

**Virginia Wine Board Grant
Final Report**

5/31/2021

Joy Ting
Winemakers Research Exchange
PO Box 555, Ivy, Virginia, 22945-0555

Title: 2021-2022 Virginia Winemakers Research Exchange Experiments and Sensory Sessions

Project Type: ☒ Research ☒ Education ☐ Marketing

Is this a multi-year grant? ☒ Yes ☐ No

If yes, which year does this report address? ongoing

Original Funding Amount: \$167,150

Remaining Balance: \$26,814.12

Objectives and Results:

The purpose of the Winemaker's Research Exchange is to promote innovation through experimentation and education in the wine industry. The primary instrument of this work is by supporting production scale experiments done by winemakers in wineries across the state of Virginia. In this funding cycle, the primary objectives of the VWRE were:

- To identify 5-7 themes and design experiments around those themes. • To support 40-55 practical research projects representing each of the 5 regions of the state with experimental design, execution, analysis, and reporting of results. • To host 8 sensory sessions around Virginia to analyze results, provide background information and allow discussion of projects.
- To publish newsletters on a monthly or bi-monthly basis to disseminate research results and broaden the impact of experiments.
- To pursue publication venues in trade magazines (Wine Business Monthly, Catalyst)

The 2020 vintage was marked with many difficulties for completion of experiments. Several frosts and a freeze event severely limited fruit for some producers. Economic and personnel constraints also limited participation this year. Despite these limitations, 50 experiments were planned prior to harvest with an additional four experiments added during or after harvest (Table 1). Experiments were planned by participants from locations in four of the five regions of the state, including seven winemakers who have not done projects in previous years. Planned

experiments clustered around several main topics for which there were at least two experiments per topic, with several experiments including multiple lots of fruit receiving the same experimental protocols, thus allowing for replication of results.

After harvest, 33 of the 54 experiments were still ongoing. The main reasons experimenters cited for not completing planned studies were poor quality of fruit and lack of ripening seen in the 2020 vintage. Chemical analysis of all ongoing projects was completed in mid-December, or after the completion of malolactic fermentation (which was late in many varieties in 2020). Sensory sessions began in February and were offered roughly biweekly through the end of May (Table 2).

Due to restrictions put in place during the COVID-19 pandemic, in-person sensory sessions were not possible. Instead, 9 virtual sensory sessions were conducted using pre-registration, shipping of sample wines, and the Zoom platform for presentation of data and discussion of results. Virtual sensory sessions were planned for 1 hour to prevent fatigue, with one exception (April 16) when a special guest speaker was given additional time (90 minutes). Due to supply, shipping, and time constraints, a maximum of two experiments were tasted at each session. Each virtual session was recorded and posted on YouTube for participants who were not able to attend at the designated time or for reference at a later date. These videos will also be incorporated into future learning paths posted on the WRE website alongside the finished reports from each experiment presented.

Six newsletters were published during this grant cycle, including one written jointly with Virginia Tech Extension Enologist Dr. Beth Chang. Due to the frequent presentation of information during sensory sessions from February through May, no newsletters were published during this time. Additional newsletter content has been prepared and is ready for publication when sensory sessions have been completed. WRE trials were also published/accepted in two outside information streams. The October issue of Wine Business Monthly included a trial by Theo Smith through the WRE as the featured winemaker trial. This trial was poured at Wine IQ in February of 2020. A study of chaptalization in Merlot done by Matthieu Finot has also been chosen for publication in an upcoming issue of Wine Business Monthly. A study conducted by Kirsty Harmon in the 2018 and 2019 vintages will be presented as a poster during the 2021 American Society of Enology and Viticulture Conference to be held June 21-24.

Social media engagement has been an area of tremendous growth for the WRE during this grant cycle. Though not originally state as an objective, when restrictions for social gatherings were put in place in March 2020, the WRE realized we needed to increase our social media efforts in order to keep participants informed about opportunities for experimentation, sensory sessions and newsletters. A social media coordinator was contracted to spend consistent time

each week to engage followers and turn existing WRE content into social media posts. Since that time, the number of followers on Instagram has increased from 280 to 539, Facebook followers have increased from 119 to 380 (219%), and Twitter from 48 to 110 followers (110%). Given our primary target audience is relatively small, as the number of wine producers in Virginia is less than 500, we feel this has been a great tool to keep people informed during a time of relative isolation.

Problems and Delays: The 2020 vintage posed several challenges to experimental development and execution. Due to restrictions put in place during COVID-19, travel by the research coordinator was limited during the portion of the season when she is usually soliciting experimental ideas. Rather than site visits, she remained in contact with winemakers through Zoom, phone calls, emails and text messages. Winemakers responded well to these forms of communication. Dr. Ting received greater than normal volume of communications during harvest asking for general assistance or asking for information from previous trials in order to address poor quality fruit.

Several winemakers who frequently do experiments declined to do so in 2020. The main reasons given were limited fruit due to severe spring frosts and limited production or personnel due to COVID-19. There were no participating wineries in the Southern region in 2020. Wineries from this region who usually participate cited crop loss due to frost and limited production planned for 2020 due to COVID as reasons for not participating this year. Poor quality fruit during the 2020 vintage also led to several experiments being dropped by the experimenters. There is no “normal” drop rate, but the rate in 2020 is less than 2018 (where at least 50% of experiments were dropped during harvest) but more than 2019 (when very few were dropped). Despite these difficulties a more than sufficient number of quality experiments remained to provide meaningful programming through 2021 sensory sessions.

Virtual sensory sessions came with both advantages and disadvantages. Shorter sessions that are available without travel allowed winemakers from more remote regions to participate. Presenting fewer experiments at one time allowed for higher quality sensory data as palate fatigue was less prevalent. Several participants commented they liked virtual sessions for convenience as well as for the ability to focus on a single topic. There were drawbacks, however. Virtual sessions do not include the same social aspects that in-person sessions provide, and several participants have expressed a desire to meet together in person once restrictions are lifted. There was also less discussion among participants in the virtual realm than is normally displayed during an in-person session. Also, despite our best efforts to encourage people to fill out sensory forms if they received wine samples, sensory return rates ranged from 52% - 85% (Table 2). Sensory data are key to objectively evaluating the results of experiments, and poor return rates make these data less robust. These also come at the cost of

materials, shipping, and time of preparation. Though difficult to measure on digital platforms, as several attendees from the same cellar may be logged in together, attendance was also perceptibly lower than the RSVP list.

Overall Benefit for Virginia Wine Industry:

The efforts of the WRE in FY2020-2021 serve the Virginia Wine industry in several ways. Several of the experiments completed in 2020-2021 have direct economic impact. For example, studies exploring the effect of chaptalization in low Brix red wines (King Family Vineyards, Blenheim Vineyards) stretch the boundaries of when a vineyard block may need to be re-planted or relegated to Rosé production. In another study, simple changes in SO₂ management (Blenheim Vineyards) were shown to lead to 10 times fewer acetic acid bacteria, known to cause spoilage that could ruin a batch of wine.

Experiments in this season also included developing protocols that improve quality winemaking for Virginia fruit. One recent example is the development of a technique at King Family Vineyards for whole cluster fermentation without the microbial spoilage often seen with this approach. This protocol was first presented in 2019, and was applied as a proof of concept at Cardinal Point Winery in 2020 with very positive results. Other such protocol-driven experiments included a series of experiments on ambient fermentations at King Family and the Vineyards and Winery at Lost Creek that revealed common difficulties with this technique and explored several solutions. A third set of protocol development experiments was run at three different wineries (Whitehall Vineyards, Hark Vineyards and Stinson Vineyards) exploring the cost, accuracy and precision of commonly used SO₂ detection methods. SO₂ measurement is among the most commonly run tests in the winery. Addressing protocols to maximize accuracy and precision and minimize cost has far-reaching impact on wine quality.

The WRE continues to play an important role in workforce development of new and experienced winemakers alike. At the beginning of the 2020-2021 season, 26 different winemakers planned projects. More than 100 different people attended at least one WRE sensory session, with many attending nearly all of the offered sessions. [Newsletters](#) and [posted research reports](#) continue to serve as an ongoing reference library for winemakers in Virginia and beyond. The WRE website had 8900 visits from 7000 unique visitors from June 1, 2020 – May 19, 2021, an increase of 48% from the previous year. A redesign of the format and aesthetic of the website is nearly complete, which will further boost results from web searches as well as assist visitors in finding the information they are seeking. There were 6 newsletters distributed through the email list in the 2020-2021 season, with more prepared from material developed during this grant cycle. The email list currently has 358 subscribers. The email newsletter is also disseminated through social media channels.

In the 2020-2021 grant cycle, the WRE actively collaborated with colleagues at Virginia Tech, helping to connect academic researchers with the industry members they are trying to serve. During harvest, we wrote a newsletter in collaboration with Dr. Beth Chang, a project which has been expanded to a Wine Board funded educational project with Dr. Ting and Dr. Chang co principle investigators. We worked with Dr. Chang and Dr. Jake Lahne to adapt the Descriptive Analysis Seminar originally funded as in-person to a virtual format. We were pleased to invite Dr. Amanda Stewart to be our guest speaker at a sensory session discussing yeast nutrition, her area of research. The WRE was also an active participant in Virginia Tech's Sentinel Vineyard project, with the research enologist providing samples each week. A parallel project conducted by the WRE on Petit Manseng ripening was picked up by Dr. Chang who expanded this pilot study to a Wine Board funded project for 2021-2022 with collaboration from Dr. Ting and Dr. Stewart. The WRE helps provide strong and active ties between industry and academics that will continue to propel the Virginia wine industry forward.

Publications and Activities Associated with Project:

WRE Newsletters:

June: Chaptalization

July: SO₂ Management

August: 2020 Harvest Reminders

September: pH, TA, and acid adjustments in juice and must

January: Sensory Training in the Winery

February: Micro-oxygenation – making friends with the oxygen in our wine

“Oxygen trials reveal effects of processing regimes in Chardonnay style”, Theo Smith, Wine Business Monthly, October 2020

“Determining effective concentration of post-malolactic SO₂ addition in Cabernet Franc and Cabernet Sauvignon”, Kirsty Harmon, Blenheim Vineyards, 72nd National ASEV Conference, June 21-24

“Trial evaluates optimum time to harvest dry Petit Manseng”, Joy Ting, WRE, The Grape Press Winter 2020

“2020 Petit Manseng Ripening”, presentation at Virginia Viticulture Association Virtual Meeting, Feb 26, 2020

Future Work:

With the continued support of the Virginia Wine Board, the WRE will continue to foster innovation through experimentation and education in the Virginia Wine Industry in 2021-2022.

Each year, we build on our experiences and findings to plan follow-up experiments as well as explore new topics. Several topics of study have already been proposed for 2021 based on findings from the 2020-2021 grant cycle. Several participants have expressed interest in further exploring the timing of tartaric acid additions to fine potassium from Petit Verdot prior to fermentation. Others have proposed more experiments using chitosan in ambient fermentations. Still others are interested in delving deeper into yeast nutrition.

In this 2020-2021 season, we increased the number of experimenters who included replication and repetition in their studies, and we will work to continue this practice. Seeing the same effect in multiple batches makes results more convincing and transferrable.

In 2020-2021 we shifted our sensory sessions from covering several topics to just one at a time due to the constraints of holding sessions virtually. In the coming season, whether we return to in-person sessions or continue to meet virtually, we plan to taste fewer experiments at any given session, allowing a fuller discussion of one or two topics.

It is also our hope that, as CDC and Virginia State guidelines continue to allow greater freedom, the Research Enologist can resume in-person visits with winemakers to cultivate new research ideas. Though virtual tools have been helpful to maintain communication in the past year, cellar visits are an excellent way to discern which areas of experimentation may be most impactful.

Final Budget and Justification:

Item Type	Original Awarded Amount	Final Amount Spent
Personnel	\$101,000.00	\$99,888.84
Fringe	\$0.00	\$0.00
Travel	\$9000.00	\$2,571.31
Supplies & Materials	\$8675.00	\$11,809.66
Contractual	\$44,475.00	\$25,670.01
Other	\$4000.00	\$396.06
Total	\$167,150	\$140,335.88

The main differences between planned and actual expenditures stem from restrictions put in

place due to COVID-19. The research enologist severely limited travel and utilized video conferencing and phone calls to correspond with participants. Though this was a good option when travel was not advised, in-person visits remain an important component of the work of the WRE, and will return in the next season. Several conferences (ASEV, Wine IQ, VVA, VWA) were either cancelled or converted to virtual formats, further limiting travel expenses. When sensory sessions were converted to all-virtual formats, costs shifted from host stipends (originally budgeted as \$5000 in host stipend) to shipping and supplies.

Table 1: 2020-2021 WRE Projects and Outcomes

Experimenter	Winery	Project
Kirsty Harmon	Blenheim	Developing a protocol for carbonic maceration in Merlot
Kirsty Harmon	Blenheim	Effect of Enhanced Alcohol through Chaptalization in Virginia Merlot
Kirsty Harmon	Blenheim	Effect of different fermentation temperature in Cab Franc
Kirsty Harmon	Blenheim	Effect of SO ₂ dosing on chemistry, sensory, and microbiology of barrel fermented Chardonnay
Kirsty Harmon	Blenheim	Use of early tartaric acid seeding to improve acid retention and sensory characteristics in Petit Verdot during aging
Michael Heny	Wineworks	Effect of Micro-oxygenation on reductive Cab Sauv
Michael Heny	Wineworks	Cofermentation of Mourvedre and Viognier to achieve a medium bodied, less tannic red wine
Michael Heny	Wineworks	Exploring nutrient strategies in barrel fermented white wine (Chardonnay) - to add or not to add?
Michael Heny	Wineworks	Exploring nutrient strategies in red wine fermentations – creating a nutrient desert
Theo Smith	Rappahannock	Skin contact vs. Stabulation for a fruit driven Chardonnay
Theo Smith	Rappahannock	Refining a protocol for stabulation: longer and colder vs. warmer and faster?
Ben and Maya	Early Mountain Vineyards	Harvesting Petit Manseng before and after the rain
Seth Chambers	Winery at laGrange	Use of non-Saccharomyces yeast <i>Torulaspora delbrueckii</i> (Biodiva, Scottlabs) to increase flavor complexity in Bordeaux reds (Merlot)

Seth Chambers Winery at laGrange

Use of non-Saccharomyces yeast *Torulaspora delbrueckii* (Biodiva,Scottlabs) to increase flavor complexity in Bordeaux reds (Cab Sauv)

Dropped

Seth Chambers	Winery at laGrange	Use of non-Saccharomyces yeast <i>Torulaspora delbrueckii</i> (Biodiva,Scottlabs) to increase flavor complexity in Bordeaux reds (Cab Franc)
Rick Tagg	Delaplane	Comparison of in-vineyard sorting and post-harvest (crushpad) sorting: is it worth all the time?
Rick Tagg	Delaplane	Does use of specialized nutrient (Stimula Chardonnay) increase fruit expression (and product differentiation) in barrel fermented Chardonnay?
Ben and Maya	Early Mountain Vineyards	Comparing fast/warm start to cool/slow start for whole cluster fermentation of red grapes (Cab Franc or Merlot)
Danielle	Barboursville	Reducing SO ₂ at crush with the non-Saccharomyces yeast BioNature (Lamothe Albeit) in Cabernet Franc and Petit Verdot
Lee Hartman	Bluestone	Does malolactic fermentation in Petit Manseng lead to a more balanced dry table wine?
Lee Hartman	Bluestone	Effect of post-malolactic racking of red wine on tannin evolution, fruit intensity, and microbial load
Mark Misch	Ingleside	Does use of chitosan at crush reduce protein instability in Pinot Gris?
Mark Misch	Ingleside	Effect of enhanced alcohol through Chaptalization in Virginia Cabernet Sauvignon
Matthieu Finot	King Family	Effect of enhanced alcohol through Chaptalization in Virginia Cabernet Sauvignon
Matthieu Finot	King Family	Using cold stabilization of red wine press fraction to reduce K ⁺ and pH during aging

Matthieu Finot King Family Using chitosan to achieve a clean ambient fermentation of

Sauvignon Blanc Sensory Session

Matthieu Finot	King Family	How does adding malic acid to acid additions affect chemical and sensory qualities of red wines?
Nate Walsh	Walsh Family Wine	Effects of fermentation temperature in Chardonnay
Nate Walsh	Walsh Family Wine	Clonal Studies in Cabernet Franc (327 and 312)
Nate Walsh	Walsh Family Wine	Clonal studies in Merlot (181 & 348)
Nate Walsh	Walsh Family Wine	Exploring the effects of stabulation in Sauvignon Blanc
Phil Ponton	Oakencroft	Exploring wine style through cofermentation of Chamborucini and Vidal
Tim Gorman	Cardinal Point	Application of King Family whole cluster protocol to Cardinal Point Cabernet Franc
Todd Henkle	Lost Creek	Strategies to minimize spoilage in ambient fermentations (chitosan, cold soak)
Todd Henkle	Lost Creek	Strategies to minimize spoilage in ambient fermentations (CO ₂ vs Dry Ice)
Todd Henkle	Lost Creek	Inoculated vs. Ambient Fermentation in reds
Emily Pelton	Veritas	Assessing optimal grape maturity in red varieties using in-house phenolic monitoring
Jake Busching	Hark	Microdosing tannin to prevent oxidation during topping in reds
Matthew Meyer	Williamsburg Winery	Della Toffola Maceration Accelerator
Emily Pelton	Veritas	Exploration of acid depletion during ripening in Petit Manseng

Nate Walsh/Ben

Sedlins Walsh Family Wine Exploration of acid depletion during ripening in Petit Manseng Data

only

Seth Chambers	Winery at La Grange	Exploration of acid depletion during ripening in Petit Manser
Tim Jordan	Mount Airy Winegrowers	Exploration of acid depletion during ripening in Petit Manser
Various	All red wine experiments/Sentin el vineyards	Monitoring tartaric:malic acid ratios in Virginia grapes
Matthieu Finot	King Family	Using specialized nutrient (Lamothe Albeit Opti Esters) to increase floral and stonefruit character in Viognier
Matthieu Finot	King Family	Exploring effects of additional ethanol level through chaptalization in Chardonnay
Matthieu Finot	King Family	Assessing optimal grape maturity in red varieties using in-house phenolic monitoring
Carl DiManno	868 Estate	Using ultrafiltration for wine concentration post-fermentation, comparison with saignee (CF)
Carl DiManno	868 Estate	Comparing ultrafiltered vs. non-concentrated wine (CF)
Theo Smith	Rappahannock	Effect of Cinn Free vs. Bentonite on sour rot infected fruit
Matthieu Finot	King Family	Effect of malolactic fermentation in sparkling wine base
Dawn Stein	Doukenie	Whole cluster fermentation in Syrah
Phil Fassieux	Whitehall, Stinson, Hark	SO2 measurement methods

Table 2: 2020-2021 WRE Virtual Sensory Sessions

Date	Session topic(s)	RSVP	Sensory Responses	You Tube views
2/4/21	Cofermentation	43	34	32
2/11/21	Stabulation and Micro-oxygenation	36	23	64
2/25/21	Virginia Viticulture Association			

3/4/21	Whole Cluster Fermentation/Carbonic maceration	42 + 8 with no wine	36	33
3/18/21	Yeast Nutrition	44 + 8 with no wine	32	40
4/1/21	Managing Acidity in Sparkling Wine Base	41	26	17
4/15/21	SO2 Measurement and Management	46	24	16
4/29/21	Chaptalization	37	25	23
5/13/21	Non-inoculated Fermentations	29	16	
6/3/21	Managing Potassium in Petit Verdot	37	Pending	