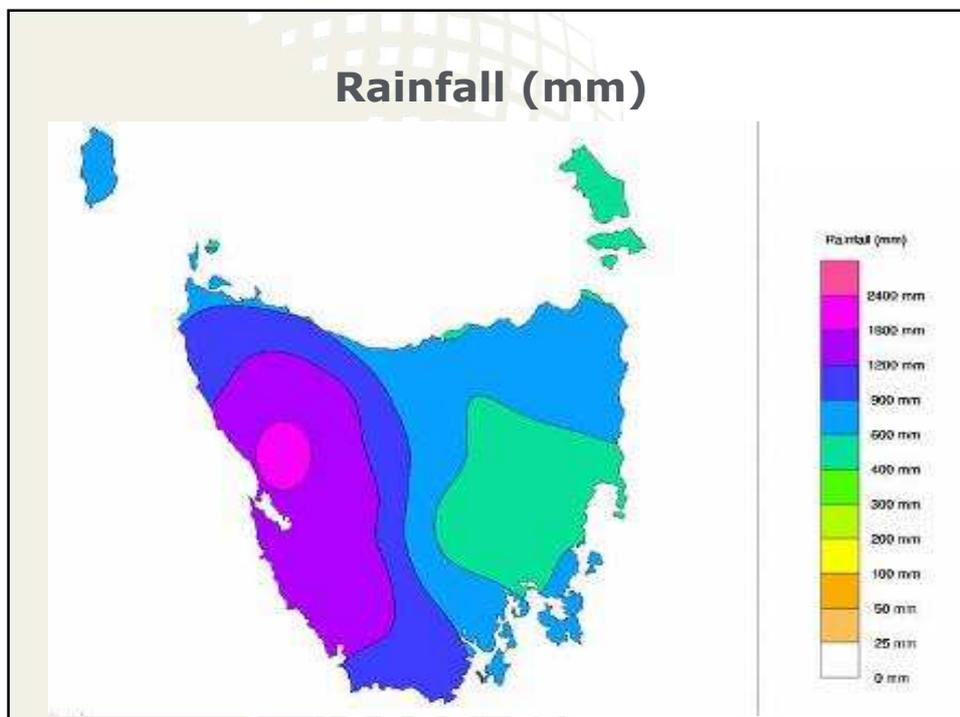
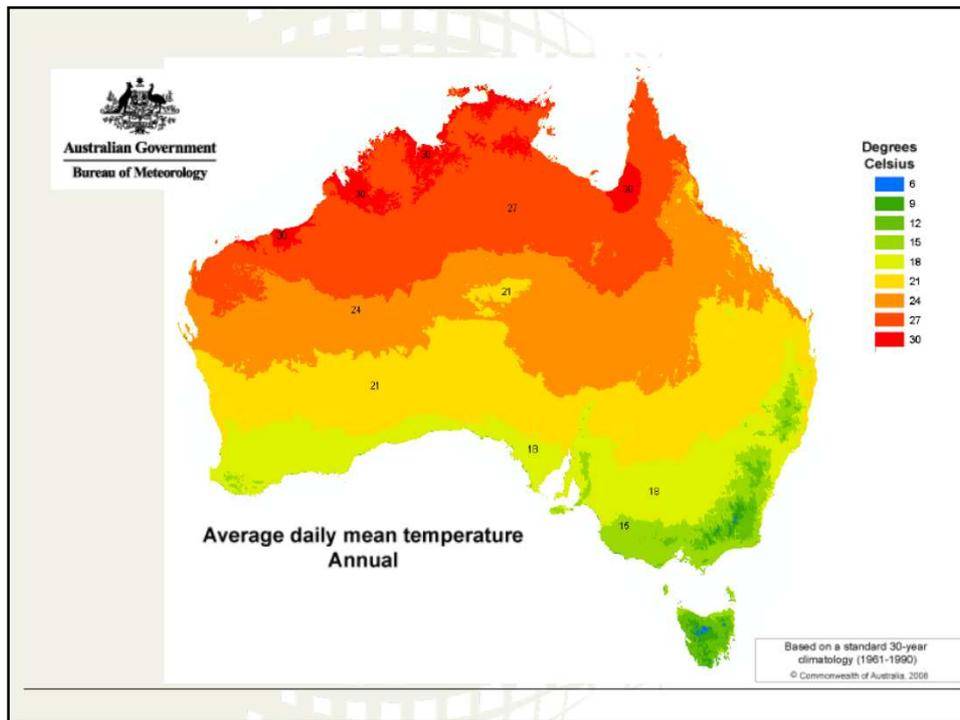
Accolade Wines commenced premium sparkling winemaking in Tasmania from the 1995 vintage which has evolved to become the House of Arras with 5 distinct styles within the brand

- Brut Elite MV (2006)
- Vintage Rose (2005)
- Grand Vintage (2004)
- Vintage Blanc de blancs (2004)
- Late Disgorged Vintage (2002)

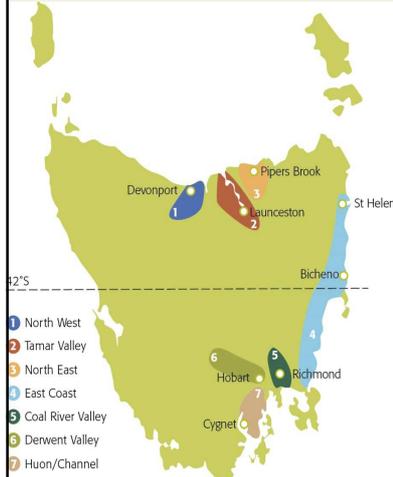


Ocean Currents





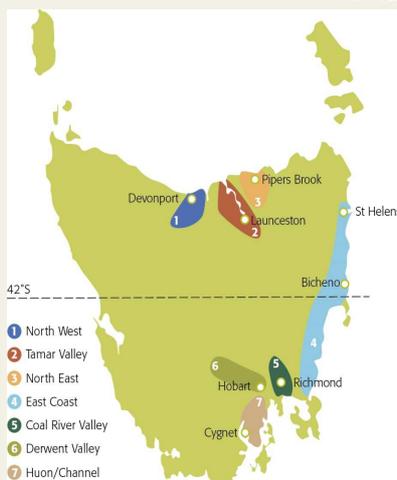
Tasmanian Viticulture/Winemaking



- **History**
- 1820's ,first wine produced near Hobart
- 1956 Morilla Estate (Hobart) established
- 1975 Pipers River planting commenced
- 1986 Sparkling wine focus (Roederer)
- 1995 Arras established
- **Now**
- 160 licenced wine producers
- 230 vineyards covering 1,500 ha
- Less than 0.5% of total Australia grape production
- Average annual intake of 7,900 T over the last 5 years



Tasmanian Wine- Varieties



- Key varieties:
- Pinot Noir - 44%
 - Chardonnay - 23%
 - Sauvignon Blanc - 12%
 - Pinot Gris – 11%
 - Riesling - 5%
- Sparkling wine production:
- Chardonnay – 59.2%
 - Pinot Noir – 45.3%
 - Total (all varieties) – 31.3%



Climatic Data for Vineyard Regions

	Lat m/s	Alt m	HDD	RF mm	RF days	RH %	SSH hr
France							
Reims	49.18	83	1,082	388	87	60	1337
England							
Oxford	51.46	63	877	376	95	-	1189
Southampton	50.55	20	951	422	91	70	1317
Tasmania							
East Coast	41	5	1024	431	75	60	1613
Upper Derwent	42.5	53	949	328	79	50	1450
Canada							
Niagara	43		1400	550			
Oregon							
Roseburg	43	146	1150	242	53	51	1725



Australian Soils

The key characteristics of Australian vineyard soils are

1. Ancient with low fertility
2. Low organic matter
 - hard and woody plants
 - low animal population
 - regular drying (annual)
 - regular burning (5 to 10 year cycles)



Regular Bushfires



Smoke Haze



Tasmanian Soil Types

PIPERS RIVER	Ferrosol red clay loam over clay or Basalt
EAST COAST	Vertosol red to grey sand clay loam and sandstone
COAL RIVER	Quartzite and white sands over clay with sandstone shelves
DERWENT RIVER with	Podosols based sandy clay loam over clay sandstone shelves



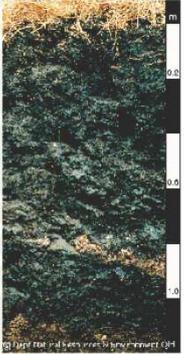
FERROSOLS

- Soils with B2 horizons which are high in free iron oxide, and which lack strong texture contrast between A and B horizons
- The B2 horizon has structure more developed than weak and a fine earth fraction which has a free iron oxide content greater than 5% (as opposed to a Dermosol)



VERTOSOLS

- Clay soils with shrink-swell properties that exhibit strong cracking when dry and at depth have slickensides and/or lenticular structural aggregates
- Although many soils exhibit gilgai microrelief, this feature is not used in their definition
- Australia has the greatest area and diversity of cracking clay soils of any country in the world





EESC202 2012

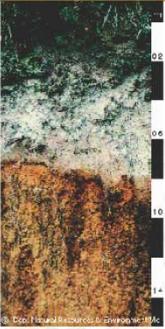


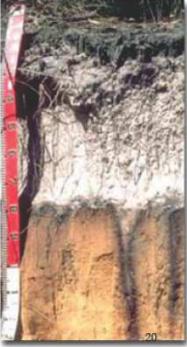
PODOSOLS

- Soils with B horizons dominated by the accumulation of compounds of organic matter, aluminium and/or iron
- A horizons are often sandy and bleached white
- These soils are recognised world-wide, and Australia is particularly noted for its 'giant' forms

COFFEE ROCK

- A compacted, cemented or indurated layer within the podosol profile that is comprised of humus and iron oxides
- Sometimes found near beaches in SE Australia





EESC202 2012



Viticulture

- **Varieties**

It is interesting that Chardonnay, Pinot noir and Pinot meunier became available to sparkling winemakers from the late 1970's with some notable developments from producers in the cool regions emerging from the 1980's.

Clonal investigation in most cases has been limited with plantings heavily reliant on the available clones from the Davis selections (I10V1/I10V5 and D5V12/D2V5) and Busby types (MV6). There is obviously much further investigation to be done with alternative clones (and rootstock combinations) and results will become evident over a long time frame if wines are to be fully assessed with the appropriate age on lees.

- **Vineyard management**

There are many practices based around vine density vigour/canopy management that have a great impact on the individual styles. Due to the high solar intensity in Australia, canopy management is a critical factor to achieve the desired amount of light and heat on the fruit.

Supplementary irrigation is essential in most regions.



Viticulture

- **Fruit Yield**

Vine density in Tasmanian vineyards is mostly within the range of 2,400 to 3,200 vines / ha.

ie in terms of vine spacing	2.2m x 1.8m = 2525 vines /ha
	2.1m x 1.5m = 3175
	1.7m x 1.5 m = 3920

Much of the inter-row spacing (first measurement above) has traditionally been driven by convenience as non-specialised equipment (eg narrow or over - row) equipment need not be used . This is a key commercial issue for regions with lower areas under vine and vineyards as part of 'mixed farming'.

Fruit yield is often quoted in T/ha which is misleading and more exact if stated in kg/vine.

For the above 10T/ha equates to 3.96, 3.15 and 2.55 kg/vine respectively.

The ideal yield is open to conjecture, however the larger vines structures are generally able to support crop levels across this range.



Bay of Fires Winery- Pipers River



Kelvedon Estate – mid east coast



VSP- Canopy/Fruiting Zone



Winemaking- Traditional Method (1)

1. Harvest/Pressing

All fruit is hand picked and whole bunch pressed with only the free run fraction (typically 500 l/T) used for the premium cuvees.

Maturity at harvest is generally between 10.5 and 11.5 Be with a corresponding acidity range of 9.0 to 12.0 g/l (as tartaric).

Mostly fruit is pressed at ambient temperature (morning harvest at 10 to 20C) however some producers chose to chill fruit to 5C by harvesting into crates and holding in cold store. Chilling fruit reduces both colour/phenol extraction and the rate of oxidation, this will certainly impact overall style.

2. Sulphur Dioxide and Oxidation

SO₂ management varies depending on the degree of 'oxidative' character desired by the winemaker. Generally base wines will have some degree of MLF and hence total SO₂s are maintained at <35ppm. This small addition is expected to moderate oxidative development and is considered as 'partial oxidation'. There are many producers who do not use any SO₂ pre ferment and actively promote oxidation (including aeration) as a way of removing colour and phenolic compounds.

This choice has fundamental style implications based the degree of oxidative modification of flavour compounds.



Winemaking (2)

3. Colour and Phenolic Management

Juices are generally fined pre-fermentation to reduce colour and tannins.

Fining agents and rates vary between producers and usage is very dependent on the level of oxidative processing applied.

The most common fining agents are

- activated carbon
- gelatine
- milk/casein
- PVPP

4. Primary Fermentation – Juice Clarity

The content of grape solids in the juice at fermentation significantly effects the palate structure. The majority of winemakers enzyme treat the juice so it can be settled for clarity. This allows finings to be added to clear juice and then racked/filtered from fining lees prior fermentation.

'Fluffy' lees (grape solids) can then be added back to the juice to achieve the desired turbidity for fermentation, this ranges between

< 30 NTU (clear, occasional)

100 to 150 NTU (light haze, common)

150 to 300 NTU (opaque, occasional)



Winemaking (3)

5.OAK

Oak influence may be introduced to the base wines via fermentation in oak or the inclusion of oak matured reserves.

5.1 Primary fermentation

When juice is fermented in oak the winemakers tend to take one of the following approaches.

New(er) oak; juice is fermented in small format oak (<500 l) from first to third use. In this situation the oak characters (toast, char, tannin) are quite intense and the use of such components usually ranges between 5 and 10% of the final blend.

Old oak; primary fermentation is either in small or large (500 to 5000 l) oak vessels of 5th use or older. With this option the wood influence is lower and generally constitutes between 30 to 100% of the blend. Wines produced via fermentation in old oak tend to show more viscosity, oxidative character and relatively advanced aging.

5.2 Reserves

Older oak is commonly used for reserve wine and often in a solera approach. Lees may also be incorporated for additional character. This method will enhance aging and palate weight and depending on SO₂ regime influence extent of oxidative character.



Winemaking (4)

6. Primary Fermentation

As these traditional method wines are not being tailored to be fruity in style most producers use commercially available yeast strains noted as being strong fermenters with lower aromatic production and adding palate texture and viscosity.

IOC18-2007 is a popular choice.

In line with the general desire to reduce fruitiness and promote complexity -the primary fermentation is generally rapid ,1.5 Be per day at 14 t 16C

- low level sulphides are accepted and indeed often promoted by reduced amelioration with either DAP or copper ion addition.

7. Malolactic fermentation

MLF (partial or complete) is often used to modify the flavour profile and reduce the acidity in cold climate wines. The addition of tartaric acid to juice/wine is allowable in Australia and hence MLF can be used purely for flavour adjustment ie when acidity is at acceptable levels

Most sparkling winemakers have a formulaic approach to the use of MLF which is an essential part of their wine style.



Winemaking (5)

7. Malolactic fermentation

7.1 Lactic Acid Bacteria

Commercially produced strains of bacteria are now common for initiating MLF and one fundamental choice is that between

- Citrate negative, these do not produce diacetyl and retain a more fruit driven style
- Conventional types producing various levels of diacetyl and introducing complexity via the classic butter like characters of this compound

7.2 Inoculation

The bacteria may be introduced by direct inoculation (frozen or freeze dried) or cross inoculation from active cultures. Results with either are often variable and preference is mostly based on winemakers experience although the apparent cost saving of using active cultures is often attractive.

Co-inoculation (addition of LAB after a predetermined level of fermentation) appears to give a more reliable start to MLF presumably due to the lower initial alcohol content and greater nutrient availability allowing bacteria to acclimatise and increase cell numbers in this (temporarily) less rigorous environment.



Winemaking (6)

Quality issues may occur with co-inoculation should the primary ferment become sluggish, in this situation attenuated characters and volatile acid levels are increased.

The alternative inoculation strategy is immediately post primary fermentation and again is a winemakers' choice.

The addition of a nutrient mix to promote LAB growth is apparently uncommon and would be more frequently used in situations where MLF is sluggish.

7.3 MLF management

Yeast lees appear to moderate the development of buttery and aldehyde characters so MLF is conducted on full or partial fermentation lees.

Temperatures are maintained between 16 and 20C and regular mixing may be used to avoid temperature gradients within a tank and stimulate bacterial activity.

Tasmanian sparkling base has a malic acid content generally between 3.0 and 5.0 g/l and winemakers may vary the extent of malic degradation by variety or vintage.

Highly active MLF will show a decline in malic acid of between 1.0 and 2.0 g/l per week.



Winemaking (7)

8. Base blend

8.1 Protein stabilisation

There is considerable conjecture over the impact on mousse and bead resulting from the removal of grape protein by bentonite, with the general consensus being

- residual grape proteins enhance these properties and hence bentonite use is minimised
- yeast autolysates from tirage maturation will infer commercial partial or complete stability.

Hence the rate of usage of bentonite varies on the winemakers philosophy, experience and to an extent, commercial courage with regard to instability.

As such most sparkling bases destined for products with greater than 2 years on lees receive partial to no fining with bentonite.

However bentonite can be considered a useful as a corrective fining for colour and phenolic removal and should be included as a winemaking option.

Protein stability levels are usually measured (rather crudely) via a heat test (turbidity after 80C for 4 hours) which may indicate commercial stability with regard to haze formation but has only anecdotal evidence for effects on bead and mousse.



Winemaking (8)

8.2 Tartrate stabilisation

Base wines are chilled in bulk to -3C for tartrate removal and the addition of crystalline tartrate (potassium or calcium) used to induce crystallisation when deemed necessary.

CMCs have recently been approved for use in Australia, the extent of their use is not common knowledge at this stage.

Stability will be confirmed either of 2 common analyses

- conductivity (3%)
- forcing test (-3C for 3 days)

8.3 Base wine fining

Final corrective fining additions may be made at this stage, winemakers will be fine tuning phenolic levels via the following popular agents

- milk/casein
- gelatine
- PVPP



Winemaking (9)

9. Secondary fermentation

Producers select a strong fermenter to ensure a rapid and complete sugar degradation thus gaining the desired CO2 content and minimising the risk of contaminant growth.

As with primary fermentation IOC18-2007 is commonly used.

However some consideration is given to yeast inoculum levels on the basis of controlling fermentation rate to influence the wine style and as such fermentation may be tailored to between 2 and weeks duration.

10. Tirage maturation

The vast majority of tirage storage is above ground in temperature controlled (refrigerated) warehouses with 14 to 16C generally considered ideal for premium products.

There is now significant trial work underway with crown cap options of various rates of oxygen permeability ie

- low; for slower development and greater reductive character.
- increasing; driving more rapid maturation and open/fruitier styles.

This is yet another stylistic choice for the winemaker.



Winemaking (10)

10. Tirage maturation

There is no legislation in Australia regarding lees aging but the general industry approach is

- NV 1 to 3 years
- Vintage 3 to 5 years
- Mature Vintage 5 to 10 years

Wine shelf price will be relative to maturation policy and hence indicative of product quality.



Winemaking (11)

10. Remuage

Riddling agents used are either a commercial bentonite/alginate mix or simply sodium bentonite (25 to 75 mg/l)

Riddling agent efficiency can vary between secondary yeast strain and if well matched it is not uncommon to achieve a 3 day remuage cycle if using automated riddling.

11. Expedition Liqueur

Final tailoring of the wine balance will occur via the liqueur and the addition rates of each component are relatively secretive winemaking I.P.

The common additives via the liqueur are

- SO₂
- Sugar
- Acid (malic, citric, lactic)
- Oak character and tannin (oak treated base wine)
- Reserve base (may be oak matured)
- Tannin or vegetable gum (commercially available)
- Spirit



Winemaking (12)

12. Expedition Closures

The influence of closure selection on the final wine style should not be underestimated. There are many conflicting views on the relative values of the options

- inert closures (screw caps, crown seal)
- cork (conventional agglomerate/disks)
- cork product (microparticle/CO2 treated)

Most focus has been on reducing TCA taint but other factors such as oxygen ingress and leaching of polyphenols from the cork have very significant effect on the wine development ie closure selection should be considered an integral factor in determining wine style.

Tertiary maturation on cork also generates much discussion though it is generally accepted that 3 to 6 months is required post disgorgement for the liqueur to integrate (mostly SO2 stabilisation) prior to release to the market.



House of Arras – Winemaking Outline

Terroir; Tasmanian East Coast and Derwent Valley

Varieties; Chardonnay, Pinot noir , Pinot meuniere

Viticulture; VSP, supplementary irrigation, 3 to 3.5kg/vine

Harvest; hand picked, 11.0 to 11.5 Be , whole cluster pressed, premium fraction 500 l/T

Juice Process; semi oxidative (total SO2 < 35 mg/l), juice fining (carbon/gelatine)

Primary Fermentation; on light solids, IOC18-2007

Oak ;5 to 10% fermented in 1st to 3rd use French oak barriques

MLF;100% (Chr. Hansen)

Reserve Wine; oak and tank aged reserves in NV product and expedition liqueurs

Blending; varietal proportion to label style.

Base Blend Stabilisation; tartrate and protein stabilised, caseinate fining

Secondary Fermentation; IOC18-2007, higher oxygen ingress crown cap, 4 to 10 years on lees at 14 to 16C.

Expedition Liqueur; SO2, sugar, acid, oak, spirit

Closures; traditional cork, minimum 6 month prior to release



Conclusion

In closing this paper, I wish to emphasise the considerable number of choices that must be made in sparkling wine production to achieve the desired wine style.

Often reading the similar technical notes on various wines you might imagine these wines would also be of similar style but this is rarely the case as each step requires empirical interpretation by the viticulturist/winemaker.

The final wine style is the cumulative result of each permutation from terroir through viticulture and winemaking to the final product.

Beauty does remain in the eye of the beholder ... the wine producer must hope that they have sufficient 'beholders' appreciating their style.

