Virginia Wine Board
Grant Report Template

1.0 INSTRUCTIONS

Use this grant report template to communicate progress on your project objectives to the Virginia Wine Board and its administrative agents.

This simplified form focuses attention on the intended and achieved results of the project, including how project results are separately shared with their intended beneficiaries. This report is not the place for a detailed technical discussion of research methodology or results.

- During the proposal stage, applicants complete the first (WHITE) sections to summarize the project's objectives, deliverables, and intended impact plus planned communication to stakeholders.
- At the midpoint of the project (December 1, due December 15), Research and Education grantees complete the center (GRAY) sections to note progress as well as expenditures to date.
- Finally, upon project conclusion (May 31, due June 30), all grantees complete the final (BLUE) sections to describe the project's results and communication, as well as the final expenditures.

2.0 GRANTEE INFORMATION

Project Title	*Tannins, anthocyanins, and other polyphenols in Virginia Cabernet Franc wines*			
Organization	Virginia Tech			
Proposal # *(if needed)*		Award # *(if needed)*		
Project Lead		Mailing Address	Research	◊
Name	Dennis Cladis	1981 Kraft Dr.	Education	◊
Title	Assistant Professor	Blacksburg, VA 24060	Marketing	◊
Email	dcladis@vt.edu		Continuing?	◊
Phone	(540) 231-5208		Year	_ of _

3.0 PROJECT OBJECTIVE, PROGRESS, AND IMPACT

3.1 PROPOSAL (February)

Summarize the project objective, the intended deliverable or result, and expected impact. (1-5 sentences or bullets)

- Objective: systematically survey tannins, anthocyanins, and other polyphenols in Virginia Cabernet Franc finished wines. All regions of Virginia will be represented proportionally to their overall Cabernet Franc production.
- Result: Establishment of average and range of tannins, anthocyanins, and other polyphenols across Virginia Cabernet Franc wines.
- Impact 1: Build capacity of Cladis lab at Virginia Tech as a local service center to serve future needs of Virginia winemakers.
- Impact 2: Elevate Virginia wine industry's prominence, prestige, and market share based on unique terroir of Virginia Cabernet Franc.
- Deliverables: Results provided directly to winemakers on their wines; summary metrics by vintage and region available to Virginia wine producers, scientific journal article publication; training of a graduate student; presentation at future VVA meeting

Summarize the project's workplan (1-5 sentences or bullets)

- Summer 2024: Sample collection
- Fall/Winter 2024-25: Sample analysis
- Spring/Summer 2025: Data analysis and dissemination/publication

How will you know your project has been successful? What project indicators will measure progress or success? (1-5 sentences or bullets)

- Collection and analysis of ~100 Virginia Cabernet Franc wines from 2019, 2020, and 2021 vintages.
- Establishment and validation of capacity for in-state phenolic measurement through the Cladis lab
- Results disseminated directly to wineries participating in the study and summary metrics disseminated to stakeholders via publications/presentations.

3.2 Mid-Year Report (December)—Research and Education Grants only

Provide project indicator status information. Describe project/workplan progress. Include any obstacles the project has encountered and the plan to overcome them.

- Methods have been developed and validated with Cab Franc in Cladis lab for detection of phenolics using the following assays:
    - Total tannins (MCP assay)
    - Total monomeric anthocyanins (TMA assay)
    - Total polymeric anthocyanins (bisulfite bleaching assay)
    - Total polyphenols (Folin assay)
    - Individual polyphenols (gallic acid, catechin, epicatechin, resveratrol, quercetin, quercetin glycosides, malvidin glycosides, cyanidin glycosides via LC-MS/MS)
- First wines have been collected (~30 samples)
- Project obstacle and solution – Locating 2019, 2020, and 2021 Cabernet Franc finished wines that are > 95% CF from Virginia wineries is very restrictive and makes it challenging to identify enough wines to test. We are lowering this threshold to 90% (and will consider lowering it further, if necessary) to increase the total number of samples collected. For each bottle collected, we will record the % CF used to make the wine. Because CF wines sold in VA must be > 75% CF to be labeled CF, we believe using a lower threshold is still relevant to the VA market. However, we will still prioritize CF wines with > 95% CF in our collection efforts.

<u>May 2025 progress update</u>

- A total of 87 samples have been collected, including 80 from Virginia wine makers and 7 from other regions of the world. Finished wines span 2019-2023 vintages and are being analyzed for the endpoints listed above.
- Sample analysis is ~2/3 complete. Thus far, we are observing significant differences in anthocyanins across different vintage years in Virginia. Total phenolics and tannins show some variance due to region and vintage year, though these patterns are still being analyzed.
- We anticipate analyses will be completed by the end of August, 2025.

3.3 Final Report (June)

Compare the project to the objective, workplan, and project indicators. Provide (as a link or attachment) the project deliverable or result. Describe the realized or expected impact of the project.

- Our objective was successfully completed, as 87 finished Cab Franc wines were collected, including 80 from Virginia and 7 out of state comparators. Vintages spanned 2019-2023.

Key takeaways

- Vintage was more important than region when comparing phenolic content of Cabernet Franc wines.
- Significant differences in total phenolic content were found in wines from 2019 and 2023 (highest values) and 2020 and 2022 (lowest values) with 2021 wines displaying intermediate values. Tannin concentration from 2019 was significantly higher than the other vintages tested.
- There were no significant differences in the concentration of phenolic compounds by region within Virginia or when compared to wines from other countries.

Impacts

- The Cladis lab has established phenolic testing capacity and is leveraging this capacity for a new VWB project.
- There were 46 different winemakers that submitted samples for this project. Results will be shared with a subset of winemakers in person as Dr. Ting does post-harvest site visits. Any winemakers not included in those visits will be contacted by email. Dr. Ting will be mindful of the heavy workload winemakers have during and after harvest, and wait until winemakers are able to focus on non-immediate workflows before contacting them. We would estimate all winemakers will have been contacted by early December.
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4.0 COMMUNICATION WITH STAKEHOLDERS

4.1 PROPOSAL (February)

Summarize how you will share project information or results. For example, will you submit for publication in a peer reviewed journal? Present at a technical conference? Conduct a training? Post on a site? Identify the specific audience/s you will inform. (1-5 sentences or bullets)

- Participating wineries will receive the results of their wines directly from the researchers along with a brief interpretation of the data.
- Collated results will be published in a peer-reviewed scientific journal, presented at a future VVA meeting, and potentially posted on the VWB and/or VWRE website(s).
- Target audiences: Virginia winemakers and broader scientific community
- Future efforts: Coordinate with Virginia winemakers to build upon this initial study by examining the effects of different variables across the vine-to-bottle winemaking process (e.g., soil types, fermentation practices, etc.).

4.2 Mid-Year Report (December)—Research and Education Grants Only

Describe communication with stakeholders to date. Note dates and locations of events or publications, as available/relevant.

- Currently, we are in the sample collection phase of the project. Dr. Ting is working with her network to collect wines for analysis in this project. As wines are collected, the Cladis lab is

analyzing them. Sample analysis should be completed in the spring, and results disseminated to winemakers by summer.

May 2025 update

- Sample collection is complete and analysis is underway. Once analysis is complete, data will be summarized and provided to all participating winemakers, including the average and range for all VA wines as well as the data specific to the wines provided by the winemaker.

4.3 Final Report (June)

Describe how the technical or material content of the project was or is planned to be shared with stakeholders or beneficiaries. List title, date, type (article, brochure, presentation, or other), purpose, and estimated audience reached. Provide a copy or link if (when) available for inclusion on the virginiawine.org site.

Deliverables

- Dr. Ting has been working with Muheng Li, the graduate student on this project, to prepare summary graphs to best communicate results with wine producers in language they can understand. That asset is nearly finished. When ready, it will be posted as an "extension-style" publication on the WRE website and featured in a WRE newsletter. The current subscription list for WRE newsletters includes 578 subscribers with an average open rate of 50-60%, meaning that WRE currently has the most impactful method for reaching winemakers in Virginia. These data will also be shared, along with individual data, with any winemaker that submitted wine (46 different producers), and integrated into WRE data analysis of current and future projects related to phenolics. Ms. Li is currently preparing a manuscript for scientific publication that will serve as a reference for winemakers that desire more in-depth information. Because this project is an enology question rather than a viticulture one, VT Extension publications and VVA WTM may not be the target audiences, though we may present in these venues if invited.
- Preliminary results were presented at a national food science conference in July 2025 (IFT FIRST, Chicago, IL). The poster title was "Tannins, anthocyanins, and other Polyphenols in Virginia Cabernet Franc finished wines". A scientific journal article is currently in preparation. Results may also be shared at VVA and/or AVA meetings in 2026. It often takes at least 1 year beyond when the lab work and initial data analyses are completed to get any scientific study published.

Challenges with 1 year timeline and effectively disseminating work to stakeholders

- The initial project timeline was ambitious given the scope of work. Developing and validating the analytical methodology, processing all samples, and training a new graduate student required more time than anticipated. As part of the student's academic development, preparation and presentation of a research poster were prioritized to fulfill program requirements and strengthen technical communication skills. Once the data were complete and ready for industry communication, the timing coincided with the start of harvest, a period when most winemakers are unable to engage with research materials. Because the findings were not time-sensitive, we elected to delay outreach until after harvest to ensure the information would receive appropriate attention and have greater impact.

5.0 BUDGET

Budget Summary			Mid-Year Research/Education only		Final	
Expense Category	**5.1 Requested**	**5.2 Awarded**	**5.3 Spent***	**5.4 Remaining***	**5.5 Spent**	**5.6 Remaining**
Personnel	$17,783	$17,783	$17,243.35	$539.65	$19992.35	($2209.35)
Fringe Benefits	$1,582	$1,582	$1591.82	($9.82)	$1854.07	($272.07)
Travel	$0	$0	$0	$0	$0	$0
Equipment (Rental)	$0	$0	$0	$0	$0	$0
Supplies	$8,000	$8,000	$2,987	$5,013	$7556.14	$443.86
Contractual	$4,000	$4,000	$2131.94	$1868.06	$2131.94	$1868.06
Other	$8,485	$8,485	$8315.50	$169.50	$8315.50	$169.50
Total	$39,850	$39,850	$35,991.98	$3,530.60	$39,850	$0

*As of 5/30/25