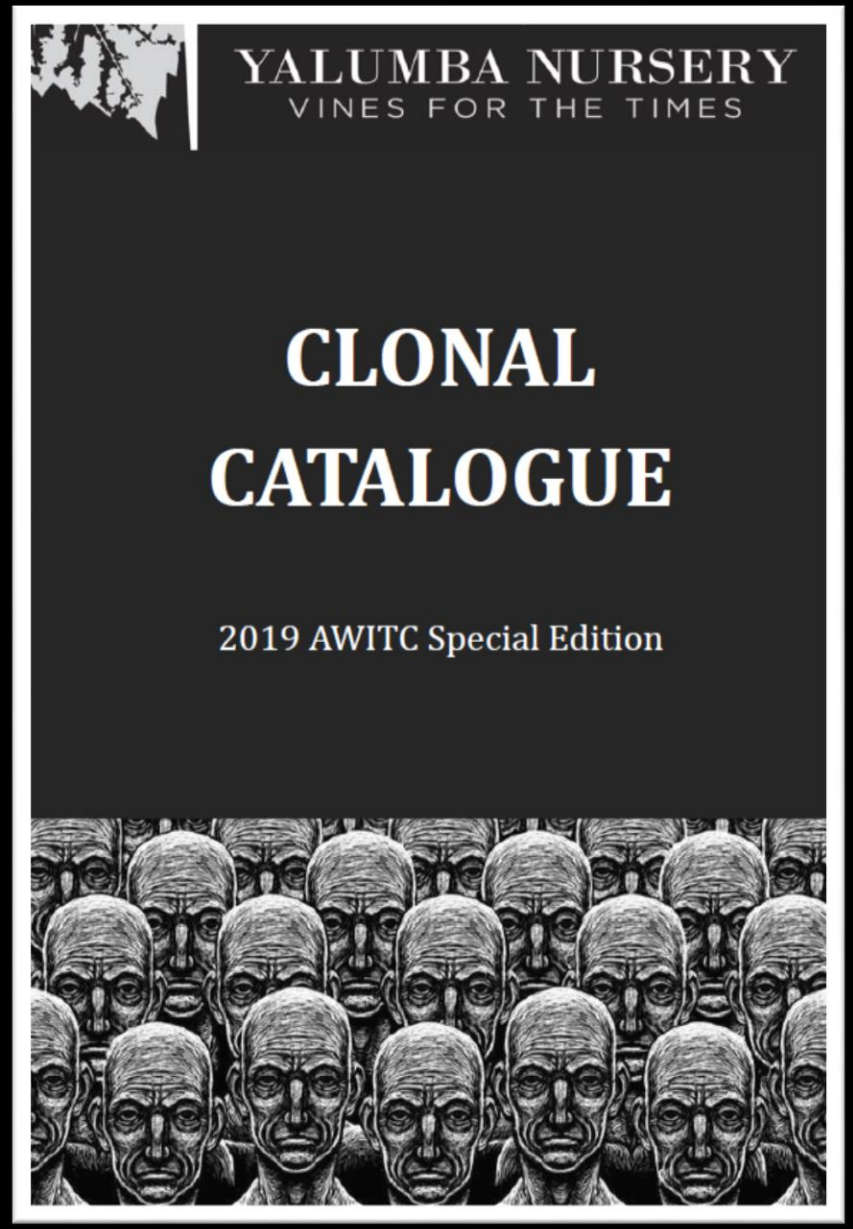
Highlights from Yalumba Nursery's Clonal Evaluation Program

By Dani Gaggl

Clonal Catalogue

- Snapshot of available clones at Yalumba Nursery
- Showcases decades worth of internal observations and data collation
- External information and trials available to public



Overview

- Yalumba Nursery's new evaluation procedures
- Focus on recent clonal evaluations conducted
- Performance and seasonal variations in Tempranillo
- First evaluation of ENTAV-INRA Pinot Noir clone performance in Australia

- Clonal Tasting

Types of Clonal Trials

- **Critical Evaluation**
  - Larger sample sizes (20+ vines per clone)
  - Photos
  - Harvest parameters (yield/vine, bunch number, bunch weight, berry weight)
  - Harvest composition (Juice analysis from crusher)
  - Experimental, small batch wines produced and evaluated by panel of winemakers

- **Observational Study**
  - Gain better understanding of general performance of clones and varieties, particularly for newly imported varieties and clones
  - Photos
  - Smaller sample sizes (5-10 vines)
  - Harvest parameters (yield/vine, bunch number, bunch weight, berry weight)
  - Harvest composition (Juice Analysis from 20 bunch sample)

Recent Varieties Evaluated

Critical Evaluations:

- Tempranillo (ITACYL and ENTAV-INRA® clones)
- Pinot Noir (Bernard and ENTAV-INRA® clones)
- Merlot (ENTAV-INRA® clones and PDFS)
- Cabernet Sauvignon (ENTAV-INRA® clones)

Observational Study:

- Grenache Blanc ENTAV-INRA® 143
- Carignan ENTAV-INRA® 63
- Potential new Riesling clones

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Tempranillo

- Gained popularity over the last 30 years
- Majority of Tempranillo planted in Australia to date is clone D8V12-notoriously variable in its production and susceptible to hen and chicken
- 7 Tempranillo Clones made available in 2011
  - ITACYL (Instituto Tecnológico Agrario de Castilla y León) clones 261, 306, 326, 32 & 98
  - ENTAV-INRA® Clones 770 and 776
- Clonal block established in Eden Valley

INSTITUTO TECNOLÓGICO AGRARIO DE CASTILLA Y LEÓN

ENTAV INRA®

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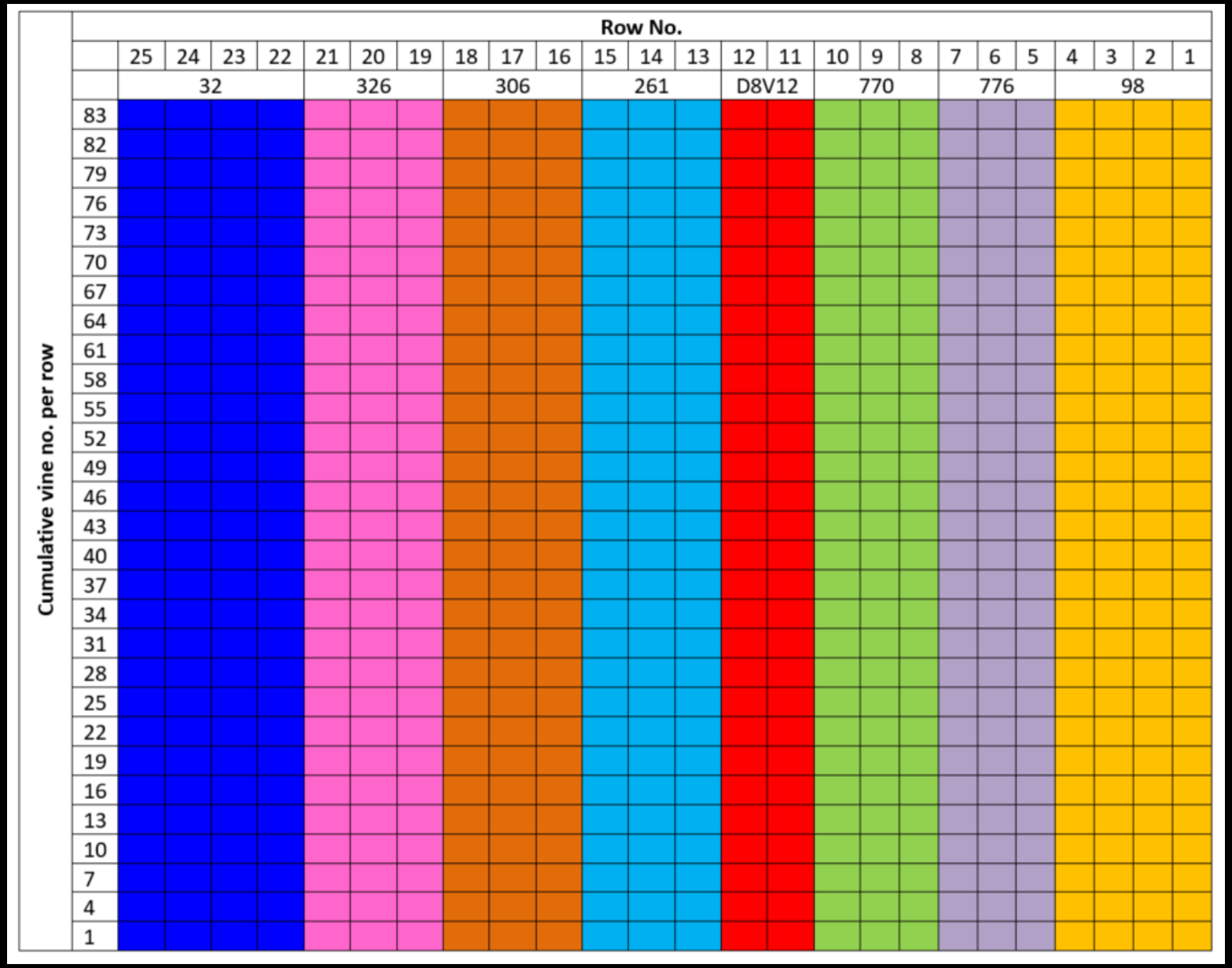
Block Layout



Viticulture:

- Own rooted
- Soil: deep, grey-yellow clay loam
- Planting Density: 2.5m x 1.8m
- Spur pruned

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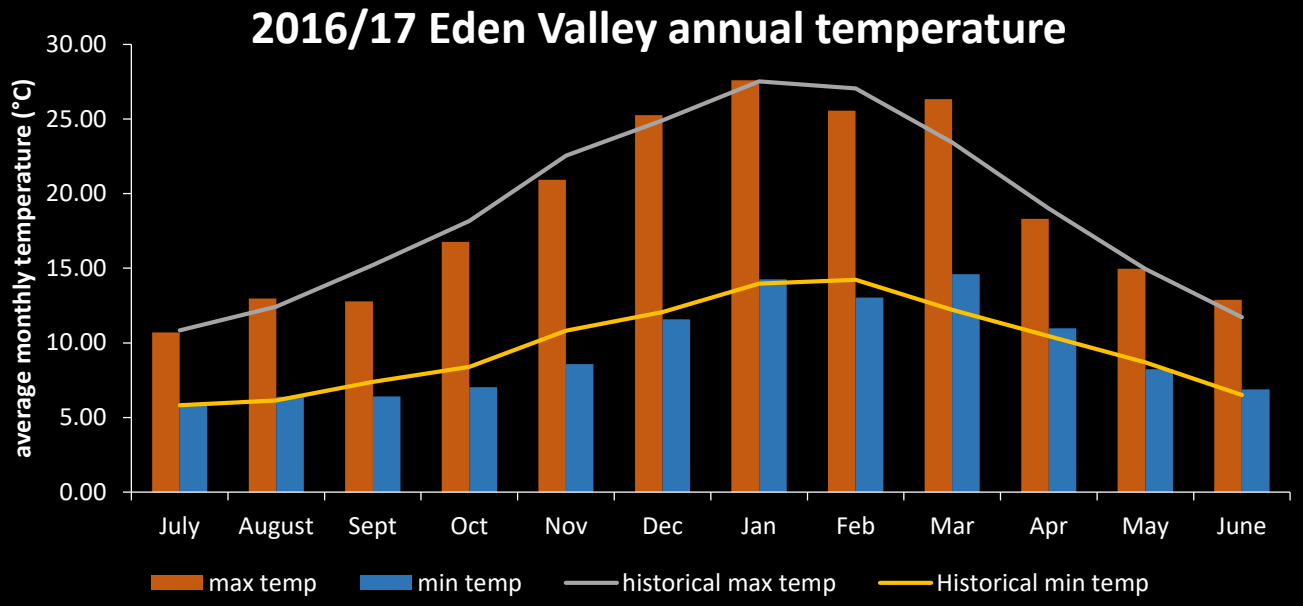
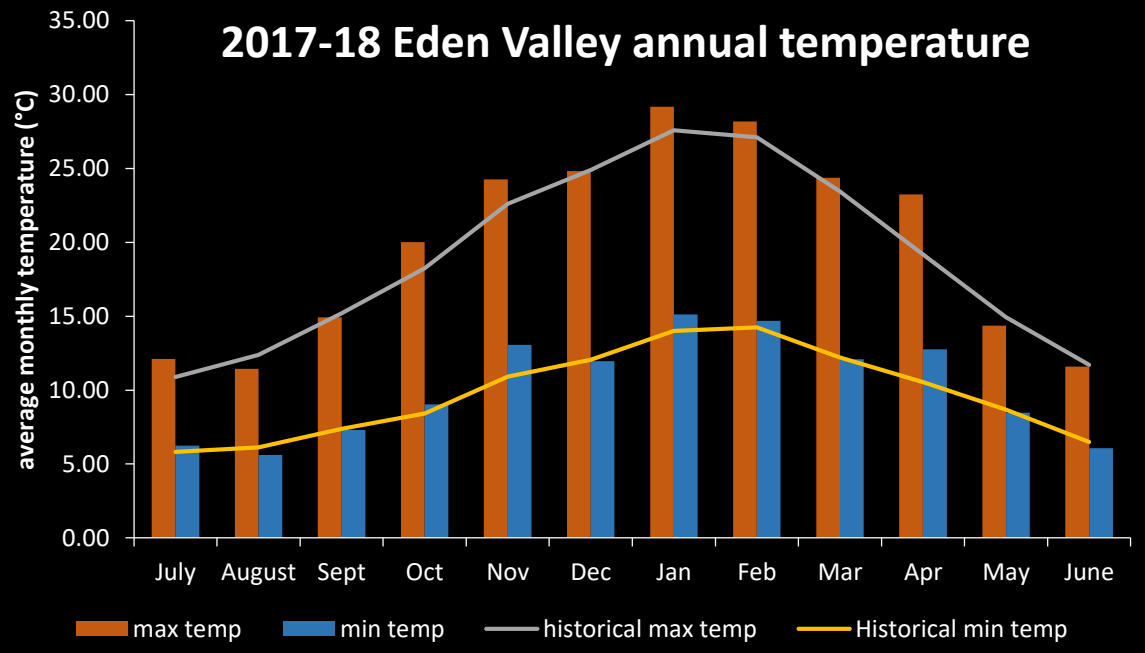
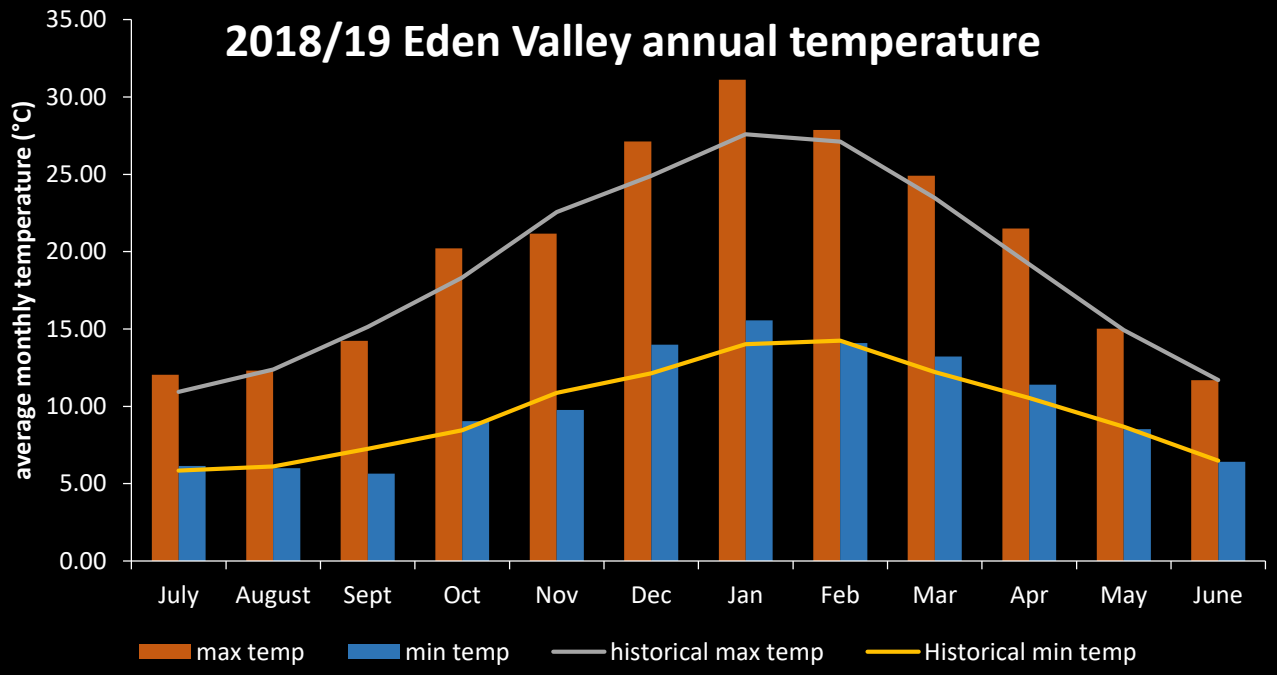
Seasonal changes in Temperature







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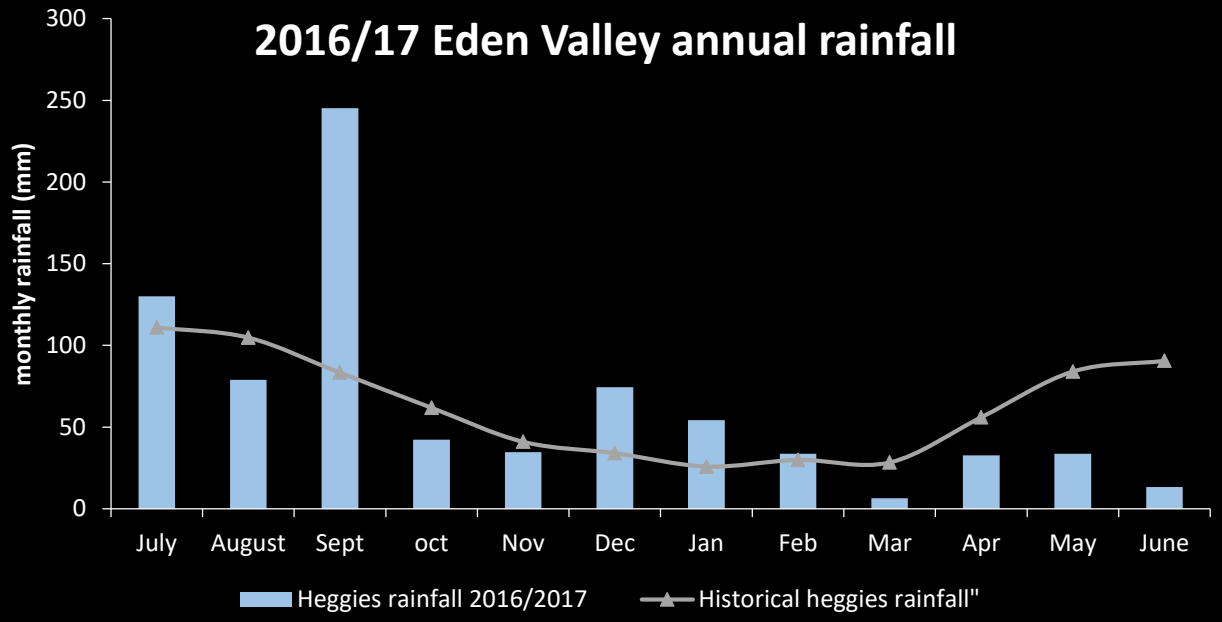
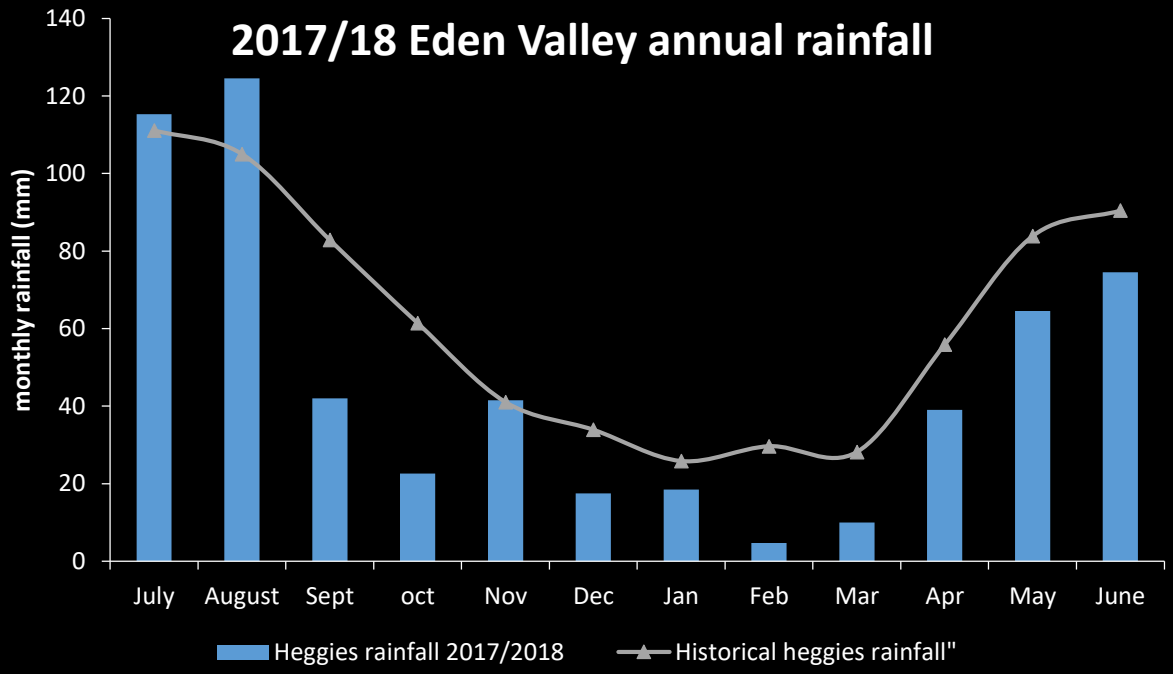
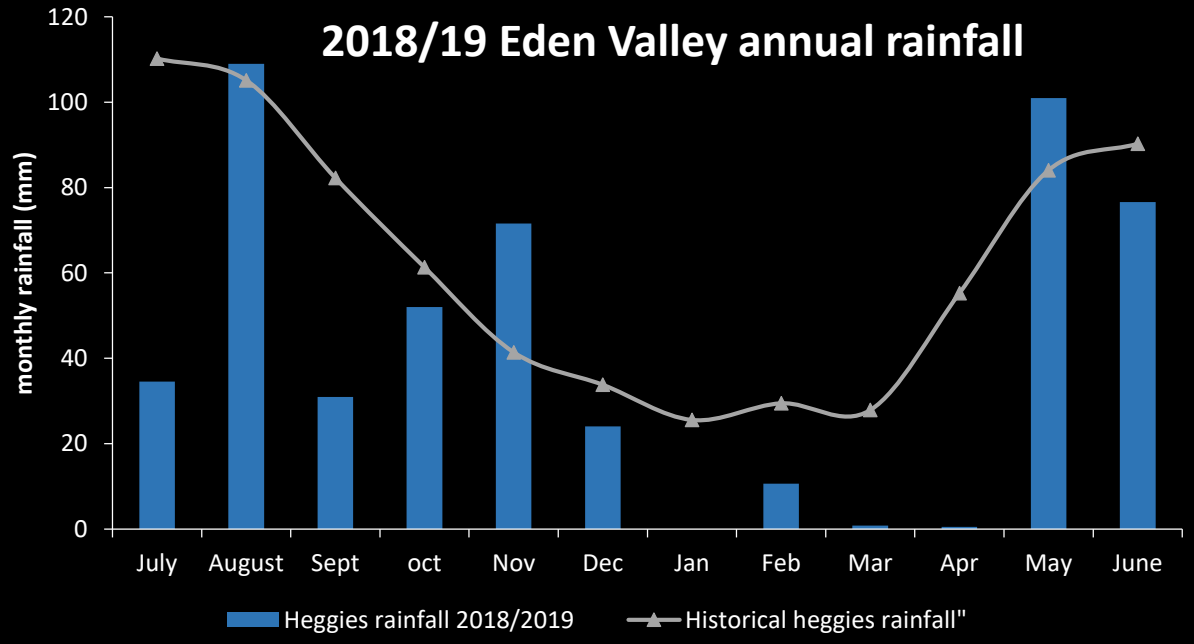
Seasonal changes in Rainfall







Data has been collected over 3 consecutive seasons (2017-19) at the trial site

- 2017 Harvest
  - Wet year, almost 3x rainfall in September and above average rainfall in December, January and February in Eden Valley
  - Temperature fluctuations in between February and April
  - Difficult to ripen, therefore no wine produced only harvest data collected
- 2018 Harvest
  - Dry year, below average rainfall from December 2017 to May 2018
  - High yields across the board
- 2019 Harvest
  - Poor conditions at flowering, hail and wind damage, reduced yields dramatically

Tempranillo Results

Comparison of origin and harvest data (2017-19) of the 8 Tempranillo clones.

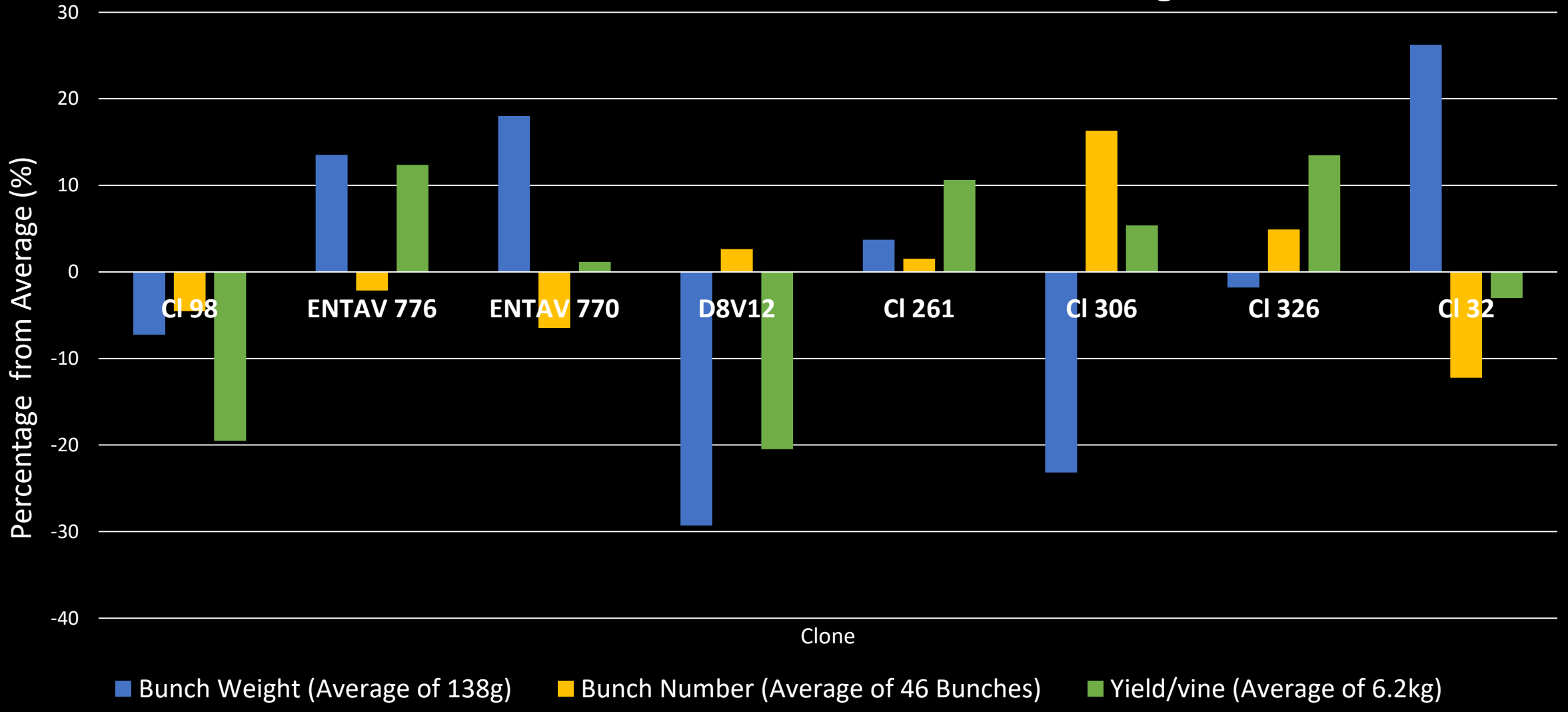
CLONE	Origin	Average Yield/vine (kg)	Average Bunch No./vine	Average Bunch Weight (g)	Average Berry Weight (g)
ENTAV-INRA® 776	Rioja	7.0	44	157	2.01
ENTAV-INRA® 770	Rioja	6.3	40	163	1.84
Cl 261	Ribera del Duero	6.9	48	144	1.93
Cl 306	Toro	6.5	62	106	1.75
Cl 326	Toro	7.0	51	136	1.91
Cl 32	Ribera del Duero	6.0	34	175	1.99
Cl 98	Ribera del Duero	5.0	41	128	1.73
D8V12	Valdepenas	4.9	49	98	1.77
Average		6.2	46	138	1.87

Breakdown of yield/vine (kg) data for each season

Season	Cl 98	ENTAV-INRA® 776	ENTAV-INRA® 770	D8V12	Cl 261	Cl 306	Cl 326	Cl 32
2017	6.6	5.1	7.0	4.0	7.9	7.0	8.2	8.8
2018	4.8	12.0	8.2	8.9	8.7	9.3	8.8	6.3
2019	3.5	3.9	3.7	1.9	4.0	3.4	4.0	2.9
Average	**5.0**	**7.0**	**6.3**	**4.9**	**6.9**	**6.5**	**7.0**	**6.0**
STD	1.6	4.4	2.3	3.6	2.5	3.0	2.6	2.9

*Drastic difference also observed in berry sizes between 2018 and 2019 season (average of 2.4g in 2018 and average of 1.7g in 2019)

Summary of harvest data from the Tempranillo clones in Eden Valley between 2017 and 2019 as a % from the average



2019 Bunch Images

D8V12

High levels of hen and chicken
Very loose bunch structure
Small bunches

Cl 98

Small Bunches but well filled

ENTAV-INRA® 770

Large bunches and large berries

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2018 Juice Analysis

- All clones were picked on the same day, except for Cl 98 which was picked one week earlier

Clone	Yield/vine (kg)	°Baume	pH	TA
Cl 98	4.8	13.7	4.45	3.85
ENTAV-INRA® 776	12	12.1	4.03	4.79
ENTAV-INRA® 770	8.2	13.3	4.10	4.51
D8V12	8.9	13.2	4.15	4.94
Cl 261	8.7	14.2	4.14	4.77
Cl 306	9.3	13.4	4.10	4.91
Cl 326	8.8	13.9	4.09	5.07
Cl 32	6.3	13.5	4.04	5.48

2018 Experimental Wine Production

- In 2018, all clones were machine harvested on the 11th of April (except for clone 98)
- Fruit destemmed and crushed, and sent to separate 1 ton open fermenters
- 8% run off due to large berry sizes in 2018 (>2g)
- Hand plunged every 6 hours
- Kept 22C
- All clones consistently fermented for 5 days to 0 Baume (peak temperature of 26C)
- Pressed after 9 days
- Wild MLF

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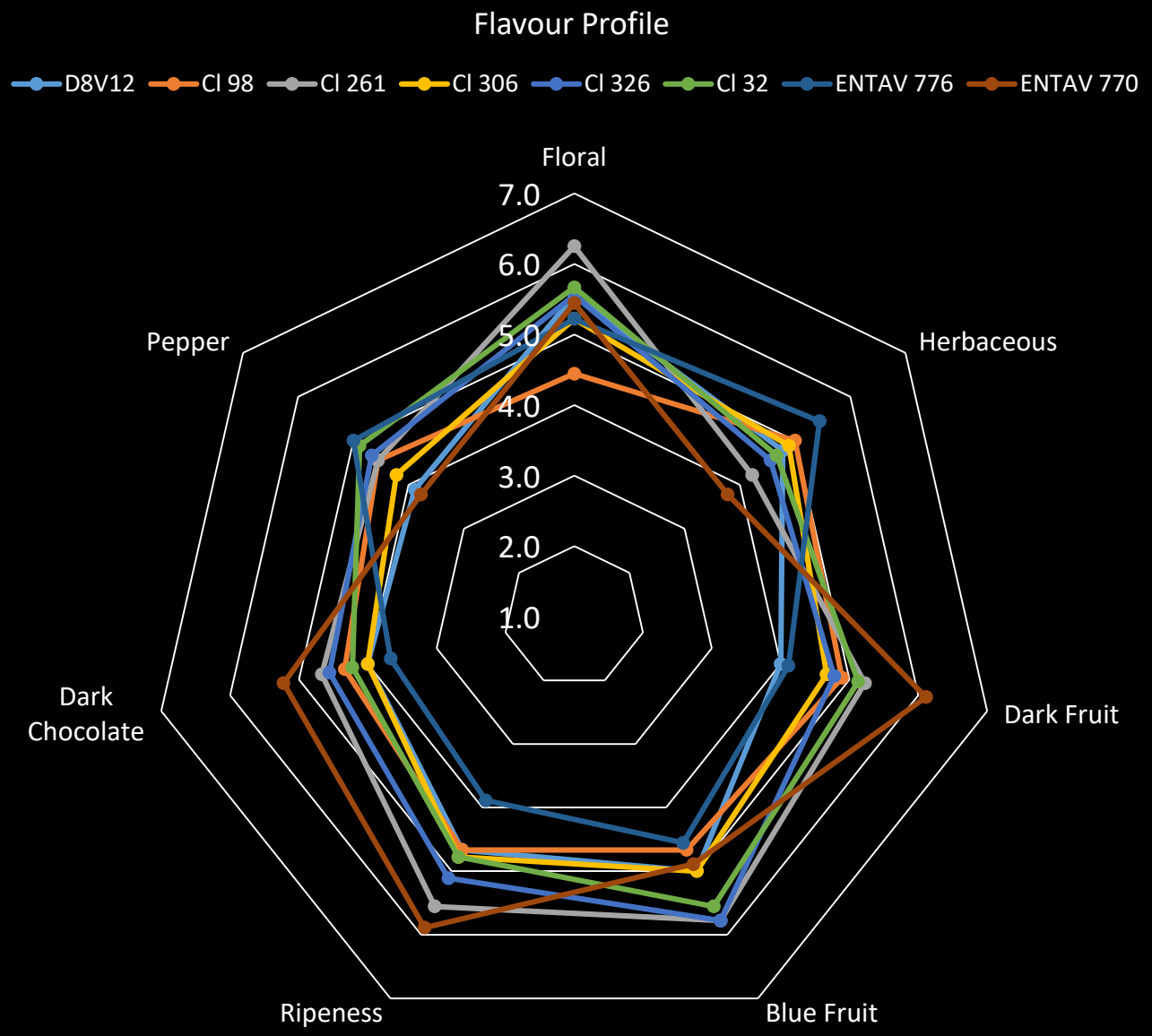
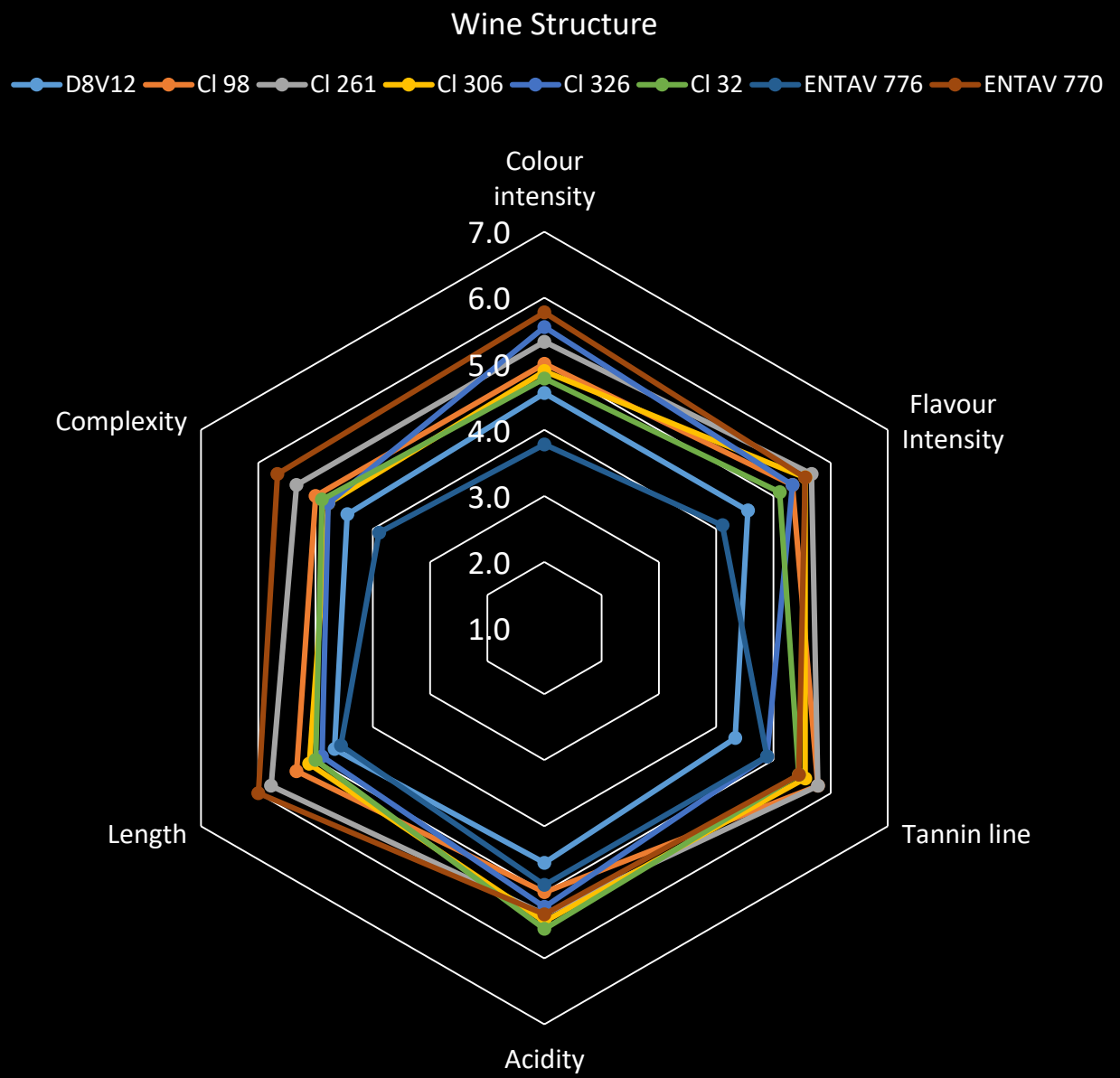
Wine Evaluation

- August 2018 a panel of 10 Yalumba winemakers gathered to evaluate the clonal wines made
- Ranked wine structure and flavour attributes (chosen by the winemaker responsible for the Tempranillo wines as typical to the variety)
- Personal comment and score out of 20

2018 Wine Evaluation





Comparison of high yielding clones

CLONE	Origin	Average Yield/vine (kg)	Wine Comment
ENTAV-INRA® 776	Rioja	7.0	Lacks colour intensity and complexity in flavour and aroma, **lighter** tannins, **lifted violets** and more white pepper, **herbaceous character**.
Cl 261	Ribera del Duero	6.9	Fresh and bright style, highly floral character, **rich fruit** flavours of **blueberries and jubes** with a slight savoury, dry herb touch, **fine tannins**
Cl 326	Toro	7.0	Quite **savoury style** with peppery and dusty character, restrained palate that lacks ripe fruit character of others, some **dark chocolate**
Cl 306	Toro	6.5	Good **intensity** of flavours and length, **darker fruits** with touch of pepper, low complexity

Comparison of low yielding clones

CLONE	Origin	Average Yield/vine (kg)	Wine Comment
Cl 98	Ribera del Duero	5.0	Medium-full bodied, lifted **peppery and floral aroma**, good flavour intensity and length**, black fruit, spice & cola** with slight herbaceous character, **blocky tannins, well structured**
Cl 32	Ribera del Duero	6.0	**Lighter style** with fresh acidity, lifted **floral** character, simple, **juicy dark and blue fruits** and plum
D8V12	Valdepenas	4.9	Good primary **dark fruits**, plum and dark cherry, slight **turkish delight/rose** water character, simple and clean, low complexity and flavour intensity, lower acidity and **fine tannins**

2019 Tempranillo Clonal Wines (Today's Tasting)

- Key differences in 2019
  - Lower yield, smaller berries (all below 1.8g) therefore no run off
  - 3 different harvest dates

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Adelaide Hills Grower Comments

"**I have found that all clones have something to offer**. The best is 306 for colour, tannin structure and flavour. CL 261 and 326 have surprisingly good colour, tannins and early ripening despite their large bunch weights. They set well this year and I would include them (as a grower) in any multi-clone planting as they crop well for the quality.

CL32 and 98 both crop heavily and their ripening is thus delayed but they produce well!

ENTAV-INRA clones have nice flavours but also crop heavily and need thinning to ripen on time.

CL306 has the smallest bunches and it did suffer from the poorest set this year as it flowers a little earlier. The others flowered outside the coldest days. We have to thin heavy clones so that the whole Temp block can be machine-picked on the same day. Typically CL306 would be the ripest by 1/2 to 1 Bé. It also has the warmest section of the block."

Clone	CL32	Entav770	Entav776	CL98	CL261	CL326	CL306
acid	good	mod	mod	mod	very good	good	very good
flavours other than cherry	black olive	strawberry	strawberry		blueberry		
Juice colour (chew & spit)	very good	good	good	good	really good	really good	really good
Baumé 5/04/2019	12.8	12.4	12.5	13.4	13.6	14.0	13.8

Pinot Noir Clones

- Clones:
  - Bernard 115- non-certified Burgundian selection which was imported into Australia in 1988 by Dr. Raymond Bernard.
  - ENTAV-INRA® 667, 828 and 943 were all imported into Australia by Yalumba Nursery in 2006 and released from quarantine in 2008.
  - Abel Clone (aka Ata Rangi or Gumboot clone) said to have originally come from Domaine Romanee-Conti in Dijon. It was unsuccessfully smuggled into New Zealand in agumboot and instead confiscated by budding winemaker Malcolm Abel who went onto plant in his own vineyard.

Dalrymple Clonal Block

- Location: Pipers River, TAS
- Vine age: 4 years (planted 2015)
- Rootstock: 1103 Paulsen
- Soil Type: Basalt with stone throughout profile, well drained
- Planting Density: 1.25m x 2.3m =3500 vines/Ha

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Block Layout

Increasing level of surface rock across block

Abel	ENTAV-INRA® 943	115	ENTAV-INRA® 828	ENTAV-INRA® 667
Row 1-8	Row 9-17	Row 18-25	Row 26-37	Row 38-48

Viticulture:

- Cane pruned
- Shoot thinning (<30cm removed)
- Aiming for one bunch/ shoot

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General Viticultural Expectations:

- Abel- bigger bunch, later ripening
- ENTAV-INRA® 943- small bunch, low yields early ripening
- 115- mid-high yield, mid ripening
- ENTAV-INRA® 828- low yield, small berries, early ripening
- ENTAV-INRA® 667- mid-lower yield, mid-early ripening

Do expectations of performance match the reality (at this site, in this year)?

Viti Data

Clone	Viti Expectations	Yield (kg/vine)	Ave. Bunch No./vine	Ave. Bunch Weight
115	mid-high yield, mid ripening	1.35	23	58
Abel	high yield, large bunch, late ripening	1.60	16	98
ENTAV-INRA 943	low yield, small bunch, early ripening	2.20	22	100
ENTAV-INRA 828	low yield, small berries, early ripening	1.39	18	77
ENTAV-INRA 667	mid-low yield, mid-early ripening	1.45	17	89

Juice Analysis

Block - Clone	Baume	pH	TA	YAN	Malic Acid
115	13.1	3.3	8.1	330.72	4.46
Abel	13	3.29	9.41	248.03	4.85
ENTAV-INRA 943	12.8	3.24	9.29	302.21	5.96
ENTAV-INRA 828	12.7	3.27	9.11	329.32	5.95
ENTAV-INRA 667	13.3	3.3	10.14	370.73	6.42

Simple Answer

➔ Based on this season……..No


Pinot Noir
Abel
Dalrymple Vineyard
TAS
21/03/19


Pinot Noir
ENTAV-INRA 943
Dalrymple Vineyard
TAS
21/03/19


Pinot Noir
Bernard 115
Dalrymple Vineyard
TAS
21/03/19


Pinot Noir
ENTAV-INRA 667
Dalyrmple Vineyard
TAS
21/03/19


Pinot Noir
ENTAV-INRA 828
Dalyrmple Vineyard
TAS


Pinot Noir
Bernard 115
Dalyrmple Vineyard
TAS
21/03/19

- The results were not as expected from this site in this season- however this is not a bad outcome
- The foreseen issues with low yield and early ripening of ENTAV-INRA® 828 and 943 were not evident
- Focus is now on the impact on sensory profile than viticulture/yield components

Individual wines were produced by winemaker Peter Caldwell at Dalrymple's winery

- Clones were processed and fermented separately
- 5% whole bunch
- Cold soak for 3 days
- Yeast RC212
- Plunge 3x per day
- Drained and pressed into tank then to barrel

Wines have been especially bottled for the AWITC and as a results have not fully completed MLF

Upon completion full wine evaluations will be completed as per 2018 Tempranillo wines

Clone	Alc	Acetic	MALIC	pH	Sugar	TA	SG
ENTAV-INRA 828	13.27	0.28	2.28	3.34	0.01	7.88	0.9929
ENTAV-INRA 943	13.17	0.29	2.32	3.27	0	8.12	0.993
ENTAV-INRA 667	13.84	0.33	2.56	3.39	0	8.07	0.9928
115	13.48	0.27	1.94	3.37	0	7.36	0.9927
Abel	13.35	0.29	2.38	3.36	0.02	7.85	0.9927

On the Horizon

- Further Evaluation of Tempranillo and Pinot Noir
- Evaluation of Yalumba's new Southern Rhone Demonstration Block planted on the Barossa Valley floor- Bourbolenc, Clairette, Cinsault, Carignan, Counoise, Grenache Blanc, Gris & Noir, Piquepoul Blanc & Noir, Muscardin
- Critical Evaluation of Shiraz clones at newly planted clonal block (including new ENTAV INRA clone)

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QUESTIONS?

Clonal Wine Tasting Part 1- 2019 Tassie Pinot Noir

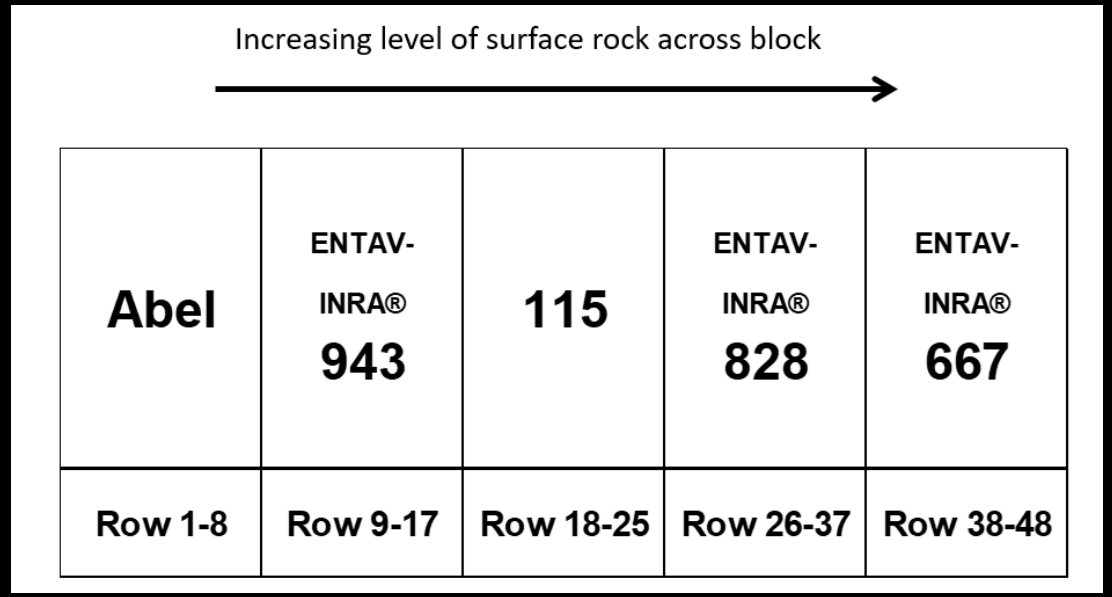
- 4 x Pinot Noir Clones (10 mins to taste)

** Please note these wines are yet to finish MLF**

Winemaking Notes:

- 5% whole bunch
- Cold soak for 3 days
- Yeast RC212
- Plunge 3x per day
- Drained and pressed into tank then to barrel

- WINE 1= Abel
- WINE 2= ENTAV INRA 943
- WINE 3= ENTAV INRA 828
- WINE 4= ENATV INRA 643



Pinot Noir

2019 Harvest Data

Clone	Viti Expectations	Yield (kg/vine)	Ave. Bunch No./vine	Ave. Bunch Weight
Abel	high yield, large bunch, late ripening	1.60	16	98
ENTAV-INRA 943	low yield, small bunch, early ripening	2.20	22	100
ENTAV-INRA 828	low yield, small berries, early ripening	1.39	18	77
ENTAV-INRA 667	mid-low yield, mid-early ripening	1.45	17	89

Wine Analysis

Clone	Alc	Acetic (enzymatic) (g/L)	MALIC (enzymatic) (g/L)	pH	TA
Abel	13.35	0.29	2.38	3.36	7.85
ENTAV-INRA 943	13.17	0.29	2.32	3.27	8.12
ENTAV-INRA 828	13.27	0.28	2.28	3.34	7.88
ENTAV-INRA 667	13.84	0.33	2.56	3.39	8.07

Clonal Wine Tasting Part 2- 2019 Eden Valley Tempranillo

- 4 x Tempranillo clones (15 mins to taste)

Winemaking Notes:

- No bleed off
- Crushed and destemmed the sent to 1 ton, stainless steel, temperature controlled fermenters

Tempranillo

3 Year Average

CLONE	Origin	Average Yield/vine (kg)	Average Bunch No./vine	Average Bunch Weight (g)	Average Berry Weight (g)
Cl 98	Ribera del Duero	5.0	41	128	1.73
ENTAV-INRA® 770	Rioja	6.3	40	163	1.84
Cl 261	Ribera del Duero	6.9	48	144	1.93
Cl 326	Toro	7.0	51	136	1.91

2019 Harvest Data

Clone	Average Yield/vine (kg)	Average Bunch No./vine	Average Bunch Weight (g)	Average Berry Weight (g)
Cl 98	3.49	47	74	1.31
ENTAV 770	3.66	42	87	1.55
Cl 261	4.01	44	91	1.74
Cl 326	4.04	48	82	1.56

Tempranillo Wine Analysis

Clone	FSO2 (mg/L)	TSO2 (mg/L)	TA (g/L)	PH	Alcohol %	Malic (enzymatic) (g/L)	Acetic (enzymatic) (g/L)
CL 98	38	65	5.4	3.92	14.0	-0.02	0.35
ENTAV-INRA 770	36	51	4.6	3.91	12.4	0.00	0.36
CL 261	51	68	5.4	3.89	13.2	-0.02	0.38
CL 326	37	57	5.6	3.91	13.3	-0.01	0.37