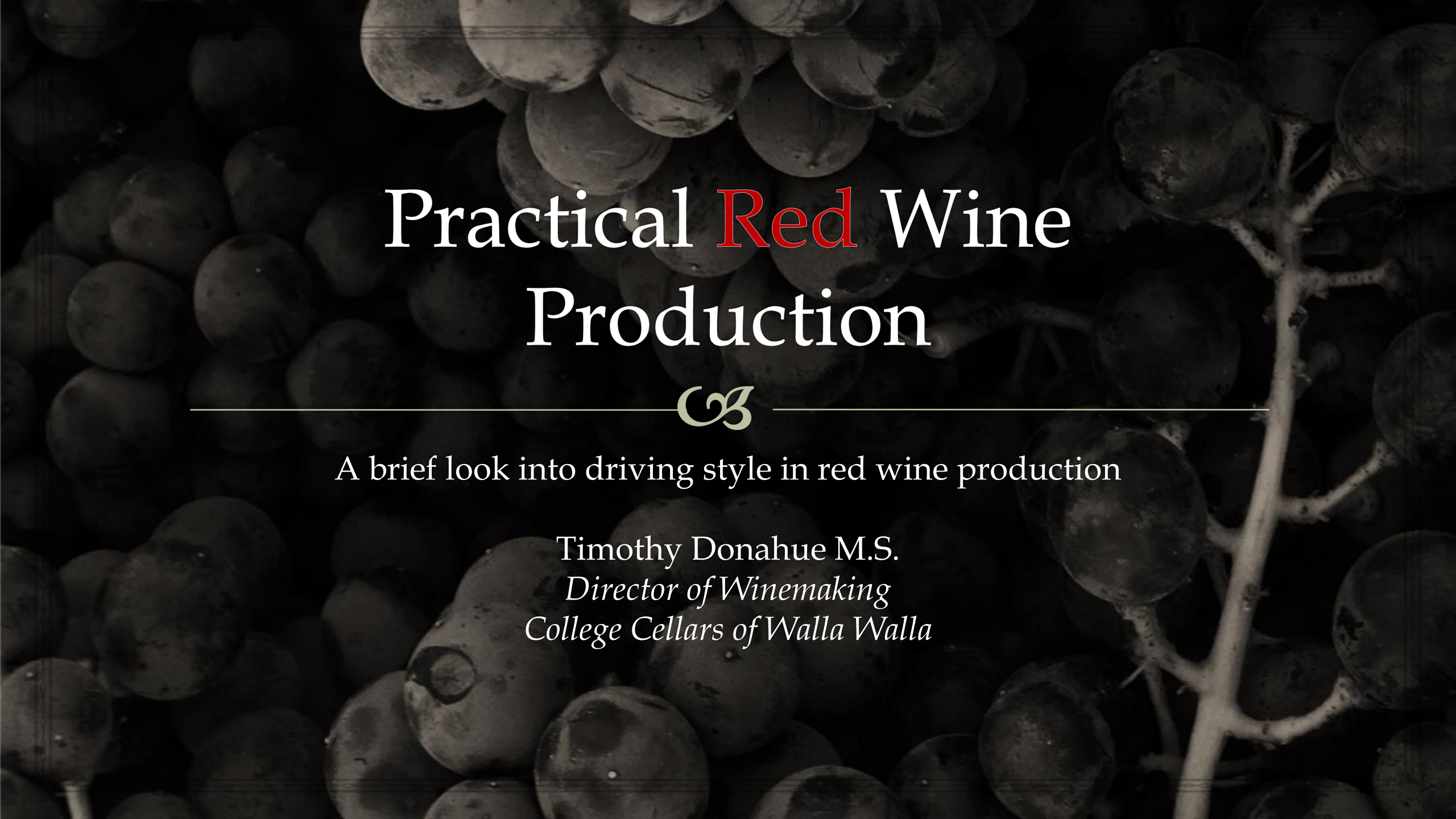


Practical Red Wine Production

A brief look into driving style in red wine production

Timothy Donahue M.S.
Director of Winemaking
College Cellars of Walla Walla

WWCC an College Cellars

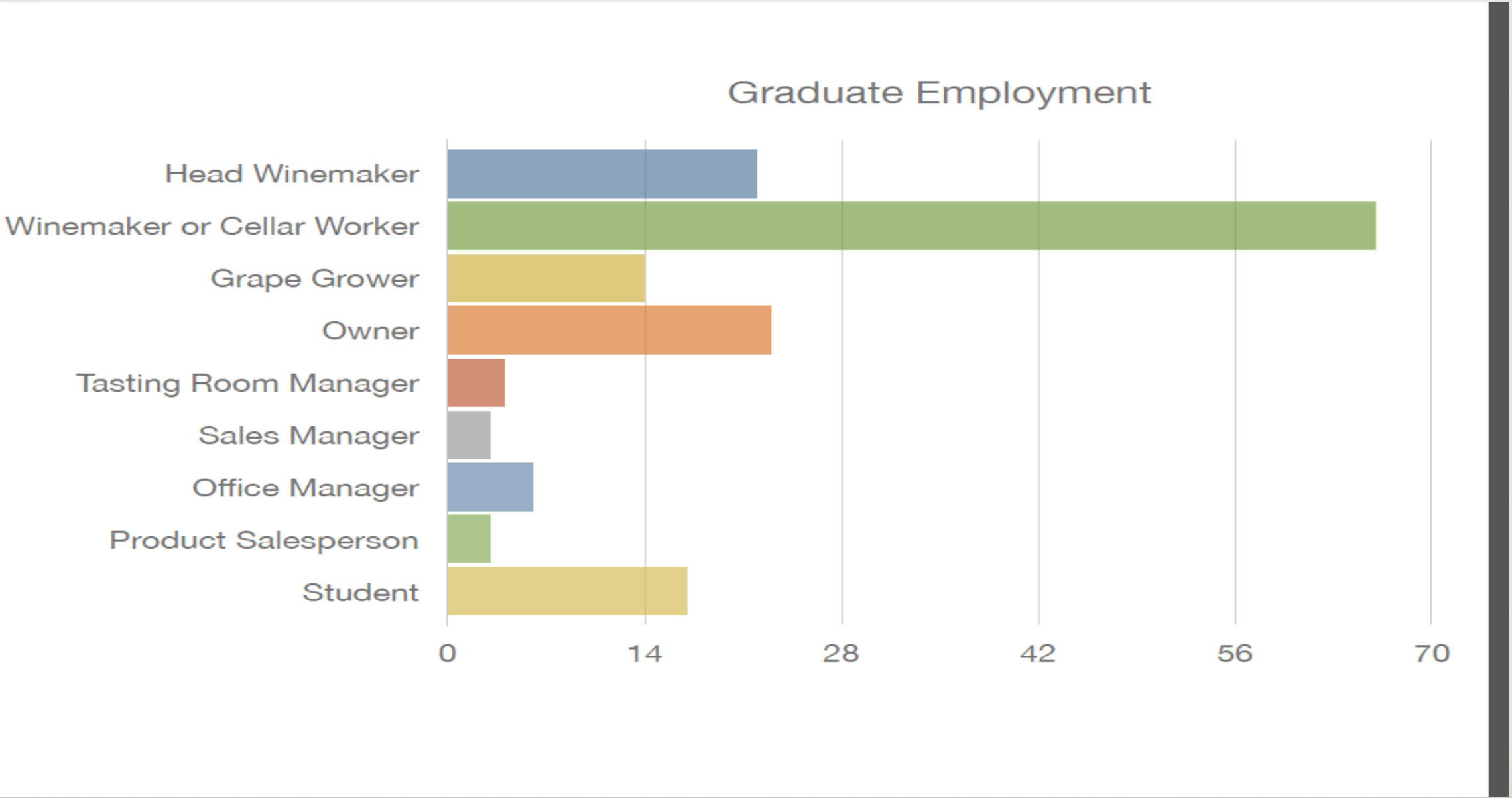
- Hands on teaching winery
- Graduate placement 84%
- Industry driver

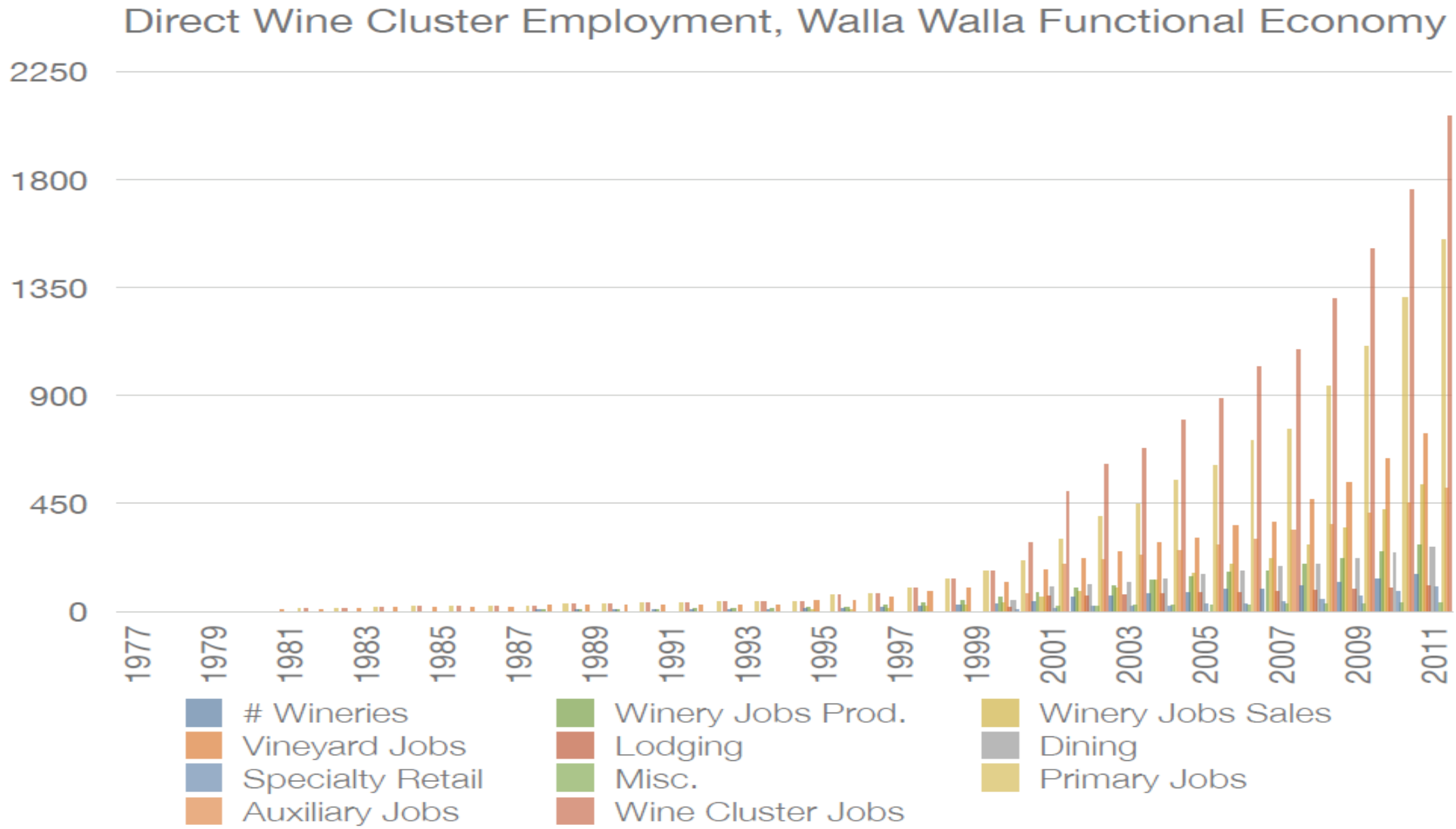
Vineyards

- Red Varietals: Cabernet Sauvignon, Merlot, Cabernet Franc, Malbec, Carmenere, Petite Verdot, Tempranillo and Barbera
- White Varietals: Semillon, Sauvignon Blanc, Marsanne, Rousanne, Viognier
- Grower/Viticulture Instructor: Jeffrey Popick

Winery

- 100% state of the art
- Optical Sorter
- Crossflow Filtration
- Production of 22 varietals and 30 wines.
- Red, White, Rose', Fortified, Sparkling and Icewine


Graduate Employment
Head Winemaker
Winemaker or Cellar Worker
Grape Grower
Owner
Tasting Room Manager
Sales Manager
Office Manager
Product Salesperson
Student
0
14
28
42
56
70


Direct Wine Cluster Employment, Walla Walla Functional Economy
2250
1800
1350
900
450
0
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
Wineries
Vineyard Jobs
Specialty Retail
Auxiliary Jobs
Winery Jobs Prod.
Lodging
Misc.
Wine Cluster Jobs
Winery Jobs Sales
Dining
Primary Jobs

Economic Buffering of Wine Industry

Percent growth in overall employment 2006 to 2011	
United States	-1.5%
Washington State	+1.1%
Walla Walla IPZ	+11.3%

Investment into Wine Center has yielded employment!

Special Thanks

Sabrina Lueck, Danielle Swan-Froese, the venerable Jeffery Popick and all of the awesome students that make College Cellars happen.

I Know Bill

Red Wine Production 101

- Harvest
- Fruit processing
- Fermentation vessel choice
- Maceration and cap management
- Pressing
- Malolactic fermentation
- Barrels
- Ageing and Stability
  - SO_2
  - Racking
  - Fining
  - Filtering
- Bottling

SEATTLE WINE AWARDS

Sip NORTHWEST

2013 Carmenère

Dr. Michael Bottoms and Skylar Simonson

Harvest

310030069	Carmenere		
titratable acidity		4.8	g/L
pH		3.63	
brix		21.7	degrees

Processing

310050092 13 SCCA-S

titratable acidity	3.7	g/L
pH	3.93	
L-malic acid	2.61	g/L
tartaric acid	2.9	g/L
brix	20.7	degrees
glucose + fructose	218	g/L
ammonia	101	mg/L
alpha-amino compounds (as N)	109	mg/L
yeast assimilable nitrogen	192	mg/L (as N)
potassium	1810	mg/L

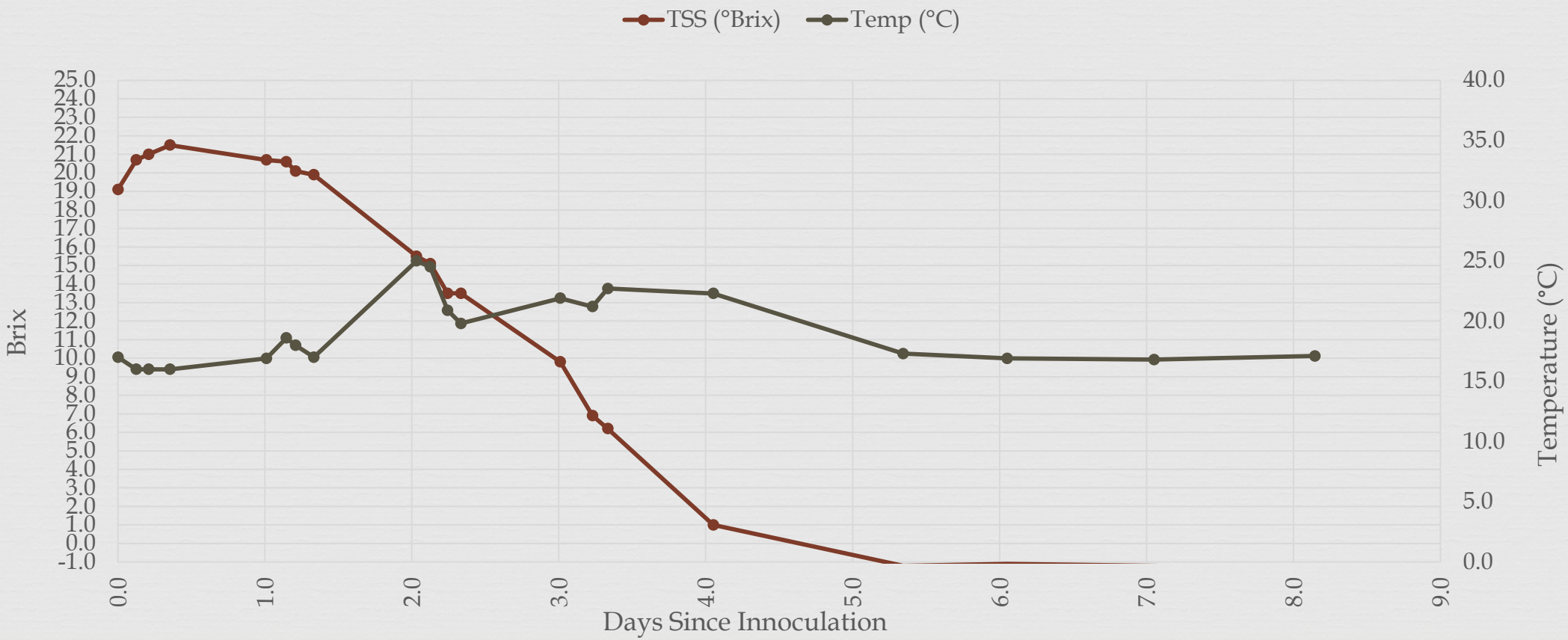
310050093 13 SCCA-US

titratable acidity	3.8	g/L
pH	4.03	
L-malic acid	2.87	g/L
tartaric acid	3.1	g/L
brix	21.1	degrees
glucose + fructose	220	g/L
ammonia	100	mg/L
alpha-amino compounds (as N)	125	mg/L
yeast assimilable nitrogen	207	mg/L (as N)
potassium	2060	mg/L

Additions and Fermentation

- 35 mg/L of SO_2 at destemmer
- 2 day cold soak
- QA-23 yeast added at 30 g/HL
- Go-Ferm at inoculation
- 5 day primary fermentation
- Punch-downs 3x daily

Fermentation



Pressing

- Pressed in 1965 “Willmes” press
- 4 cycles
- 3.0 bar max pressure
- Free run and press fraction combined.

Barreling Down

- Racked 24 hours post pressing.
- Aged in 2,500 L puncheons
- Seguin Moreau
  - American oak
  - Medium long toast
- 100% new oak

Ageing

- 75 mg/L SO_2 post MLF
- Topped Monthly with 500 mg/L sterile filtered topping wine.
- SO_2 maintained at 40 mg/L free
- Aged for 6 months

- 5/9/2014

405090533 13 SC CA

free sulfur dioxide	41	mg/L
molecular sulfur dioxide	0.35	mg/L
total sulfur dioxide	106	mg/L
titratable acidity	5.2	g/L
pH	3.88	
volatile acidity(acetic)	0.38	g/L

Filtration

- Wine was cross-flow filtered to 0.2 µm
- SO_2 adjusted to 40 mg/L free
- Sparged with nitrogen to reduce DO below 0.8 mg/L and to remove any residual CO_2 from fermentation.

Bottling/Post

- Measurements during bottling:
- Volume, pH, TA and Dissolved O_2

- 07/01/2014

407010161 13 SCCA

free sulfur dioxide	35
molecular sulfur dioxide	0.30
total sulfur dioxide	93
titratable acidity	5.3
pH	3.87
volatile acidity(acetic)	0.38

'Scorpion' Bottle Sterility Panel

Brettanomyces bruxellensis	<10 cells/mL
Zygosaccharomyces bailii	<10 cells/mL
Saccharomyces cerevisiae	<10 cells/mL
Lactobacillus plantarum	<10 cells/mL
L. casei/paracasei/mali/nagelii	<10 cells/mL
L. brevis/hilgardii/fermentum	<10 cells/mL
Pediococcus species	<10 cells/mL
Acetic acid bacteria	<10 cells/mL
Oenococcus oeni	<10 cells/mL
Lactobacillus kunkeei	<10 cells/mL

Carmenère – Key Points

- Use vintage history to determine additions
- Low alcohol + high pH = Watch carefully
- Short ageing time to minimize spoilage possibilities
- Sterile filter before bottling

SEATTLE WINE AWARDS

Cabernet Sauvignon
Summit View Vineyard

Casey Carslile, Bob Bailey, Josh West, AJ Berglin

Harvest

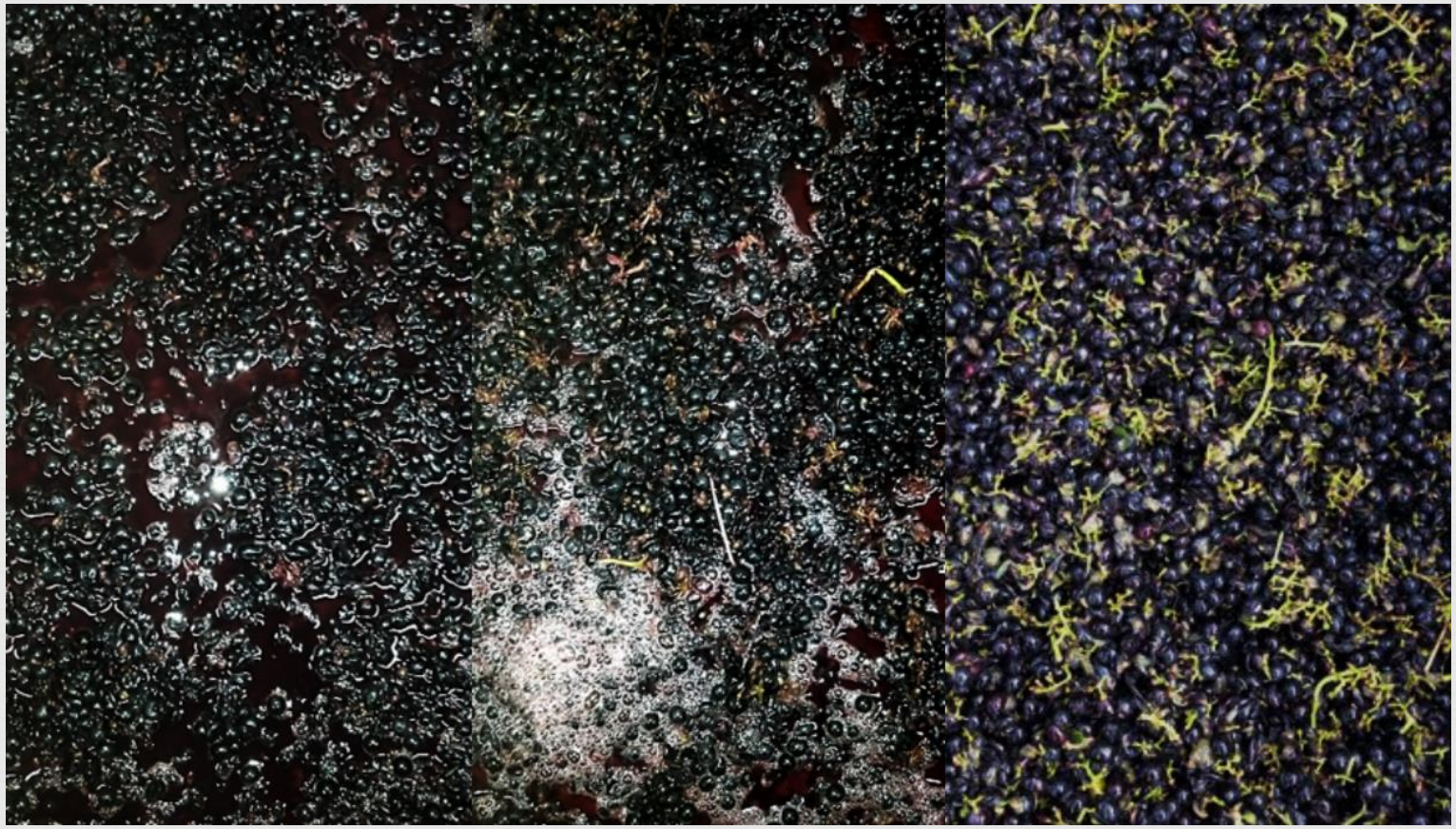
2012 Cabernet Sauvignon Summit View Vineyard

brix	25.9 degrees
glucose + fructose	280 g/L
pH	3.59
titratable acidity	3.8 g/L
L-malic acid	1.27 g/L
tartaric acid	4.96 g/L
potassium	1440 mg/L
yeast assimilable nitrogen	99 mg/L (as N)

Processing

- Hand picked
- Grapes destemmed and lightly crushed
- Optically sorted
- Must was pumped to barrel
- 30 mg/L of SO_2 at the must pump

Optical Sorting



Sorted Unsorted MOG

Optical Sorting

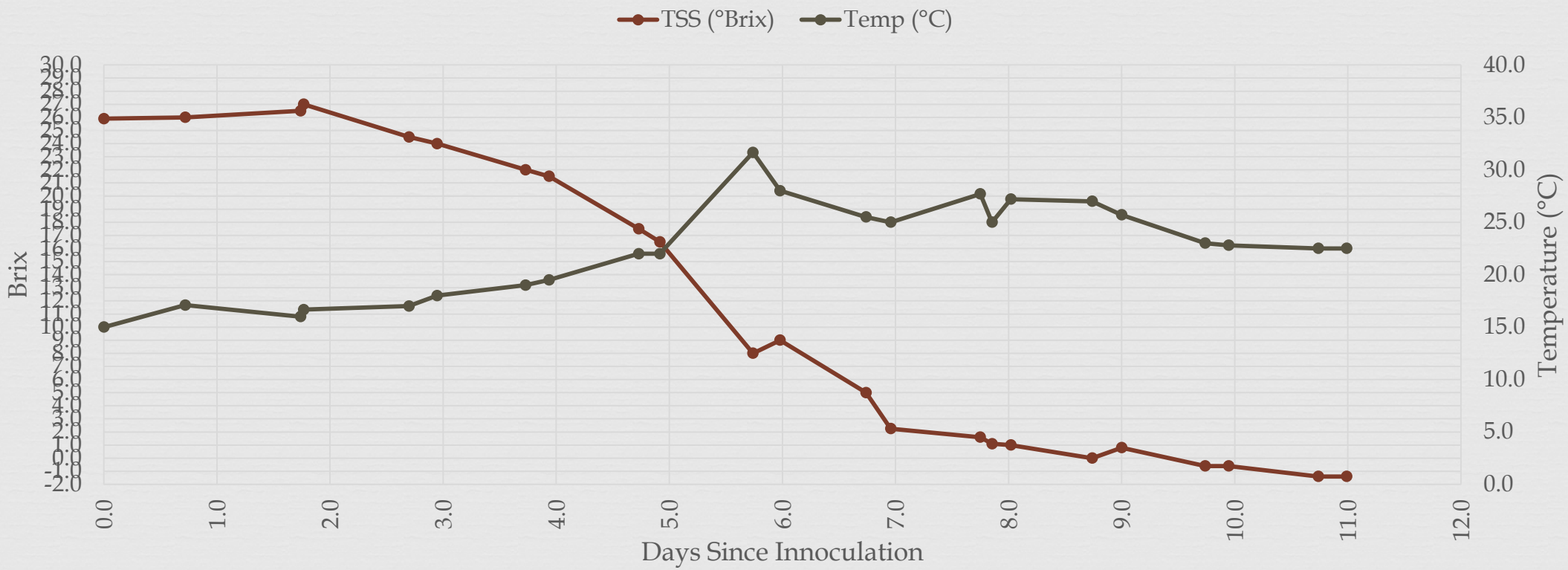
Fermentation Vessel

- Fermented in French oak barrels.
- Ellagic (wood) tannins help to polymerize grape phenolics and stabilize color.
- Anecdotally enhances oak integration

Fermentation

- EC-1118 yeast used
- DAP additions to target 320 mg/L of Nitrogen
  - Split into 3 doses
    - 22 Brix
    - 15 Brix
    - 10 Brix

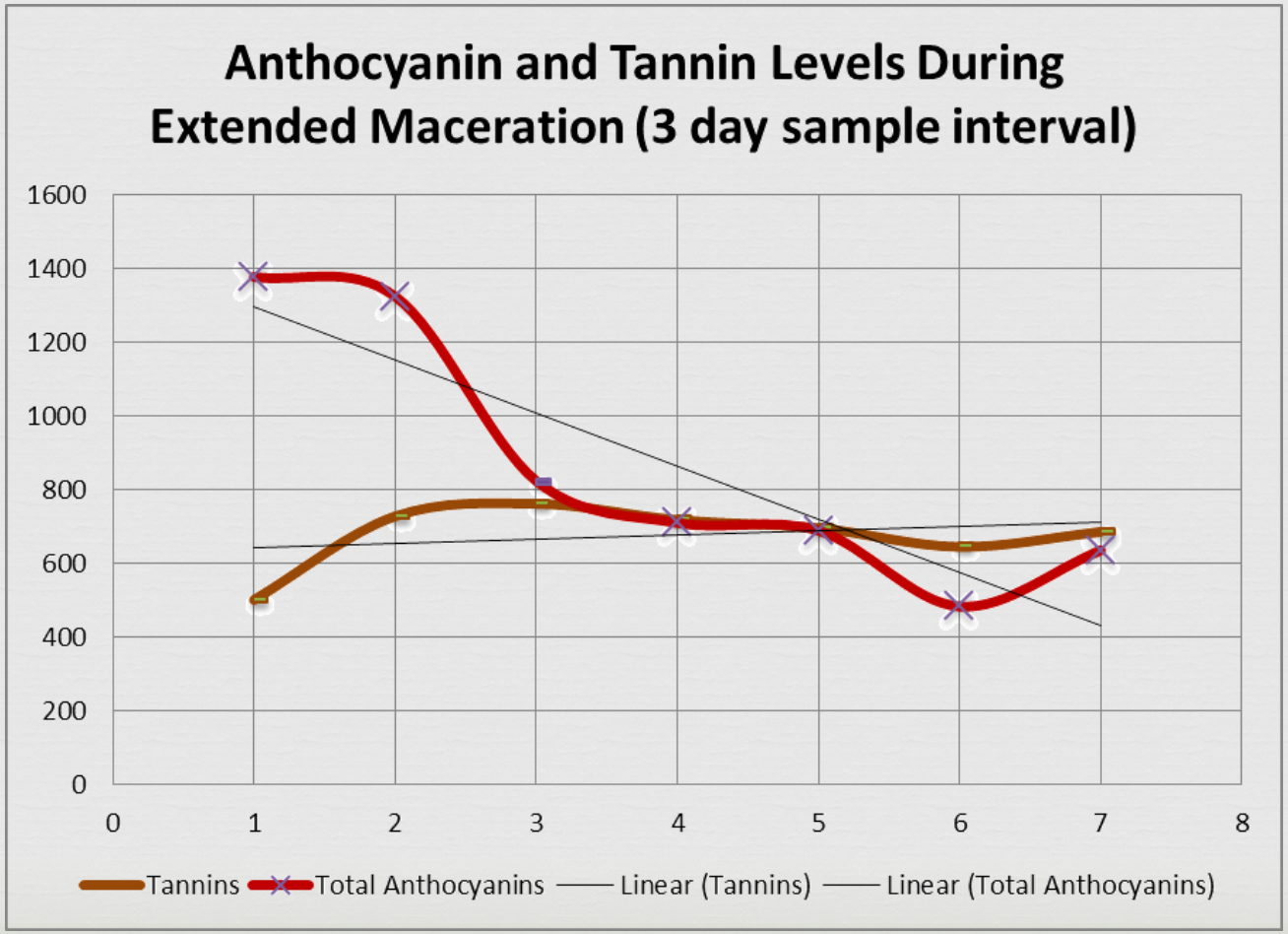
Fermentation Management



Cap Management

- Punched down 3 x daily.
- Pumped over 2x with delestage
- Daily O_2 direct additions
- 8 day fermentation
- 95° peak fermentation temperature
- 21 day maceration

Extended Maceration



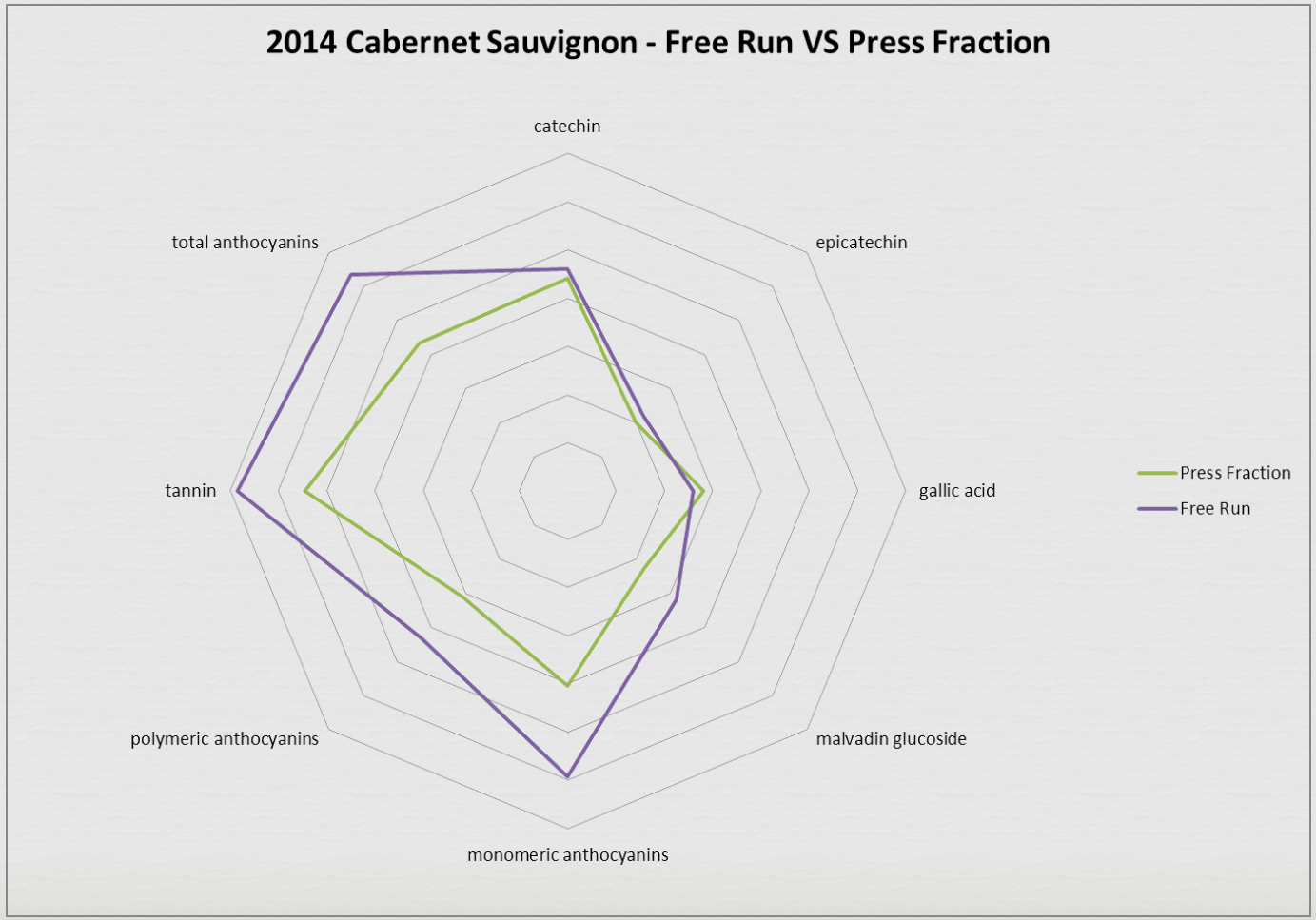
Pressing

- Pressed in Mori ½ ton basket press.
- Free run drawn off prior to pressing directly to 100% new Radoux French oak barrels.

Press Cuts

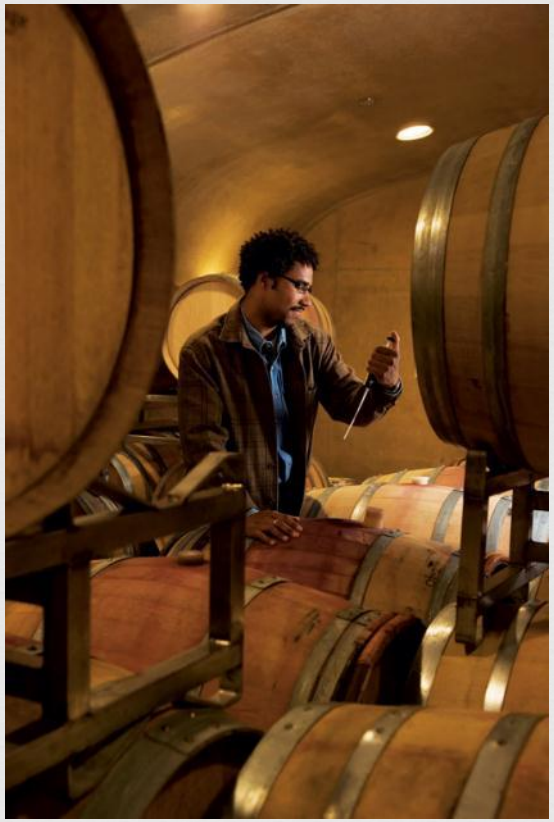
- Press cuts were made based on sensory analysis of pressings.
- Cuts were made at 120 G/ton
- Complete yield was 150 G/ton
- Remainder was sent to “Scholarship Red”

Press Cuts Perception VS Reality



Malolactic Fermentation

- Racked 24 hours post pressing.
- Enoferm Beta MLF in barrel
- Malolactic fermentation in cool environment for slow completion
- MLF completed 4 months post primary
- <0.5g/L glucose/fructose
- <0.05g/L Malic Acid
- 65 mg/L SO_2 add post MLF on 2/15/13



Ageing and SO_2

- Aged in 2 new Radoux French oak barrels
- SO_2 maintained at ≈ 30 mg/L
- Topped monthly
- Racked once
- Not blended

Date	Free SO_2	Action
12/14/12	0mg/L	None
02/15/13	0mg/L	65mg/L add
02/21/13	21mg/L	15mg/L add
04/13/13	28mg/L	5mg/L add
09/02/13	22mg/L	15mg/L add
01/05/13	29mg/L	5mg/L add
04/03/13	22mg/L	8mg/L add
04/06/13	30mg/L	Bottling
07/10/13	23mg/L	-----

Pre Bottling

- Malic dry - confirmed
- Low residual sugar - confirmed
- High ethanol confirmed
- SO_2 bump for bottling

free sulfur dioxide	25	mg/L
molecular sulfur dioxide	0.23	mg/L
total sulfur dioxide	74	mg/L
titratable acidity	5.4	g/L
pH	3.85	
volatile acidity(acetic)	0.56	g/L
L-malic acid	<0.05	g/L
glucose + fructose	0.4	g/L
ethanol at 20C	15.22	% vol
ethanol at 60F	15.17	% vol

Bottling

- Wine racked to tank
- Free SO_2 bumped to 30 mg/L (From 22 mg/L)
- Filtered with 10µm “bug catcher”
- Hand corked
- Hand labeled

Final Analysis

- Post bottling check.

free sulfur dioxide	23	mg/L
molecular sulfur dioxide	0.21	mg/L
total sulfur dioxide	63	mg/L
titratable acidity	4.4	g/L
pH	3.85	
volatile acidity(acetic)	0.55	g/L
ethanol (NIR)	15.40	% vol
ethanol at 60F (NIR)	15.35	% vol

Great Northwest WINE

SAN FRANCISCO
INTERNATIONAL WINE COMPETITION

2012 Syrah
Cockburn Ranch Vineyard

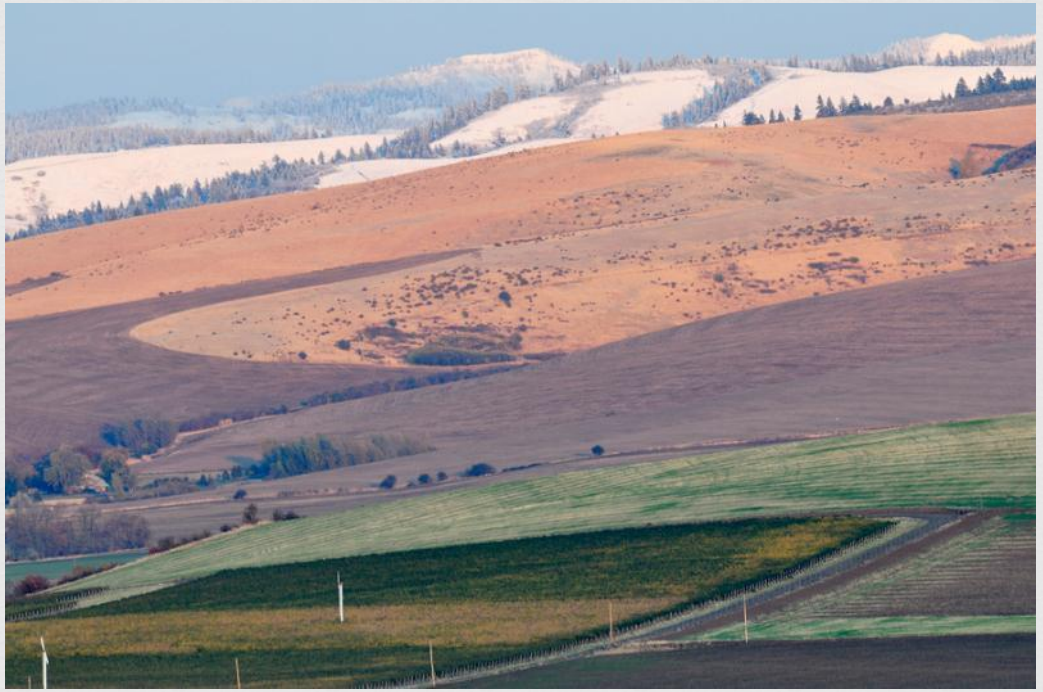
Winemakers: Frank Benson, Sarah Schwartz, Sorin Dimitru, Lucy Carlson, Matt Newbry

Harvest

2012 Syrah Cockburn Ranch

brix	25.3
glucose + fructose	263 g/L
pH	3.65
titratable acidity	5.2 g/L
L-malic acid	3.24 g/L
tartaric acid	3.47 g/L
potassium	1890 mg/L
yeast assimilable nitrogen	104 mg/L

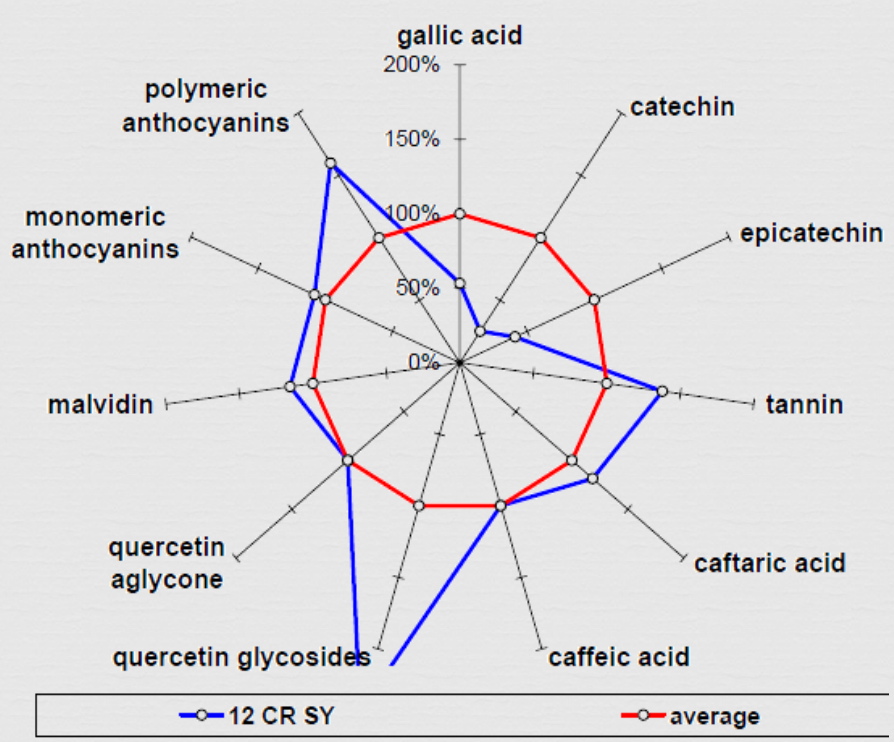
Dry grown – non irrigated



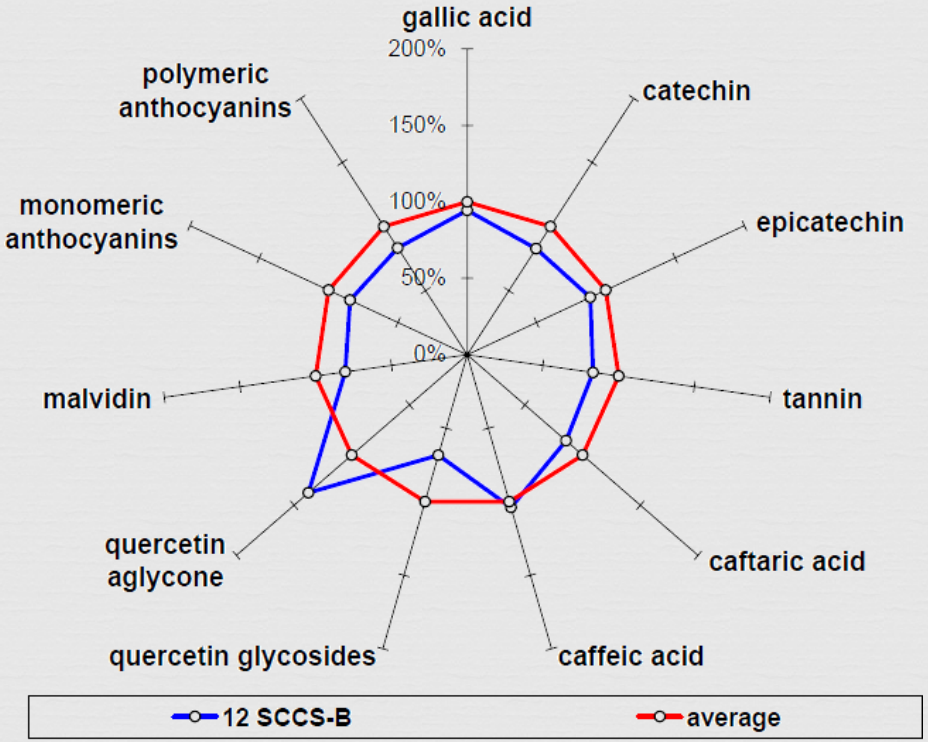
Stem Inclusion

- Why?
  - For flavor and mouthfeel
- Stems contain large amounts of “seed” tannins such as: catechin and epicatechin
  - On their own, they are perceived as bitter.
  - However, they are the foundational building blocks of tannin and color stabilization.
- Consider your varietal!

Stem Inclusion

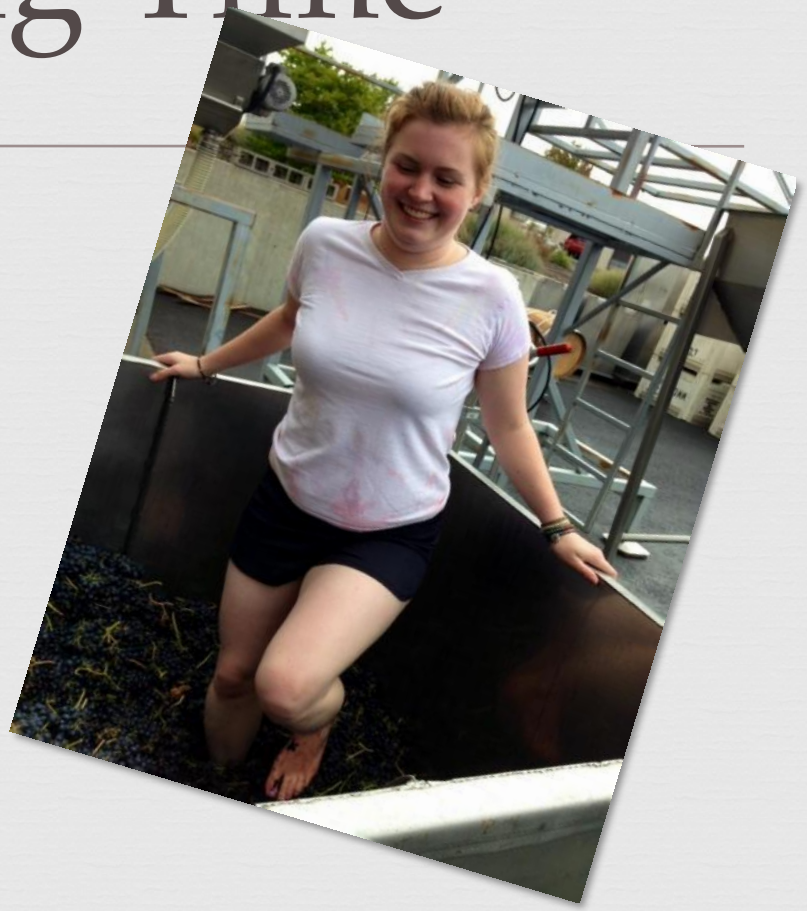


gallic acid (mg/l)	1	total anthocyanins (mg/l)	1299
catechin (mg/l)	16	malvidin glucoside (mg/l)	591
epicatechin (mg/l)	12	monomeric anthocyanins (mg/l)	1242
tannin (mg/L)	772	polymeric anthocyanins (mg/l)	57
caftaric acid (mg/l)	4	quercetin glycosides (mg/l)	122
caffeic acid (mg/l)	< 1	quercetin aglycone (mg/l)	< 1



gallic acid (mg/l)	11	total anthocyanins (mg/l)	441
catechin (mg/l)	37	malvidin glucoside (mg/l)	231
epicatechin (mg/l)	13	monomeric anthocyanins (mg/l)	415
tannin (mg/L)	458	polymeric anthocyanins (mg/l)	26
caftaric acid (mg/l)	25	quercetin glycosides (mg/l)	29
caffeic acid (mg/l)	5	quercetin aglycone (mg/l)	3

Foot Stomping Time



Stem Lignification

Lignified

Unlignified

(Images: Tablas Creek)

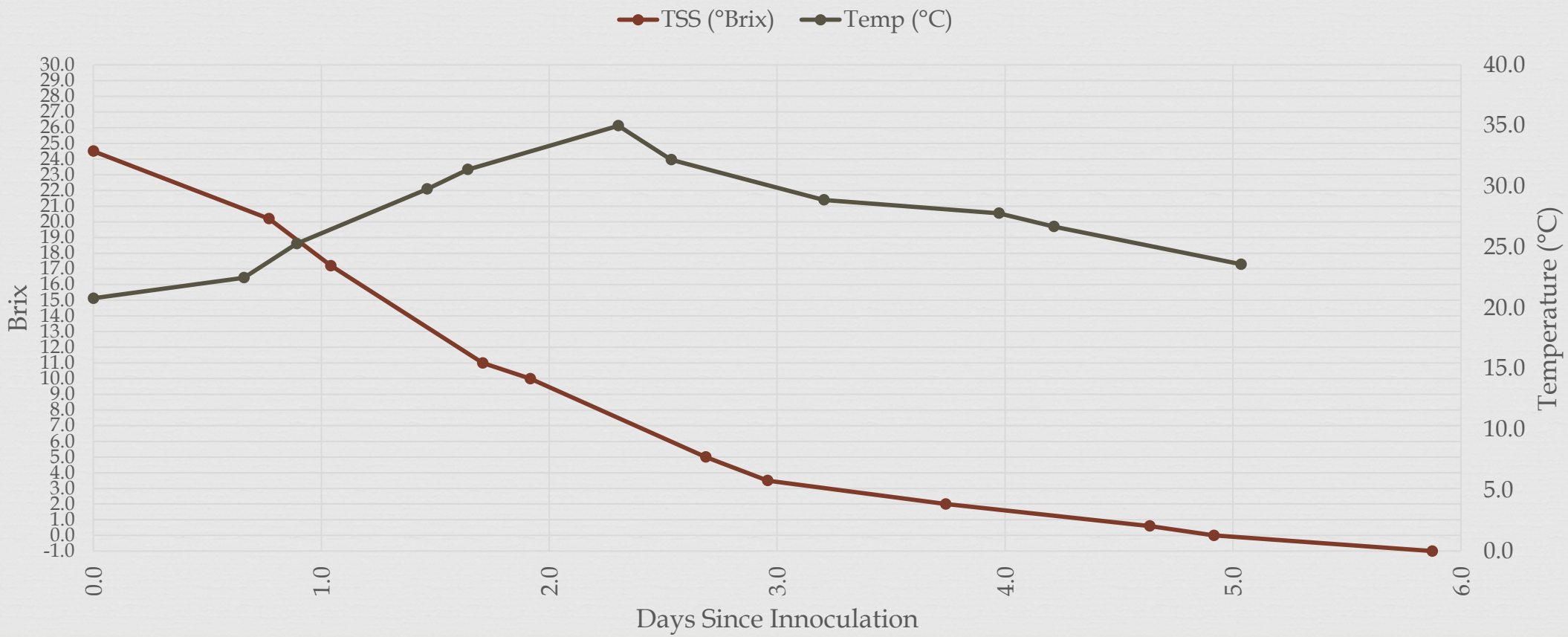
Co-Fermentation/ Pigmentation

- Syrah was co-fermented with 10% Viognier
- Causes early, temporary, color increase.
- Used less ripe Viognier to add acidity and reduce brix of Syrah
- Natural must adjustment!

Additions and Fermentation

- 35 mg/L of SO_2 at destemmer
- 2 day cold soak
- ICV-D54 yeast added at 30 g/HL
- Go-Ferm at inoculation
- 6 Day primary fermentation

Fermentation Management



Cap Management

- 4 X daily punch down's
- DAP additions at 22, 18 and 12 Brix, totaling a 220 mg/L addition
- Pressed at dryness

Pressing

- Pressed in Mori basket press
- No press cuts
- Settled for one day
- Racked directly to barrel with lees

Barreling Down (COSY)

- Wine was aged in
  - 2nd vintage American oak (Nadalie)
  - 2nd vintage Russian oak (Seguin Moreau)
- Wine was not racked until bottling

Ageing

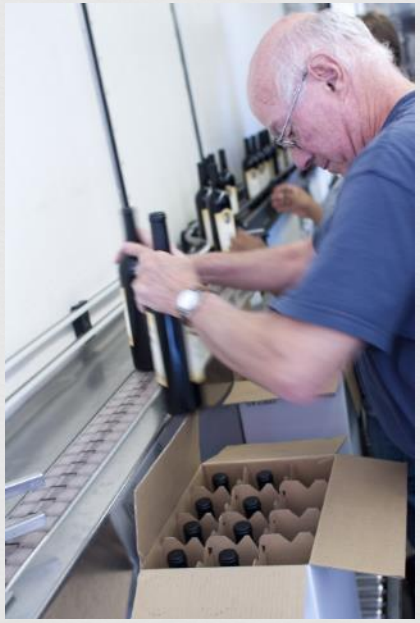
- 75 mg/L SO_2 post MLF
- Topped monthly with 500 mg/L sterile filtered topping wine.
- SO_2 maintained at 30 mg/L free
- Aged for 18 months

Fining/Filtration

- Syrah was fined with 0.1 g/L of isinglass
- Wine was subsequently racked and cross-flow filtered to 0.2 µm
- SO_2 adjusted to 30 mg/L free
- Sparged with nitrogen to reduce DO below 0.8 mg/L and to remove any residual CO_2 from fermentation

Bottling/Post

- Measurements during bottling:
- Volume, pH, TA and Dissolved O_2



- 07/01/2014

402110093 12COSY

free sulfur dioxide	28	mg/L
molecular sulfur dioxide	0.21	mg/L
total sulfur dioxide	79	mg/L
titratable acidity	6.0	g/L
pH	3.93	
volatile acidity(acetic)	0.62	g/L
ethanol at 20C	15.60	% vol
ethanol at 60F	15.55	% vol

'Scorpion' Bottle Sterility Panel

Brettanomyces bruxellensis	<10	cells/mL
Zygosaccharomyces bailii	<10	cells/mL
Saccharomyces cerevisiae	<10	cells/mL
Lactobacillus plantarum	<10	cells/mL
L. casei/paracasei/mali/nagelii	<10	cells/mL
L. brevis/hilgardii/fermentum	<10	cells/mL
Pediococcus species	<10	cells/mL
Acetic acid bacteria	<10	cells/mL
Oenococcus oeni	<10	cells/mL
Lactobacillus kunkeei	<10	cells/mL

Questions???


COLLEGE · CELLARS
WALLA WALLA
2013
CARMENÈRE
Clarke Vineyard
WALLA WALLA VALLEY
ALC 12.5% BY VOL
COLLEGE · CELLARS
WALLA WALLA
2012
CABERNET SAUVIGNON
Clarke Vineyard
WALLA WALLA VALLEY
ALC 14.0% BY VOL
COLLEGE · CELLARS
2012
SYRAH
Cockburn Ranch Vineyard
WALLA WALLA VALLEY
ALC 15.5% BY VOL

ETS LABORATORIES

THANK YOU!

WALLA WALLA COMMUNITY COLLEGE · ESTABLISHED 1967 ·


E2
delta
CURE
TRI-CITY
0409
0409
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