# The Impact of Trellising on Ripening and Quality in Merlot (2017)

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## Summary and Introduction

Different trellising systems can have a large impact on canopy sun exposure, leaf area:fruit ratios, and yields. Different trellising systems also have different labor requirements for proper management. Determining which trellising system is best for a given site, on a given variety, is therefore very important. This study examines the difference between two training methods – VSP and Scott Henry – on resulting juice and wine quality. Merlot (clone 181) was planted in 2000 and trained as Scott Henry. In 2017, every other row of this block was converted to VSP. All vineyard treatments were identical, with leaf pulling on east side of vine after fruit set. Grapes were harvested on the same day, and all fermentation practices were identical between treatments. There were not many differences in juice and wine chemistry, except for slightly lower tartaric acid in the Scott Henry wine and decreased acidity. Tannin may have been slightly lower in the Scott Henry wine as well. Overall, these wines were not found to be significantly different, but perhaps would have been at more lenient p levels. Descriptive analysis was not completely consistent between tastings. Preferences slightly favored the VSP trellis, but this was not strong. This study should be repeated over multiple years on different grape varieties. More careful attention should be paid to viticultural parameters, such as leaf area to fruit weight ratios, and yield parameters.

## Results and Discussion

There were not many differences in juice and wine chemistry, except for slightly lower tartaric acid in the Scott Henry wine and decreased acidity. Tannin may have been slightly lower in the Scott Henry wine as well. Although another study had found little difference in sugars between merlot grapes on VSP compared to vertically split canopy systems, the present study observed higher levels of phenolic compounds in vertically split canopy systems, different from what was observed in this other study (Dufourcq et al. 2005).

| Juice Chemistry | | | | | | |
|---|---|---|---|---|---|---|
| | Brix | Density (g/mL) | pH | TA (g/L) | Malic Acid (g/L) | YAN (mg N/L) |
| VSP | 21.1 | 1.085 | 3.62 | 3.96 | 2.20 | 131.00 |
| Scott Henry | 21.1 | 1.085 | 3.60 | 3.96 | 2.16 | 150.85 |
| % Change | 0% | 0% | -1% | 0% | -2% | 15% |

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) |
| VSP | 12.42 | <1 | 3.56 | 5.27 | 0.70 | 1.8 | <0.15 | 1.13 | 1100 | 37 | 18 | 0.45 |
| Scott Henry | 12.53 | <1 | 3.67 | 4.87 | 0.75 | 1.3 | <0.15 | 1.19 | 1150 | 41 | 18 | 0.35 |
| % Change | 1% | | 3% | -8% | 7% | -28% | | 5% | 5% | 11% | 0% | -22% |

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

| Color Profile | | | | | |
|---|---|---|---|---|---|
| | A420 | A520 | A620 | Hue (420/520) | Intensity (420 + 520 + 620) |
| VSP | 0.346 | 0.538 | 0.118 | 0.643 | 1.002 |
| Scott Henry | 0.331 | 0.494 | 0.118 | 0.670 | 0.943 |
| % Change | -4% | -8% | 0% | 4% | -6% |

Results from ICV in Mid March

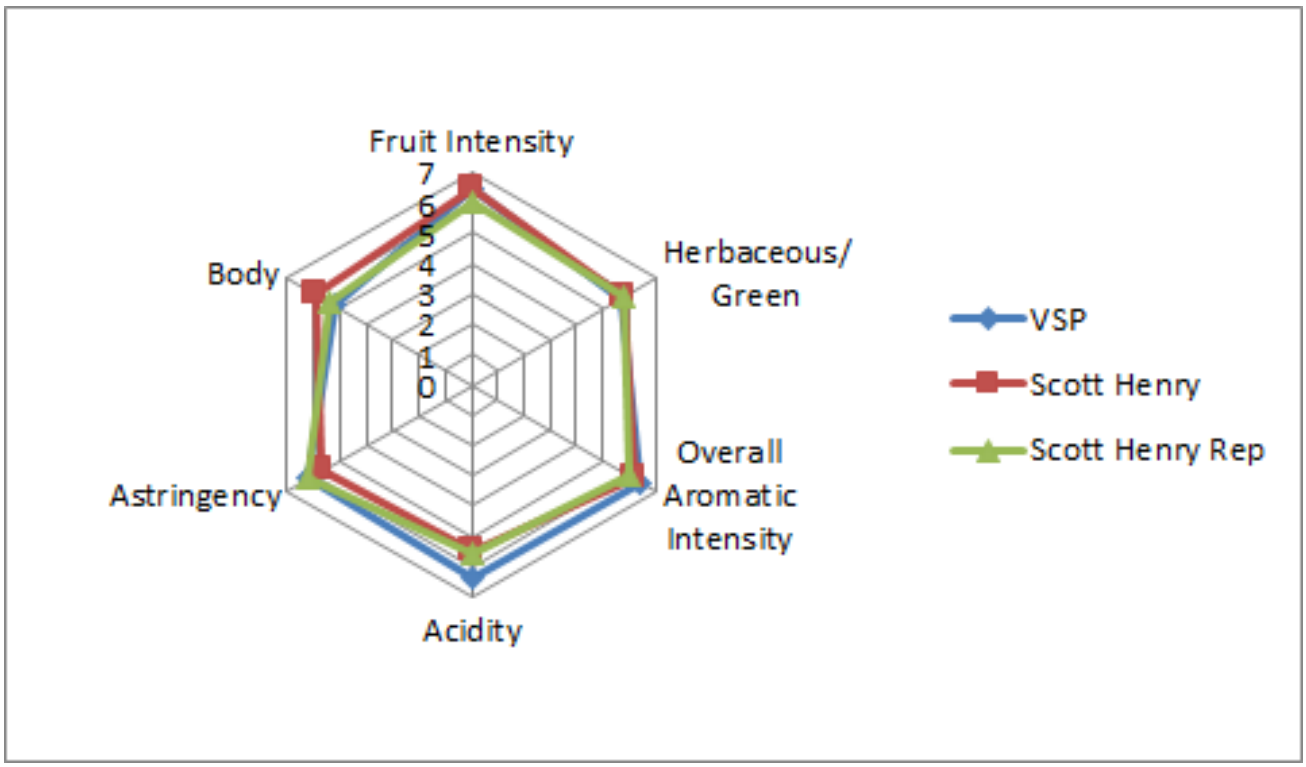
| Phenolic Profile | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Caffeic Acid (mg/L) | Caftaric Acid (mg/L) | Catechin (mg/L) | Epicatechin (mg/L) | Catechin:Epicatechin Ratio | Catechin:Tannin Ratio | Gallic Acid (mg/L) |
| VSP | 14 | 9 | 56 | 39 | 1.44 | 0.12 | 35 |
| Scott Henry | 13 | 6 | 52 | 38 | 1.37 | 0.12 | 34 |
| % Change | -7% | -33% | -7% | -3% | -5% | 0% | -3% |

Results from ETS in Mid March

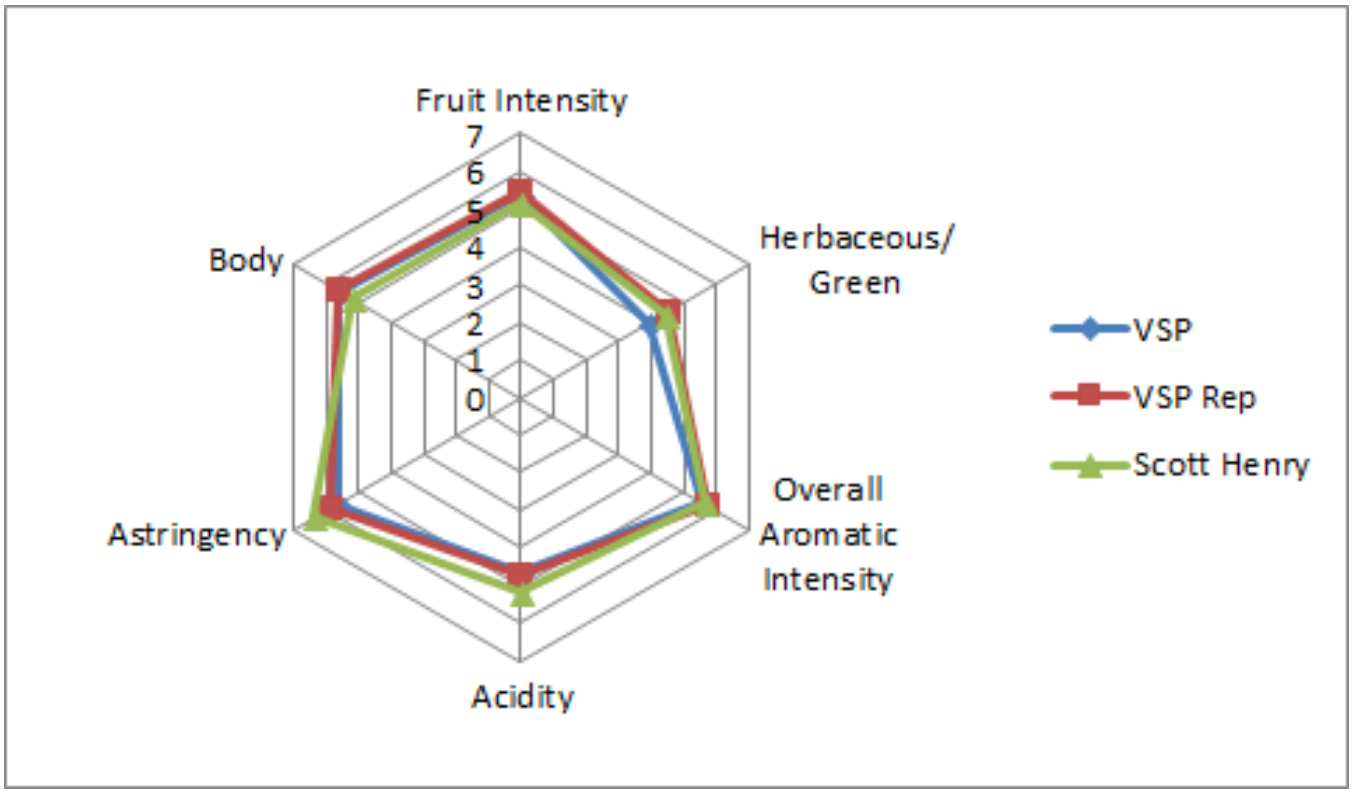
| Phenolic Profile | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Malvidin glucoside (mg/L) | Monomeric Anthocyanins (mg/L) | Polymeric Anthocyanins (mg/L) | Quercetin (mg/L) | Quercetin Glycosides (mg/L) | Tannin (mg/L) | Total Anthocyanins (mg/L) | Resveratrol (cis and trans) (mg/L) |
| VSP | 162 | 332 | 28 | 6 | 23 | 482 | 360 | 0.1 |
| Scott Henry | 168 | 329 | 28 | 5 | 18 | 444 | 357 | 0.1 |
| % Change | 4% | -1% | 0% | -17% | -22% | -8% | -1% | 0% |

Results from ETS in Mid March

For the triangle test on April 4, of 10 people who answered, 5 people chose the correct wine (50%), suggesting that the wines were not significantly different. Of those who answered correctly, 3 preferred the Scott Henry, 1 preferred the VSP, and one had no preference. For the descriptive analysis, there were no strong trends for the descriptors used in this study. The VSP wine had a slight tendency to have higher perceived Acidity.




For the triangle test on May 2, of 24 people who answered, 12 people chose the correct wine (50%), suggesting that the wines were not significantly different. These wines would have been significantly different at $p<0.10$. In general, people who answered correctly preferred the VSP treatment to the Scott Henry (8 judges vs 4 judges). For the descriptive analysis, there were no strong trends for the descriptors used in this study. There was a slight tendency for the Scott Henry wine to have higher Acidity and Astringency, and lower Body. It also had slightly lower Fruit Intensity.




Overall, these wines were not found to be significantly different, but perhaps would have been at more lenient p levels. Descriptive analysis was not completely consistent between tastings. Preferences slightly favored the VSP trellis, but this was not strong. This study should be repeated over multiple years on different grape varieties. More careful attention should be paid to viticultural parameters, such as leaf area to fruit weight ratios, and yield parameters.

## Methods

This study examined the difference between two training methods: VSP and Scott Henry. Merlot (clone 181) was planted in 2000 and had been trained in a Scott Henry split canopy. In 2017, every other row was converted to VSP. All vineyard treatments between blocks were identical, with standard leaf pulling just after fruit set, only on the east side. The two training methods were harvested on the same day (September 6, 2017) and destemmed on September 8 and transferred into T bin on September 9. At this time, 20g/hL FT Rouge Berry and 0.165mL/L Color Pro was added. On September 10, Gaia yeast was added at 10g/hL, after which the must was cold soaked for 3 days. During cold soak the T bins were pumped over one time per day. On September 13, BM4x4 was added at 20g/hL with 10g/hL FG-Fermoplus Energy Glu. On September 14 FDF-Fermoplus DAP Free was added at 36g/hL, and this amount was again added on September 16. All treatments in the cellar were kept the same.

During active fermentation the T bins were punched down three times per day until the end of alcoholic fermentation and extended maceration in which they were only punched down one time per day. Extended maceration post fermentation was 18 days (from September 21-October 8). Must was pressed and barreled on October 8. On November 8, ML Bacteria Pre AC 450 was added at 1g/hL with Energizer at 5g/hL. Omega MBR was added on November 13 at 1g/hL. On December 5, Effergran was added at 25ppm. On February 8, barrels were racked and returned. On March 7, 20ppm sulfur dioxide and 0.5g/L tartaric acid were added, and wine for the research exchange was taken soon after.

These wines were tasted on April 4 and on May 2. For the triangle test, descriptive analysis, and preference analysis for the April 4 tasting, 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 on the April 4 tasting, any judge who had not fully completed the descriptive analysis ratings were removed. In order to then make the number of judges between groups equivalent, one judge from group 1 was transferred to group 2. This resulted in a final data set of 3 groups, each with 3 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, Acidity, Astringency, and Body.

The same procedures for data analysis were used on the May 2 tasting. For the descriptive analysis in this tasting, one judge was transferred from group 3 to group 1, one judge was eliminated from group 2 so that each group had 7 judges, for a total of 21 judges.

## References

Dufourqc, T., Gontier, L., Serrano, E., and Ollat, N. 2005. Adaptation des modes de conduit Scoot-Henry et Smart-Dyson dans le vignoble de Gascogne sur cepages Merlot N et Colombard B. Extrait du GESCO, Actes de colloque. Accessed on May 22, 2018. http://www.vignevin-sudouest.com/publications/compte-rendus-recherche/pdf/modes_de_conduite_gesco.pdf