

exploring the clonal diversity in
chardonnay

nick dry
yalumba nursery



Yalumba Nursery

vines for the times

Presentation Outline

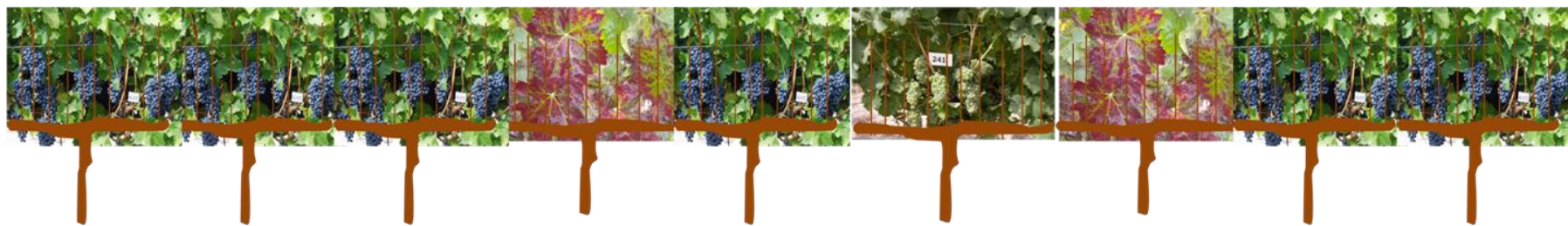
- Timeline of Chardonnay clone imports
- Exploring the clonal diversity in Chardonnay- Yield
- Exploring the clonal diversity in Chardonnay-Sensory Attributes
- Three new clones





**MASS
SELECTION**

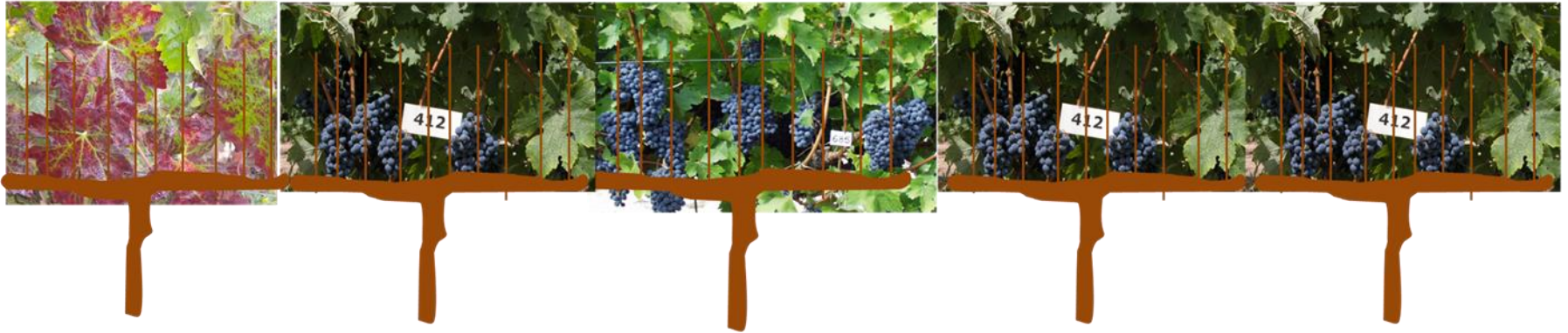
**Cuttings taken from
across the vineyard**



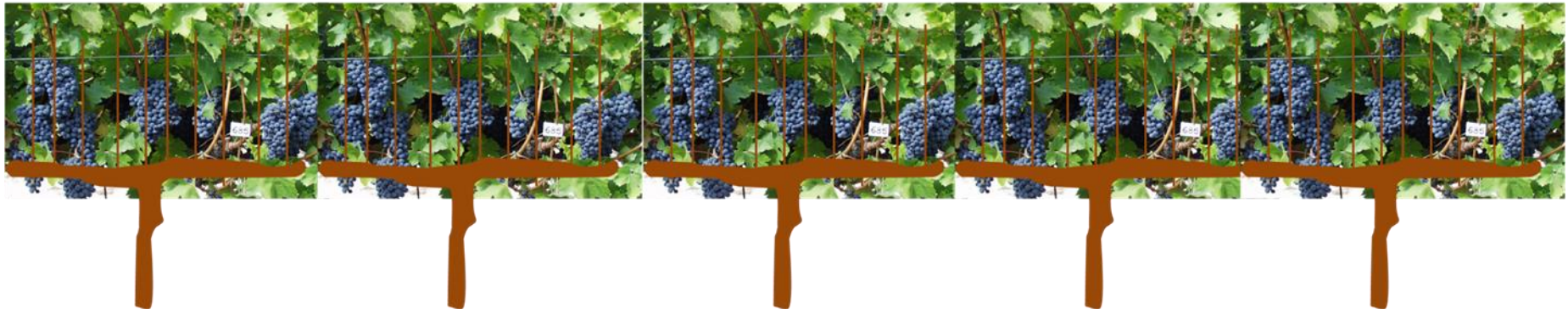
Yalumba Nursery

vines for the times

What is a clone?



A population derived from a single mother vine, with attributes the same as the mother (Robinson, 2012).



Timeline of Chardonnay Clone Imports into Australia

1957- Gin-Gin imported into W.A (?)¹

1958- P58 (France)¹

1968 - Mendoza (C2V16, FPS01A)¹ – Argentina via UC Davis²
- 'OF' (F1V3) – UC Davis^{1,2}

1969- G9V7 (FPS05) and I10V1, I10V3, I10V5 (FPS06, 07, 08)- UC Davis ^{1,2}

1980- ANTAV 13 AND ANTAV 84 (Burgundy) ^{1,2}

1988- 76, 95, 96 and 277 (Burgundy)¹

Late 80's/Early 90's?- 118, 114, 352, 415 (Burgundy³)

2004- ENTAV-INRA[®] 548 and
ENTAV-INRA[®] 809 (Burgundy)³

2007- ENTAV-INRA[®] 1066
(Burgundy)³

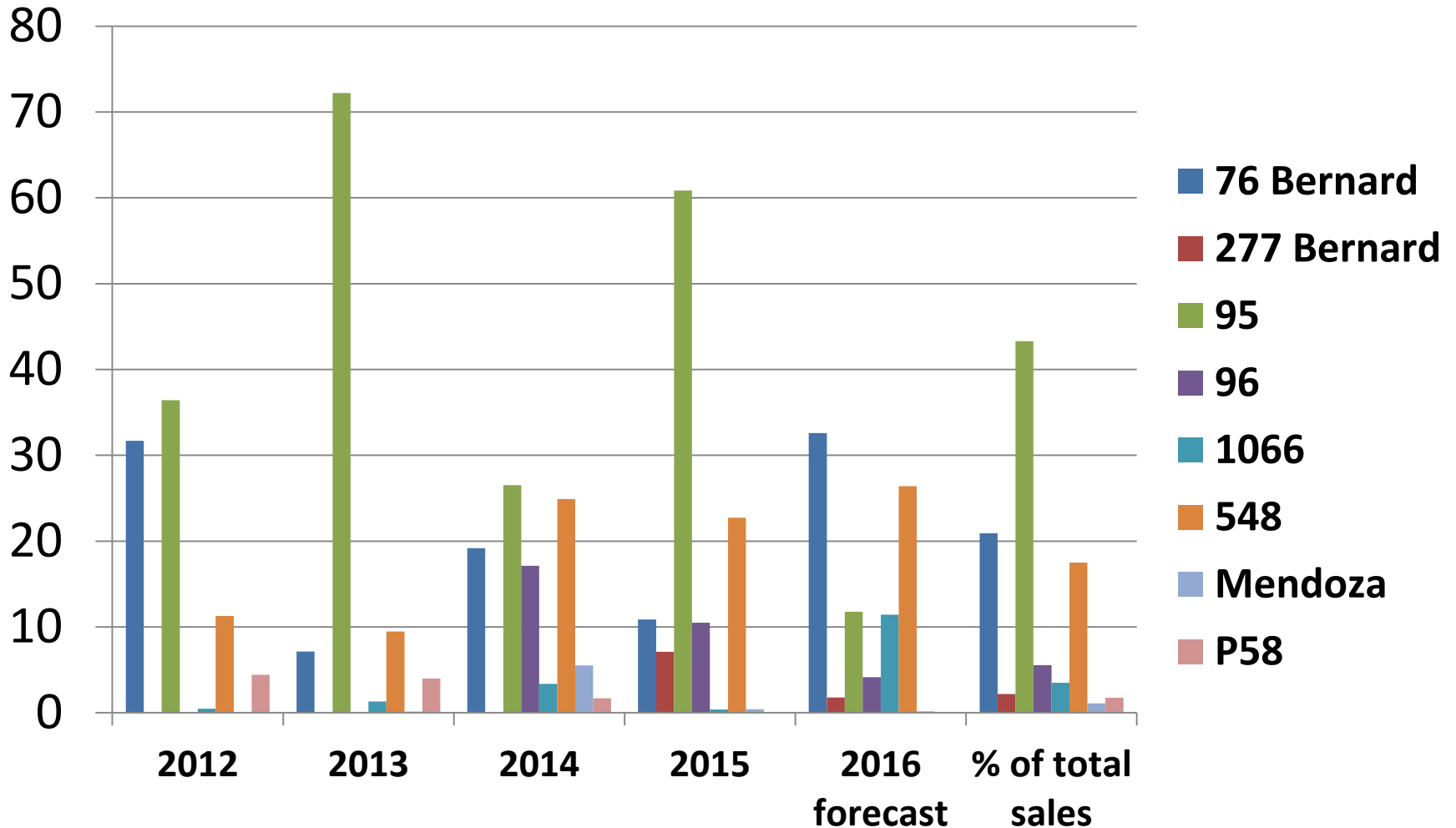
Sources:

1- Nicholas, P (2006) National Register of Grapevine Varieties and Clones.

2-Cirami, R. and Ewart, A. (1995) Clonal Selection in Australia. In Proceedings Int. Symposium on Clonal Selection. ASEV.

3- Yalumba Nursery/ENTAV-INRA[®]

% of sales by clone (2012-2016)



exploring the clonal diversity in Chardonnay- Yield



ENTAV –INRA® 277



ENTAV –INRA® 548



Source: ENTAV –INRA®

Yield and Yield Components-French data

Clone	Yield/vine (kg)	Bunches/vine	Bunch weight (g)
76	2.54	23.4	107
95	2.48	23	107.6
96	2.81	22.7	121
277	2.74	24.6	109.6
548	1.67	19.7	81.4
809	2.06	21.9	90.4
124	2.97	25.1	118.2
Average	2.47	22.91	105.03

5 years of data collection
Appellation : AOC St Véran
Clay Soil
Density: 8696 vines/Ha

Source: ENTAV-INRA

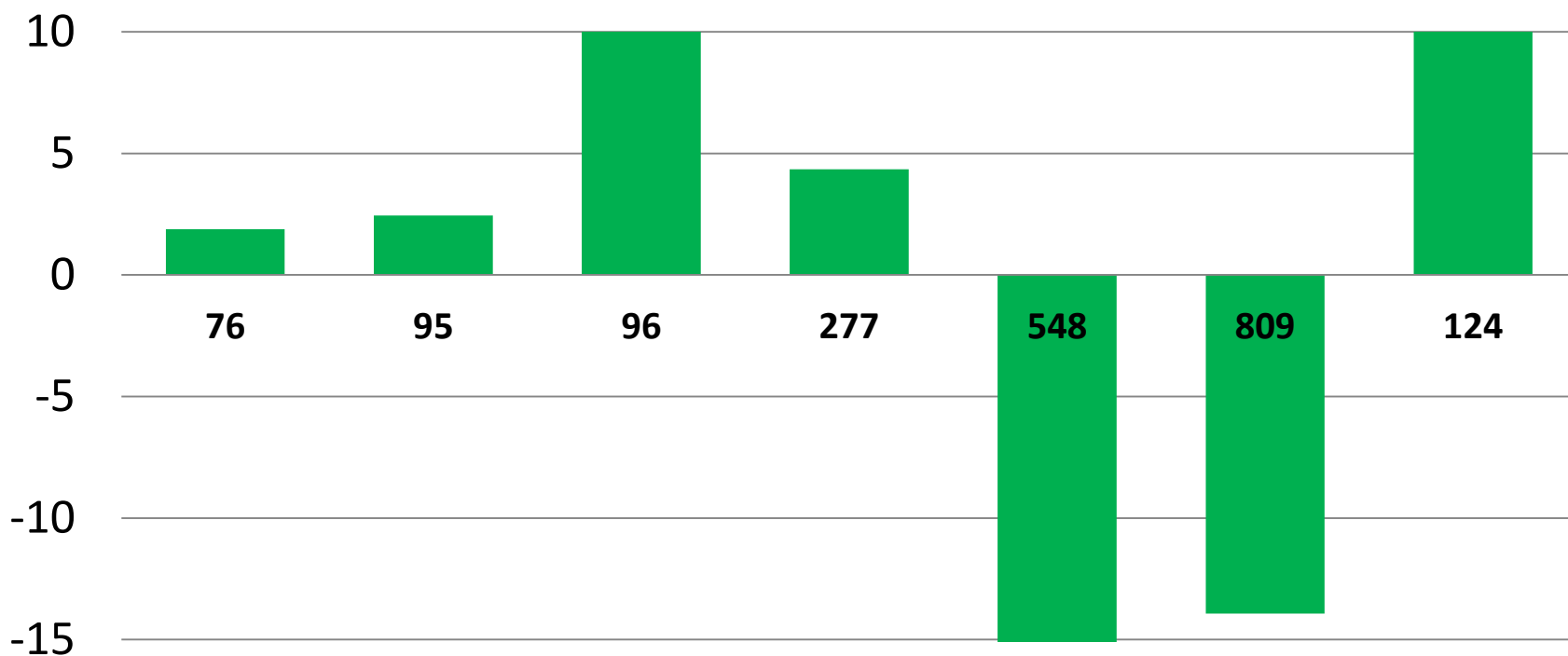
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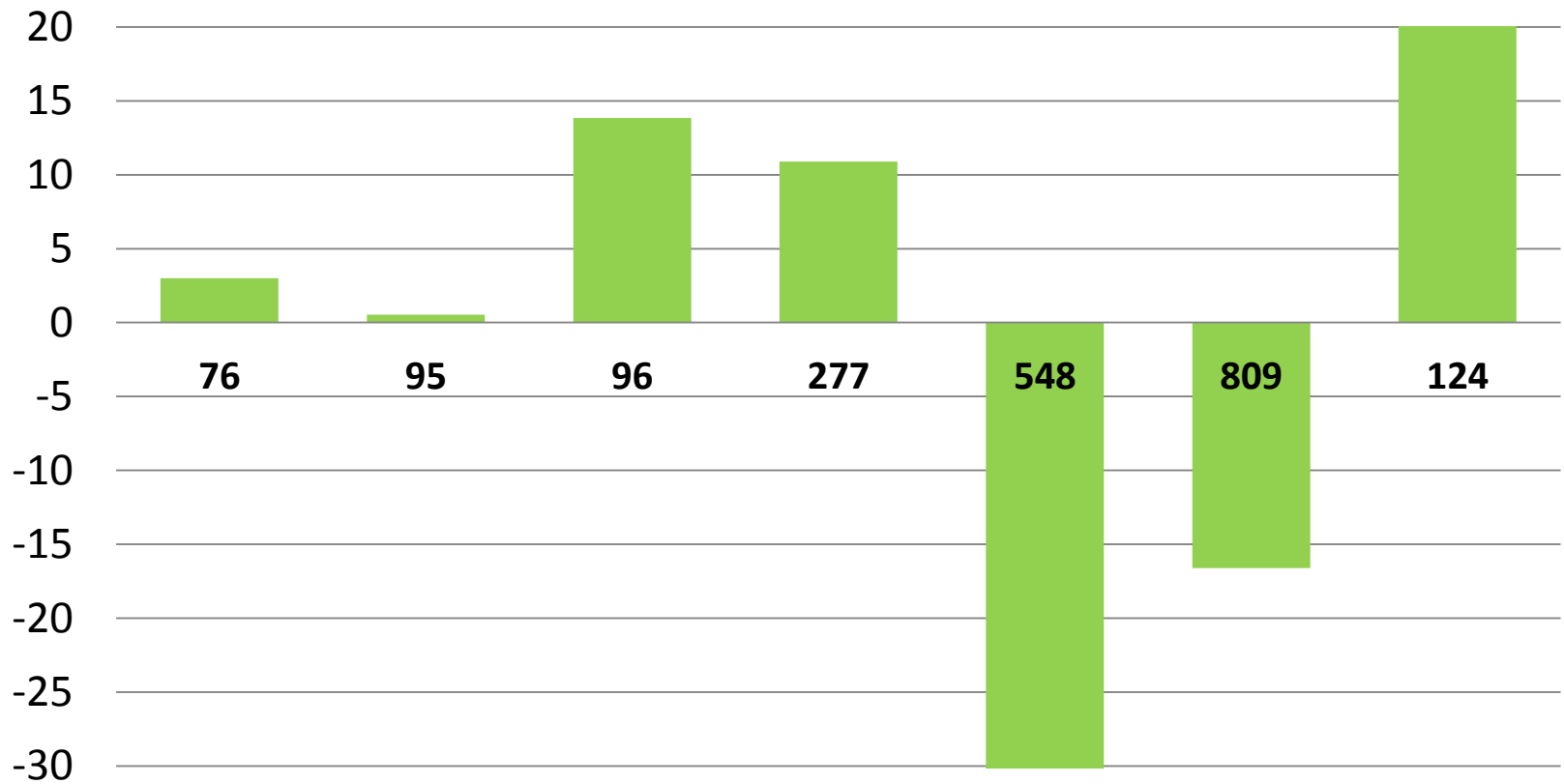
Bunch weight/vine of 7 clones displayed as a % from average



5 years of data collection
Appellation : AOC St
Véran
Clay Soil
Density: 8696 vines/Ha

Source: ENTAV-INRA

Yield of 7 Chardonnay clones displayed as a % from average



5 years of data collection
Appellation : AOC St Véran
Clay Soil
Density: 8696 vines/Ha

Source: ENTAV-INRA

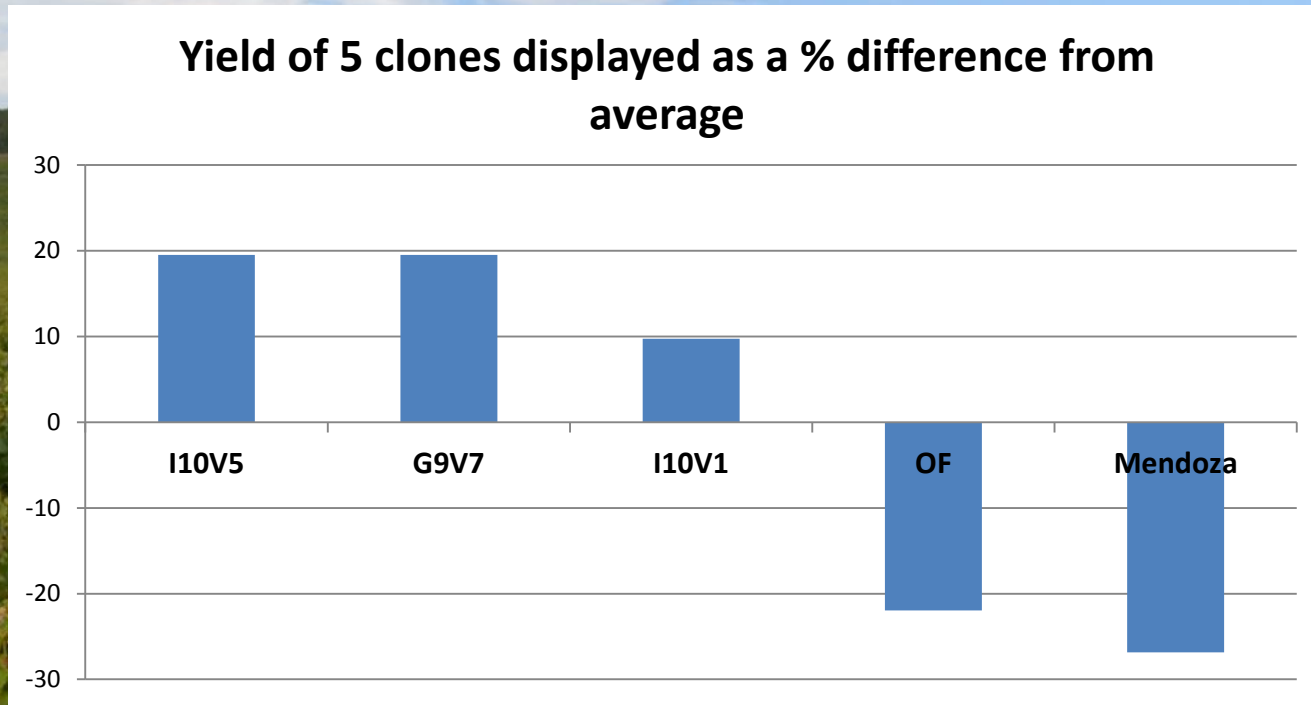
Adelaide Hills Replicated Trial

Planted 1985
3174 vines/Ha
Harvested 1990-1992

Data source:

Cirami, R. (1993) Clonal Selection of Chardonnay Clones. The Australian Grapegrower and Winemaker. Annual Technical Issue.

Clone	Yield/vine (kg/vine)
I10V5	4.9
G9V7	4.9
I10V1	4.5
OF	3.2
Mendoza	3
LSD	0.5





exploring the clonal diversity in
chardonnay-sensory attributes

Chardonnay I10V1- Winemaker comments:

'More obvious in flavour, white peach tending to tinned fruit when overripe. More "conventional" flavour profile but actually performs well in the right sites. Important not to pick too late'-joint comments winemaker/viticulturist-Yarra Valley

'I don't like this clone, particularly in the cooler end of the valley. It is just plain simple. However we had some 40 year old stuff that was pretty exciting. I am pretty convinced this is just vine age' - Winemaker- Yarra Valley

'Love it! Great purity of fruit flavour from the Hills (grapefruit, white stone fruits)! Slightly more richer and fuller than say clone 96. Shows wonderful regional fruit characters. Slightly softer, more rounder type of acid. Like to see larger berry sizes and big canopies.'- Winemaker-Adelaide Hills and Tasmania

Upfront, fruit driven (spectrum tending to tropical/melons), fleshy, generous palate but can tend to blowsiness. In cooler regions pick later for fruit expression, in warm regions pick earlier to avoid blowsiness/loss of acidity. Good for producing generous, fruit driven styles – more commercial. Winemaker-Multi-region

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Chardonnay Clone: I10V1

Flavour Profile

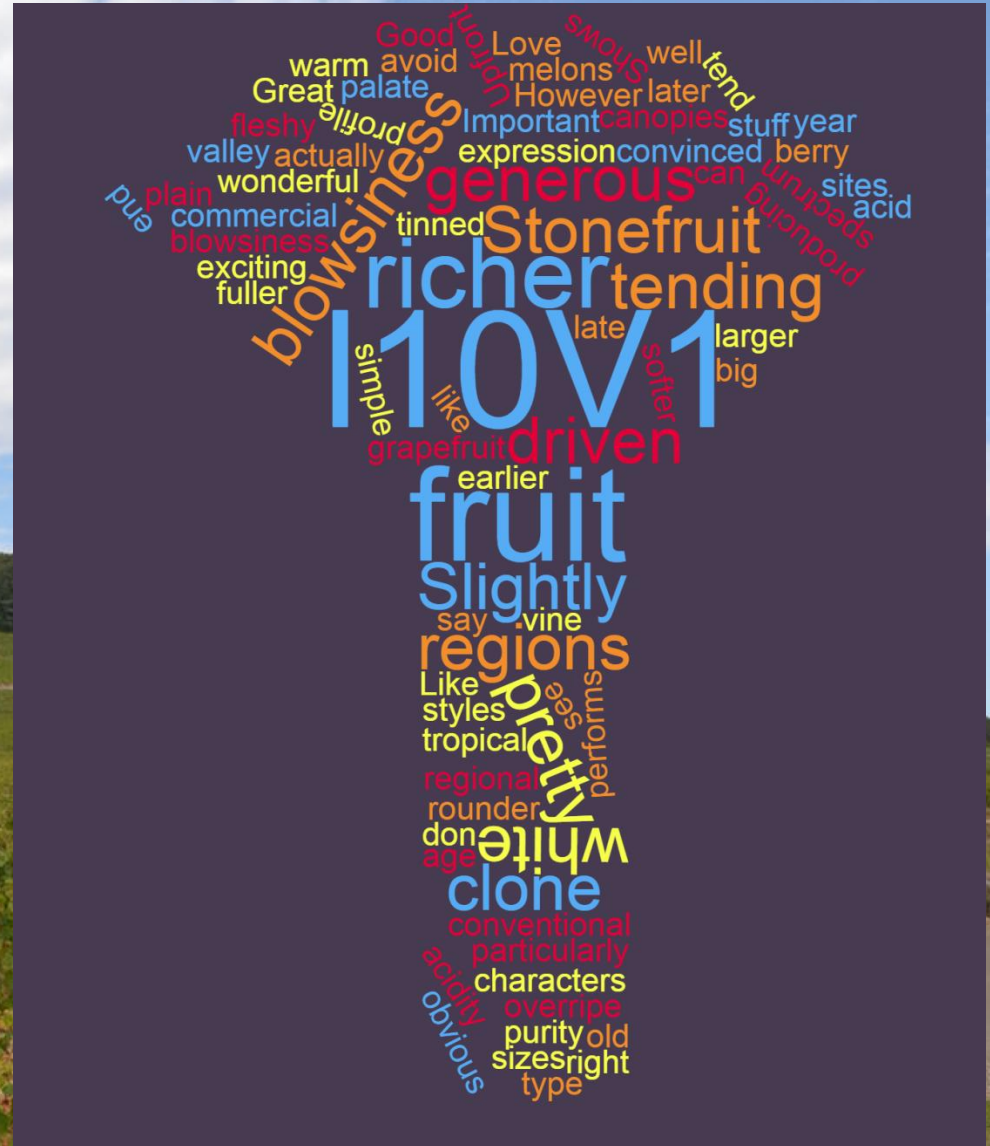
- White peach
- Grapefruit
- White stone fruits
- Tropical/melons

General comments:

- Plain, simple
- Conventional flavour profile
- fruit driven styles – more commercial

Style and Structure:

- Richer and fuller
- Fleshy, generous palate
- Rounder type of acid



Chardonnay Mendoza-Winemaker comments:

'Punchy, fruit forward clone tending to melon when too ripe. We need to pick this one early but it can be good when we do. We don't see so much hen and chicken in the Yarra.'

-joint comments winemaker/viticulturist-Yarra Valley

'crops very well, healthy canopy, but had a very strong green pineapple character. We need to be careful to tame it with 277 and 96 as it is so strong by itself. particularly in they cool years when it can be almost green capsicum like. It needs to be slightly exposed and pick up some dappled sunlight. We avoid shading - unless it is a very warm year. Only sets a low crop on our place.'

-Winemaker- Yarra Valley

*Bigger, richer and fuller style and more fruity. Have always performed well (A grade) even though they don't typically "look" great in the field. Smaller canopies & small crops. **Winemaker-Adelaide Hills and Tasmania***

*Produces a rich, full style. Generous but still with good structure/line. I'd use as a blender to add extra dimension/richness or to produce a fuller style. Quite a distinctive clone. Aroma spectrum tends to florals, mango flesh/exotic tropicals, quince (EV) – richer aromatic tones. **Winemaker-Multi-region (RL, AH, EV, KV, TAS)***

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Chardonnay Clone: Mendoza

Flavour Profile:

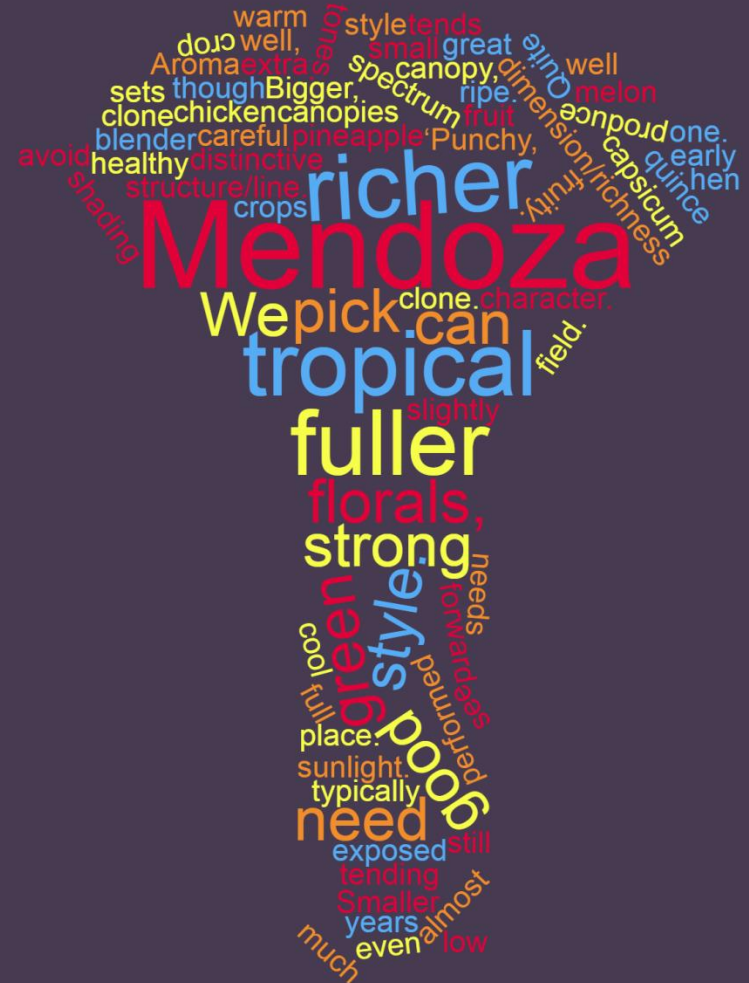
- More fruity
- Tending to melon when too ripe
- Strong green pineapple
- Florals, mango flesh/exotic tropicals, quince

Style and Structure:

- Bigger, richer and fuller
- Rich, full style
- Punchy, fruit forward
- good structure/line

General comments:

- Always performed well (A grade)
- Tame it with 277 and 96 (blender)
- Use a blender to add extra dimension/richness



Chardonnay clone: P58

'Fine, lemony, intense, complex, generally lower cropper than some other clones' joint comments winemaker/viticulturist-Yarra Valley

'Solid. This is the MV6 of the yarra chardonnay ... reliable and solid. Easy to manipulate. Picked early it is citrus, picked a little riper it can be very pretty white peach. Too ripe it shows yellow peach'- Winemaker- Yarra Valley

'Only time I had it was from Tasmania. We don't get it anymore as the grower keeps it for themselves! Absolutely loved it.....very pure fruit, lovely lemon/lime characters and very fine and linear. Very intense! Great for very cool climate region like Tasmania. Some of the best Chard I've ever seen.- Winemaker-Adelaide Hills and Tasmania

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Chardonnay Clone: P58

Flavour Profile:

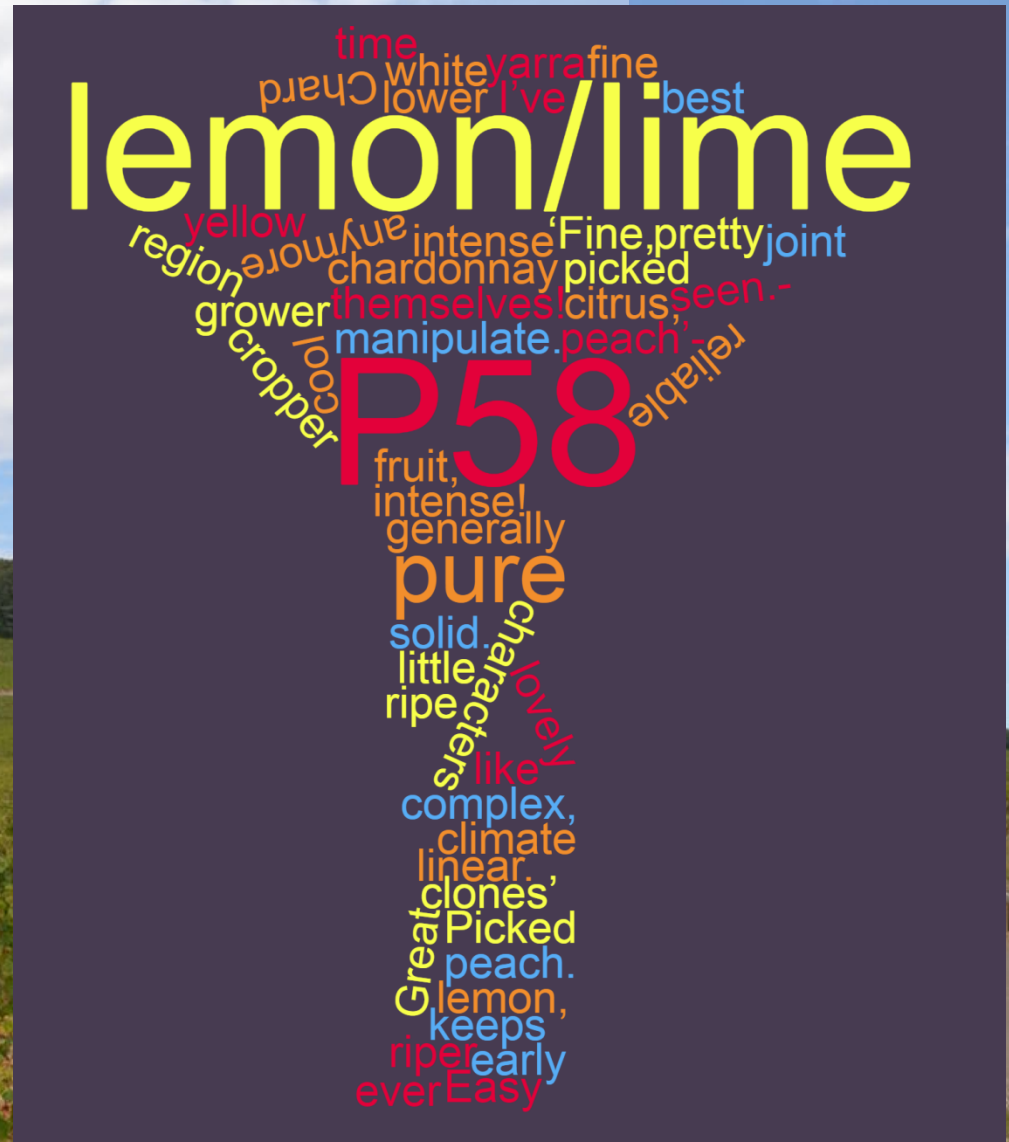
- Lemony
- Lemon/lime characters
- Picked early it is citrus
- Picked a little riper, pretty white peach.
- Too ripe it shows yellow peach

Style and Structure:

- Very fine and linear
- Very Intense
- Fine, intense, complex

General comments:

- Reliable and solid. Easy to manipulate



Chardonnay clone : 76

'Attractive citrus, fine mineral, moderate but consistent yielder'-joint comments winemaker/viticulturist-Yarra Valley

*'Lemony but a bit simple on our shallow topsoil (over clay)-
-Winemaker- Yarra Valley*

*'It doesn't seem as intense and structured as the 96. I would say it's a bit more of an elegant Chard clone for the lighter finer style-
Winemaker Adelaide Hills*

Similar acid drive/structure to 95 but a bit more fruit driven and fuller in the palate – flavour spectrum tends more to the riper citrus and florals for me. More of a blender option or to produce a slightly more fruit forward style with structure.- Winemaker Adelaide Hills

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Chardonnay Clone: 76

Flavour Profile:

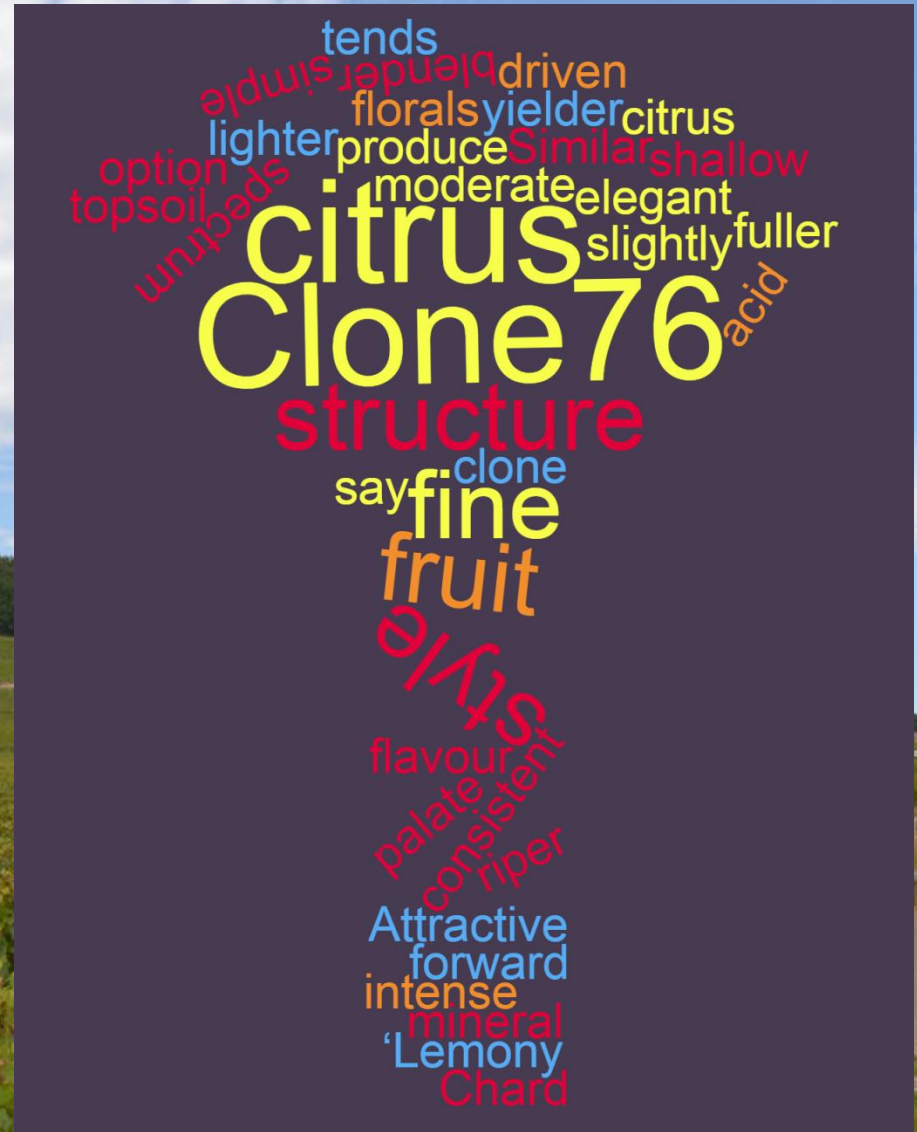
- Citrus
- Lemony
- Riper citrus and floral

Style and Structure:

- Fine mineral
- Elegant.... lighter finer style
- Fruit forward style with structure

General comments:

- Not as intense and structured as the 96
- Blender



Chardonnay B95- Winemaker comments:

'subtle, less intense but very fine, citrus, often needs thinning to achieve quality' *joint comments winemaker/viticulturist-Yarra Valley*

'Solid but lacks any real excitement - good stainless steel ferment. Not on a great piece of dirt. Crops can be heavy if vines not managed.' - *Winemaker- Yarra Valley*

'very fine with tight acid and very intense citrus fruit characters. Lovely fine, mineral acid structure. Perfect if making a fine and intense chardonnay style.' *Winemaker-Adelaide Hills and Tasmania*

My personal favourite – performs well in all regions I have seen it – Produces a fine, elegant style with good acid drive through palate length (acid retention is key) but also good flavour concentration. I like the elegance and palate structure this clone gives – regardless of where it is grown. Typical flavours = citrus spectrum with acid drive, structure and length. *Winemaker-Multi-region (RL, AH, EV, KV, TAS)*

Chardonnay B95- Winemaker comments:

‘subtle, less intense but **very fine, citrus**, often needs thinning to achieve quality’ *joint comments winemaker/viticulturist-Yarra Valley*

‘Solid but lacks any real excitement - good stainless steel ferment. Not on a great piece of dirt. Crops can be heavy if vines not managed.’ - *Winemaker- Yarra Valley*

‘very **fine with tight acid and very intense citrus** fruit characters. Lovely fine, **mineral acid structure**. Perfect if making a fine and intense chardonnay style.’ *Winemaker-Adelaide Hills and Tasmania*

My personal favourite – performs well in all regions I have seen it – Produces **a fine, elegant style with good acid** drive through palate length (acid retention is key) but also good flavour concentration. The **elegance and palate structure is excellent – regardless of where it is grown**. Typical flavours = **citrus spectrum with acid drive, structure and length**. *Winemaker-Multi-region (RL, AH, EV, KV, TAS)*

Chardonnay Clone: 95

Flavour Profile:

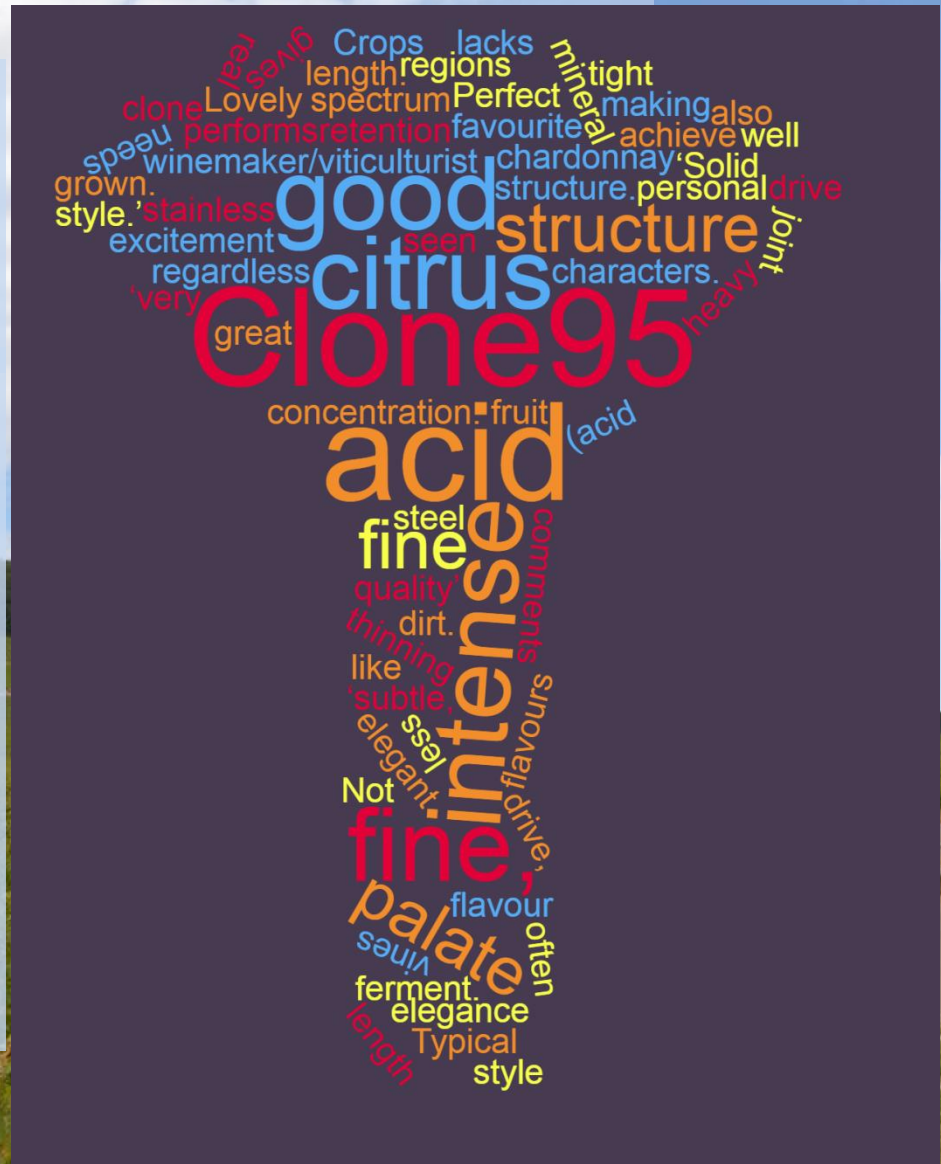
- Citrus
- Very intense citrus
- Citrus spectrum

Style and Structure:

- very fine
- Fine with tight acid
- Mineral acid structure
- A fine, elegant style with good acid and structure

General comments:

- Elegance and palate structure (is good) regardless of where it is grown.



Chardonnay B96- Winemaker comments:

'lifted, attractive grapefruit, high yielding'

joint comments winemaker/viticulturist-Yarra Valley

' lovely zesty and almost a green apple skin character. When it is picked at perfect ripeness it is honey dew melon like. It has really good spine and phenolics and the yarra lemon curd thing. Again will carry a heavy crop if not kept in check' -Winemaker-Yarra Valley

'Love it! Very structured and muscular clone with good richness and mouth-feel at lower be's (around 12.5). Intense fruit with lovely purity of regional flavours. The rich palate is ideal for the funkier and more textural styles. Can have relatively big crops (10+ t/ha) but still look great.-Winemaker-Adelaide Hills and Tasmania

'Complex, solid and weighty, plump and textured and can add structure to blends. Also good for sparkling as it produces consistent higher yields without significantly reducing concentration of flavour. Winemaker-multi-regional

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'lifted, attractive grapefruit, high yielding'

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Chardonnay Clone: 96

Flavour Profile:

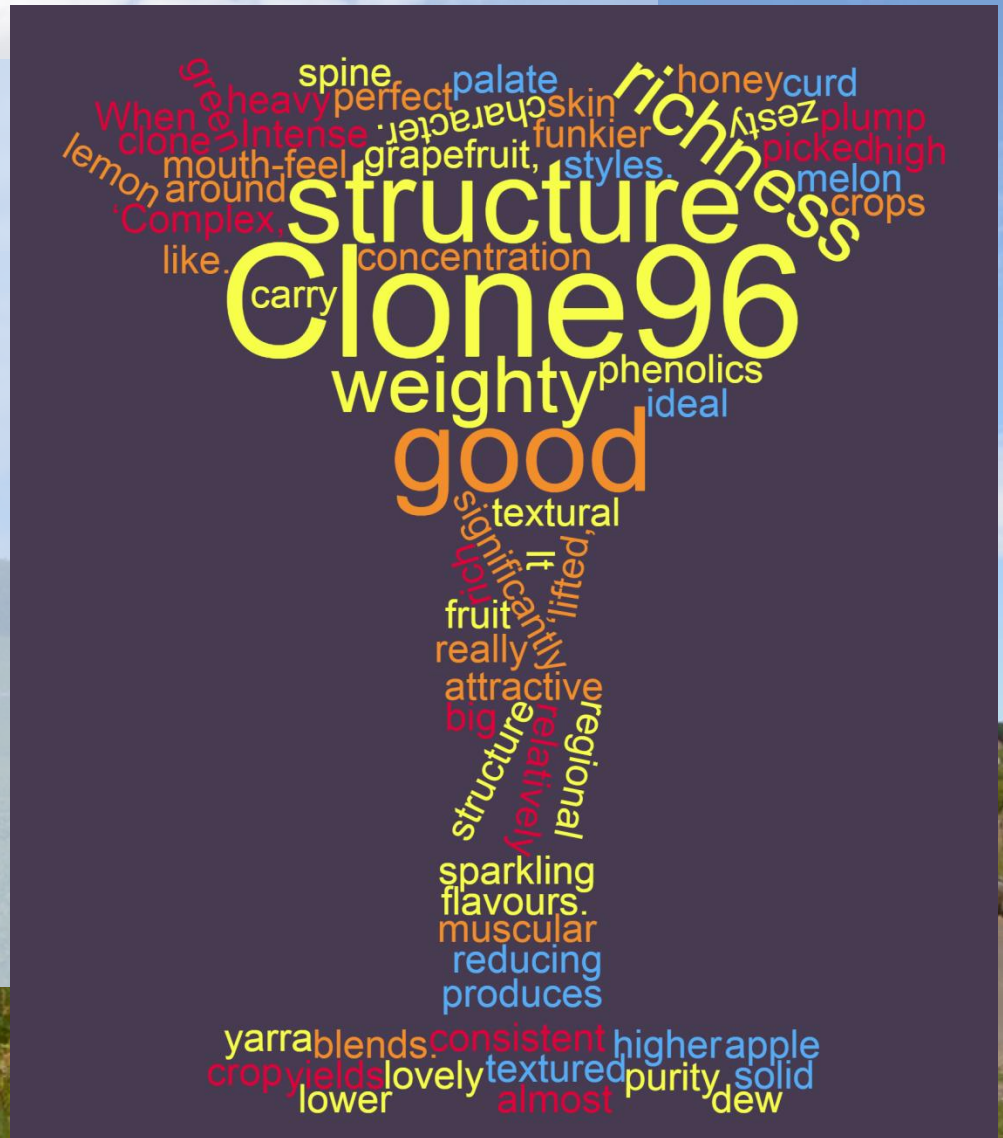
- Lifted, attractive grapefruit
- Zestygreen apple skin character

Style and Structure:

- Good spine and phenolic's
- Very structural and muscular clone
- Solid and weighty, plump and textured

General comments:

- Ideal for the funkier and more textural styles
- Good for sparkling
- Can add structure to blends



Chardonnay B277- Winemaker comments:

'big bunches and yield may need to be controlled but fine, complex, slaty' **joint comments winemaker/viticulturist-Yarra Valley**

'probably my favourite clone but we have it on a really amazing east facing slope above our large dam. Really savoury grapefruit and carries a really good pithy citrus skin character at 12 baume. This is the basis of our Premium Chardonnay ' -
Winemaker- Yarra Valley

'Not a fan. It's best use is for acid retention. I typically find this doesn't give a great deal of fruit expression (borders on neutral) but it does retain a very high level of acidity – tight, lean structure. Good blender if you want acid without fruit'.-
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Matrix highlighting the diversity of sensory attributes within Chardonnay clone population - based on the collective view of 4 winemakers

Clone	Flavour			Style and Structure				
	Citrus	Stone fruit	Tropical	Intense	Rich	Fine	Elegant	Structured
I10V1		■	■		■			
Mendoza			■	■	■			
P58	■			■		■		
76	■					■	■	
95	■			■		■	■	
96	■							■
277	■					■		

Chardonnay ENTAV-INRA® 809

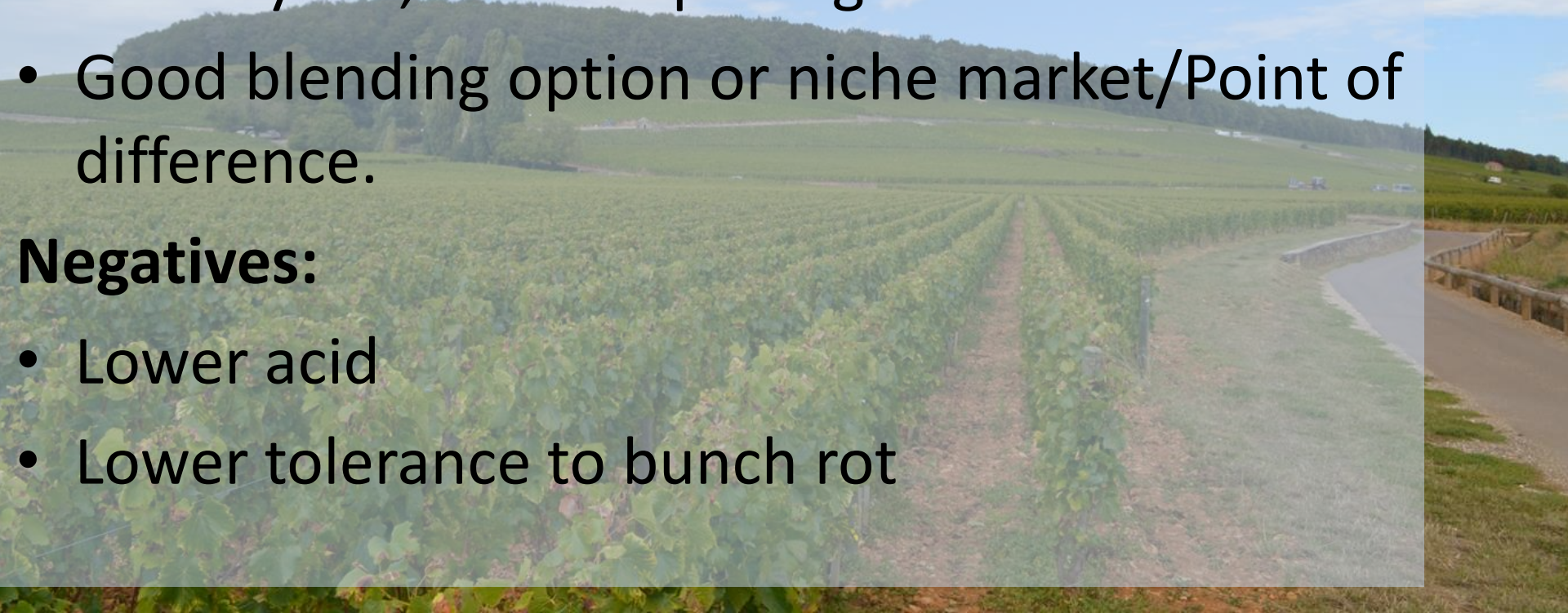


Positives:

- Quality 'musque' clone- highly aromatic
- Lower yield, earlier ripening
- Good blending option or niche market/Point of difference.

Negatives:

- Lower acid
- Lower tolerance to bunch rot



A musque for summer



**GRAEME PHILLIPS
WINE**

“Musque”, writes Jancis Robinson in *The Oxford Companion to Wine*, “is a French term meaning both perfumed, as in musky, and muscat-like.”

“Many vine varieties, including chardonnay, have a musque mutation, which is particularly aromatic and may add to the variety’s own characteristics a grapey scent reminiscent of muscat.”

Now Moorilla’s winemaker, Conor van der Reest, in keeping with MONA’s groundbreaking ethos, has produced Tasmania’s and, he believes, Australia’s first commercially available chardonnay musque wine.

Connor says the musque clones, originally from France but now very rare in that country, arrived as ordinary chardonnay vines from France in the early days in grape growing in his home wine region of Ontario in Canada where today they’re very popular.

“When I developed the Moorilla Muse and Praxis series, I thought that the planting of chardonnay musque in Tasmania for the Praxis wines would be an excellent way to show off this unique version of a very well-known variety,” he says.

“He says the grapes for this, their first, vintage were picked at their perfumed best”

Accordingly, certified chardonnay musque vines were obtained from the Yalumba nursery in Nuriootpa in the Barossa and planted at Moorilla’s St Matthias vineyard on the west bank of the Tamar in 2010.

He says the grapes for this, their first, vintage were picked at their perfumed best and made in two small batches, each given a few hours of skin contact, then one fermented with wild yeast, the other inoculated yeast before the batches were blended and the wine bottled in July with just 2g per litre of residual sugar.

He says the musque characters give chardonnay’s usual crisp apple, stone fruit and citrus aromas and flavours a bright lift and that, with the grapes having lower natural acid at ripeness, the wine best suits early drinking when it’s fresh and young.

Chardonnay ENTAV-INRA® 548

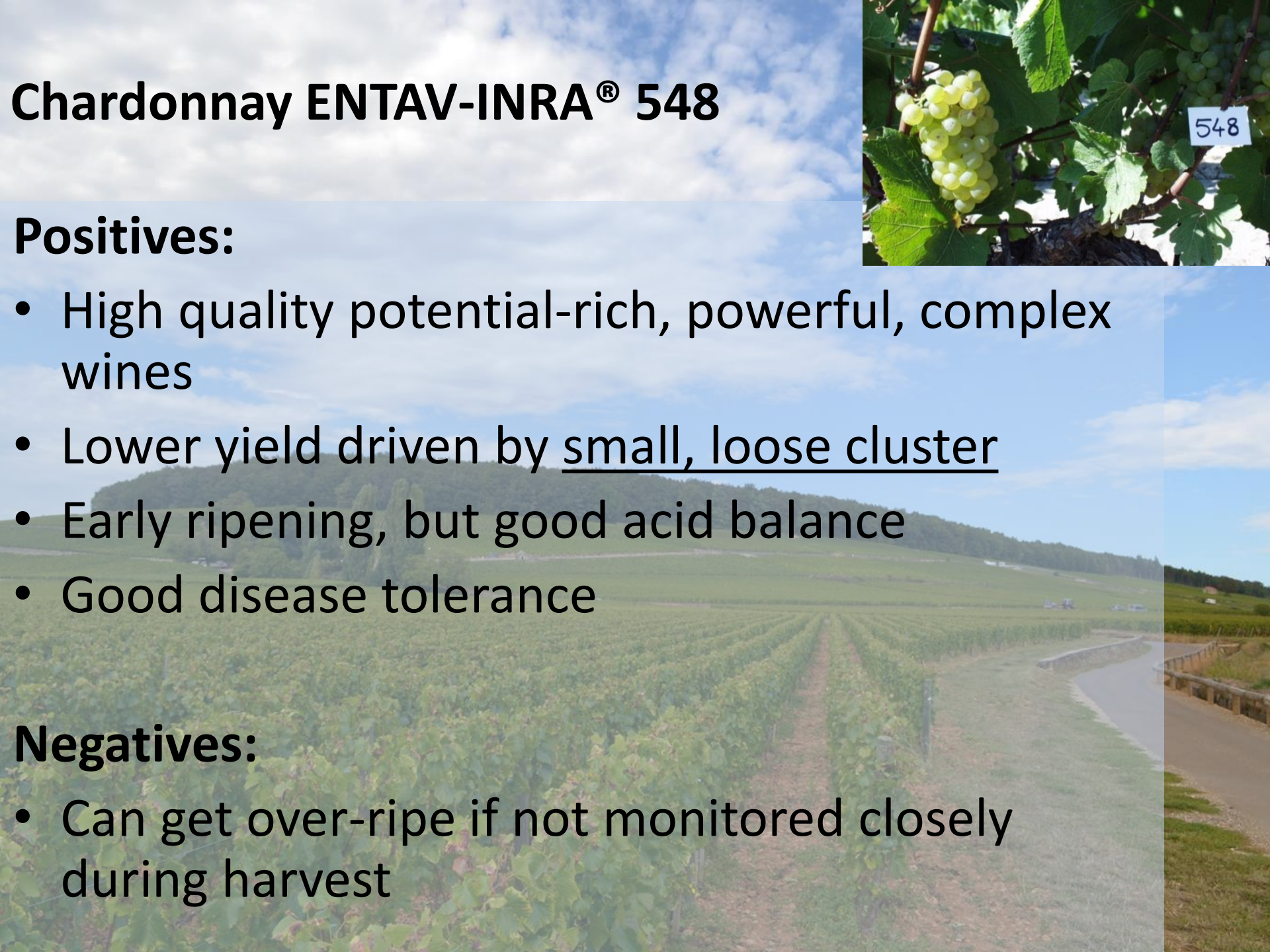


Positives:

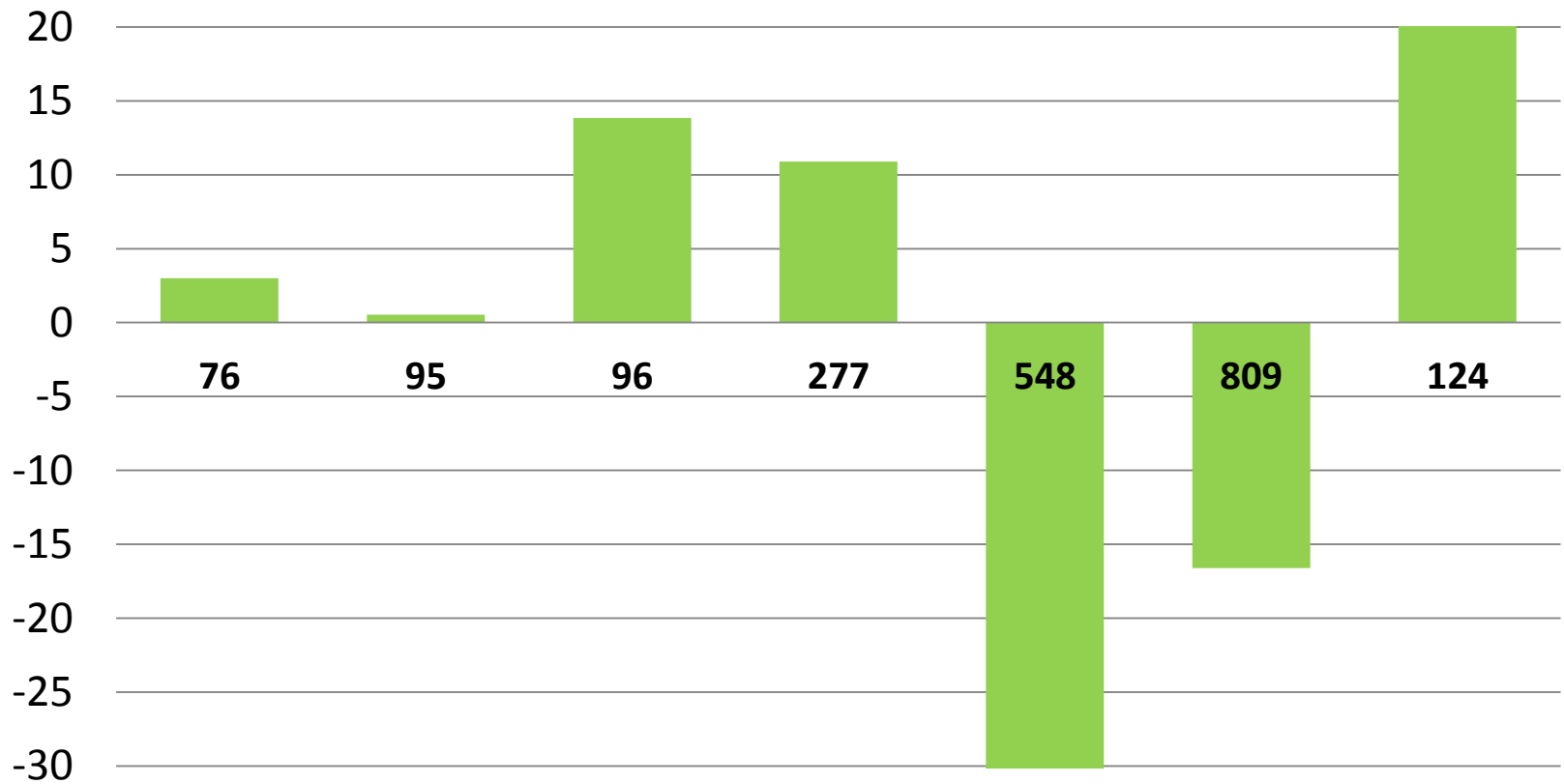
- High quality potential-rich, powerful, complex wines
- Lower yield driven by small, loose cluster
- Early ripening, but good acid balance
- Good disease tolerance

Negatives:

- Can get over-ripe if not monitored closely during harvest



Yield of 7 Chardonnay clones displayed as a % from average



5 years of data collection
Appellation : AOC St Véran
Clay Soil
Density: 8696 vines/Ha

Source: ENTAV-INRA

Chardonnay ENTAV-INRA® 1066



Positives:

- High quality potential-rich, powerful, complex wines
- Very low yield → small, loose cluster (hen and chicken)
- Very early ripening
- Low disease potential

Negatives:

- Yield may be too low in some years, particularly in climates that have poor weather conditions during flowering
- Wines can get 'fat' if harvested late

Many thanks to the survey respondents,
the Yalumba winemaking team,
ENTAV INRA[®], YVWGA and Mark Krstic and
the AWRI team.

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Yalumba Nursery

vines for the times