VIRGINIA WRE
WINEMAKERS RESEARCH EXCHANGE

Whole Cluster Inclusion in Syrah Fermentation (2017)

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Summary

This study examines the impact of whole cluster inclusion in Syrah fermentations. Syrah grapes from the same vineyard block were harvested and processed into T bins. One T Bin received fruit that was completely destemmed, whereas the other received 30% whole cluster inclusion. All other treatments between wines were identical. Each wine received a 6 day cold soak, and then afterwards were inoculated with RX-60 and received 2-3 punchdowns per day for 4 days in order to limit tannin extraction. Wines macerated for 17 days total, including cold soak. There were no differences in cold soak or in wine chemistry between treatments. Color intensity was higher in the whole cluster treatment, even though anthocyanin and quercetin parameters were slightly lowered by whole cluster inclusion. Catechin was increased in whole cluster inclusion. No significant sensory differences were found for these wines via triangle testing. No discernable preference trends could be seen in this tasting. For the descriptive analysis, there were no strong trends for the descriptors used in this study. There was a slight tendency for whole cluster inclusion to increase Fruit Intensity and decrease Herbaceous/Green Character. More studies should be performed on the impact of whole cluster inclusion in Virginia Syrah, and different rates of inclusion should also be examined.

Introduction

The role of whole cluster and stem inclusion in winemaking is very controversial. Whole cluster fermentation is often used in Burgundian Pinot noir and is thought to add complexity to the wine (Weston 2000). Whole clusters are thought to round out and complement the low tannin in Pinot noir, and the flavors of Syrah can be complemented by stems (Meisner 2016). However, whole cluster inclusion also results in stems being added to the wine. Stems can enhance structure and wine quality sometimes, but also can add vegetal aromas (Ribèreau-Gayon et al. 2006). In certain cases, these vegetal aromas can also be perceived as spicy, and may act as a counterbalance to overly fruity qualities. Vegetal aromas and tannin additions may also balance out some carbonic maceration character which is found in whole cluster inclusion, which enhances ester aromatics, extends fermentation after pressing, and reduces the contribution of seed tannin. Stem inclusion is less common for Bordeaux varieties because of their already high levels of pyrazine (Meisner 2016). The reticence to use stems due to pyrazine characteristics in certain varieties is likely unfounded, due to cultural practices and climatic conditions which can greatly lower pyrazine character. Stems tend to lower alcohol content, decrease titratable acidity, and increase pH (due to high potassium levels). Stems can contribute a large amount of tannin to wine. Additionally, stems tend to decrease color intensity by adsorbing anthocyanins (Ribèreau-Gayon et al. 2006; Reshef et al. 2016). Finally, wines made with stem inclusion tend to have higher color stability over time (Ribèreau-Gayon et al. 2006). These results vary, however (Ribèreau-Gayon et al. 2006), and are dependent on many other factors, such as extraction kinetics, maceration practices, the level of crushing in the grapes, grape variety, and possibly stem maturity. Whole cluster and stem inclusion require much more thorough study before any hard conclusions can be drawn. This study examines the impact of whole cluster inclusion on Syrah wine.

Results and Discussion

There were no differences in cold soak or in wine chemistry between treatments. Color intensity was higher in the whole cluster treatment, even though anthocyanin and quercetin parameters were slightly lowered by whole cluster inclusion. Catechin was increased in whole cluster inclusion. For the triangle test, of 7 people who answered, 3 people chose the correct wine (43%), suggesting that the wines were not significantly different. No discernable preference trends could be seen in this tasting. For the descriptive analysis, there were no strong trends for the descriptors used in this study. There was a slight tendency for whole cluster inclusion to increase

Fruit Intensity and decrease Herbaceous/Green Character. More studies should be performed on the impact of whole cluster inclusion in Virginia Syrah, and different rates of inclusion should also be examined.

Juice Chemistry			
	Brix	pH	TA (g/L)
Juice Chemistry	20.4	3.62	4.4

In House Data

Cold Soak Chemistry				
	Brix	pH	TA (g/L)	YAN (mg N/L)
0% Whole Cluster	20.5	3.91	4.8	131.7
30% Whole Cluster	20.4	3.86	4.6	123.9
% Change	0%	-1%	-4%	-6%

In House Data

Wine Chemistry												
	Ethanol (%vol/vol)	Residual Sugar (g/L)	pH	TA (g/L)	Volatile Acidity (g/L)	Tartaric Acid (g/L)	Malic Acid (g/L)	Lactic Acid (g/L)	Potassium (mg/L)	Total SO2 (ppm)	Free SO2 (ppm)	Molecular SO2 (ppm)
0% Whole Cluster	12.30	<1	3.65	4.91	0.40	1.5	<0.15	1.45	1350	64	21	0.43
30% Whole Cluster	12.07	1	3.65	4.85	0.39	1.6	<0.15	1.55	1350	52	11	0.22
% Change	-2%		0%	-1%	-3%	7%		7%	0%	-19%	-48%	-49%

Results from ICV in Late March, Except Tartaric Acid and Potassium from ETS in Late March

Color Profile					
	A420	A520	A620	Hue (420/520)	Intensity (420 + 520 + 620)
0% Whole Cluster	0.242	0.396	0.085	0.611	0.723
30% Whole Cluster	0.274	0.458	0.097	0.598	0.829
% Change	13%	16%	14%	-2%	15%

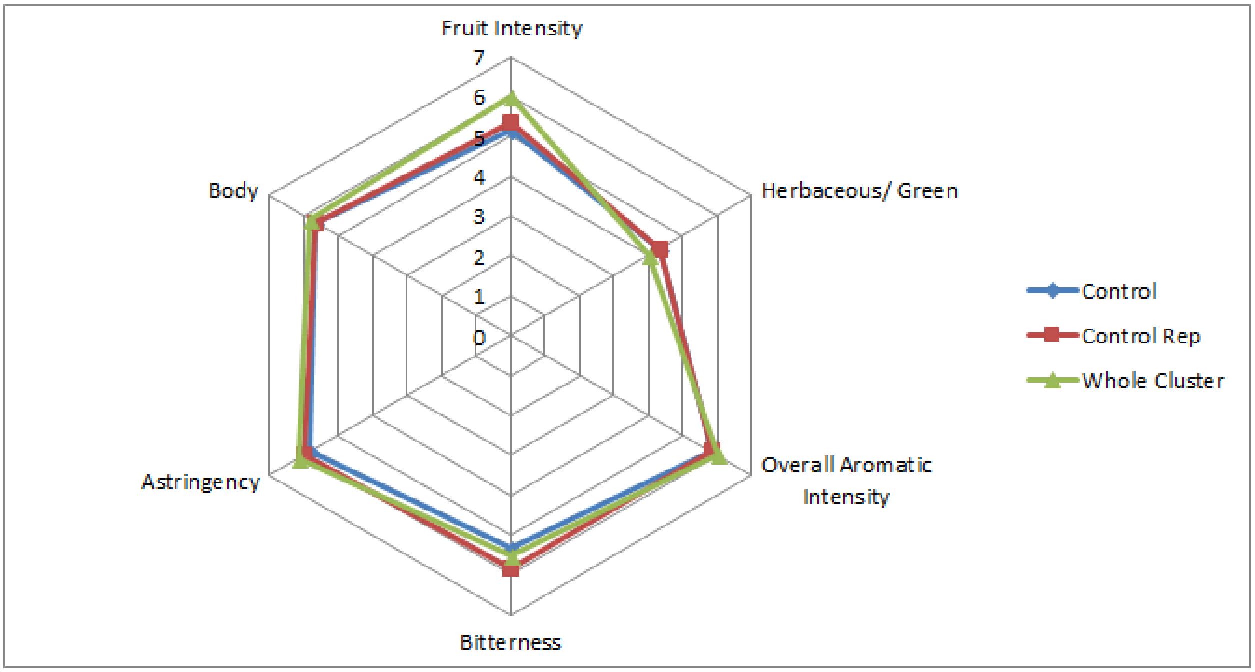
Results from ICV in Late March

Phenolic Profile					
	Caffeic Acid (mg/L)	Caftaric Acid (mg/L)	Catechin (mg/L)	Epicatechin (mg/L)	Gallic Acid (mg/L)
0% Whole Cluster	9	25	25	12	19
30% Whole Cluster	11	26	38	16	22
% Change	22%	4%	52%	33%	16%

Results from ETS in Late March

Phenolic Profile								
	Malvidin glucoside (mg/L)	Monomeric Anthocyanins (mg/L)	Polymeric Anthocyanins (mg/L)	Quercetin (mg/L)	Quercetin Glycosides (mg/L)	Tannin (mg/L)	Total Anthocyanins (mg/L)	Resveratrol (cis and trans) (mg/L)
0% Whole Cluster	156	291	36	11	75	547	327	1.4
30% Whole Cluster	146	269	36	9	63	536	305	1.4
% Change	-6%	-8%	0%	-18%	-16%	-2%	-7%	0%

Results from ETS in Late March



Methods

Syrah grapes (clone 470 on 101-14, 14-year-old vines) were harvested on September 2, 2017 and destemmed into two T Bins on September 4. One T Bin received solely destemmed fruit, whereas the other T Bin received 30% Whole Cluster fruit. At crush, both T bins received 50ppm sulfur dioxide, 30g/hL Tannin VR Supra, and 40g/ton HE Grand Cru Enzyme. Both treatments then received a 6 day cold soak at 50°F. On September 10, both treatments were inoculated with RX-60 at 25g/hL rehydrated with 30g/hL Dynastart. All other treatments were identical. Both fermentations received 35g/L Thiozote, 30g/hL Nutristart Org, 30g/L Opti-Red, and 1g/L Tartaric Acid. Malolactic Bacteria was added on September 12, and both fermentations received 2-3 punchdowns per day until September 14 (so as not to over extract tannin), after which both fermentations received 1 punch down per day until pressing. Wines were pressed on September 21, for a maceration time of 17 days total. Only free run wine was used.

These wines were tasted on May 9. For the triangle test, descriptive analysis, and preference analysis, anybody who did not answer the form were removed from consideration for both triangle, degree of difference, and preference. Additionally, anybody who answered the triangle test incorrectly were removed from consideration for degree of difference and preference. Additionally, any data points for preference which did not make sense (such as a person ranking a wine and its replicate at most and least preferred, when they correctly guessed the odd wine) were removed.

In order to balance the data set to perform statistical analysis for descriptive analysis, any judge who had not fully completed the descriptive analysis ratings were removed. There was a final data set of 3 groups, each with 2 judges (considered as replications within groups, and groups were considered as assessors). Data was analyzed using Panel Check V1.4.2. Because this is not a truly statistical set-up, any results which are found to be statistically significant ($p<0.05$) will be denoted as a "strong trend" or a "strong tendency," as opposed to general trends or tendencies. The statistical significance here will ignore any other significant effects or interactions which may confound the results (such as a statistically significant interaction of Judge x Wine confounding a significant result from Wine alone). The descriptors used in this study were Fruit Intensity, Herbaceous/Green, Overall Aromatic Intensity, Bitterness, Astringency, and Body.

References

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