NYWGF RESEARCH - FINAL REPORT

Funding for fiscal year: 2022-2023

SECTION 1:

Project title: Hybrid Red Wine Color: Consumer Perception and Hydrolysable Tannin Stabilization

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New Research ☒ **Continued Research** ☐

Amount Funded **$** 22,277

SECTION 2:

Project Summary Impact Statement: Anecdotal evidence suggests that wines made from hybrid red grape cultivars have different colors than traditional *V. vinifera* wines, because *V. vinifera* grapes almost exclusively contain anthocyanin monoglucosides, whereas non-*vinifera* and hybrid grapes contain a mixture of both anthocyanin monoglucosides and diglucosides. Diglucosides are less reactive, less colored at wine pH, and have a greater tendency to brown than their monoglucoside counterparts. Some hybrid cultivars also contain high proportions of anthocyanins other than malvidin-3-glucoside, which is the major anthocyanin in *V. vinifera* cultivars. Monoglucoside anthocyanins have a greater capacity to change color and are more reactive than diglucosides, which undergo slower and less polymeric pigment formation than their monoglycosylated counterparts. Wine grape breeders and winemakers have expressed strong concerns about customer rejection of red wines with 'non-vinifera-like' color, but to date no consumer sensory studies had been performed. Assessing consumer perception of color and quality in red hybrid wines will either relieve fears of rejection or provide a starting point for additional evaluation.

Objective: To evaluate consumer sensory perception of color of regional interspecific hybrid wines and its effect on perception of quality.

Materials & Methods: A sensory panel was recruited to assess consumer perception of color in 8 commercial wines (Maréchal Foch, Corot noir, Norton, Marquette, St. Croix, plus Pinot noir from New York, Burgundy, and Oregon). Wines produced with minimal neutral oak aging were sourced from the 2020 vintage to replicate a typical consumer experience of a monovarietal wine. The sensory study was concurrent to chemical analyses for color characteristics to correlate perception of color characteristics to overall liking.

Wine Color Perceptions: Eighty-six consumers prescreened for regular wine consumption assessed wines on a hedonic 9-point scale for liking of hue, color intensity, and overall

appearance. They also rated 'expected liking' based on all attributes prior to smelling and tasting the wine, then rated 'actual liking' following wine evaluation, each on a hedonic 9-point scale. After tasting, panelists answered a questionnaire about their use of color attributes to gauge quality. Evaluations were performed at the Cornell Sensory Evaluation Center in Ithaca, using individual booths lit with standard fluorescent lighting and using RedJade® Sensory Software Suite (RedJade®, Redwood Shores, CA, USA) to collect panelist responses. Sample orders were counterbalanced for each panelist and labeled with randomized three-digit codes.

Color Analyses: Duplicate color measurements were taken via CIE-L*a*b* performed on a Hunter Labs Colorimeter, UltraScan VIS (Reston, VA) with EasyMatch® QC software to analyze of the data and calculate ΔE (total perceivable color difference).

Results/Outcomes/Next Steps: Sensory evaluation suggested that panelists do not differentiate between the hue of wine color (defined as the perceived color of the wine) and intensity (defined as the strength or weakness of the color), and that overall appearance liking correlates with both measures. Further, panelists' overall liking of appearance correlated with their expected liking of each wine. Despite not consciously using color intensity, panelists generally liked the appearance of more intensely-colored wines best, and expected to like them more than lighter-colored wines. Further, 'non-*vinifera*' color did not predict perceived liking, as the Maréchal Foch, Marquette, and St. Croix were ranked as highly as French and Oregon Pinot noir, and higher than New York Pinot noir. Once panelists were able to taste and smell the wine, actual liking was an average of 1.5 points lower than expected liking for all wines except New York Pinot noir. About 50% of panelists indicated that they always used visual color inspection to assess their potential for liking a wine. These results suggest that variance from typical *V. vinifera* wine color is not a perceived quality issue for red wine consumers, but that sensory characteristics other than color (aroma and taste) ultimately determine consumer liking.

Technology Transfer Plan: The sensory portion of this study was presented to an audience of 98 industry members and researchers at the annual meeting of the American Society of Enology and Viticulture, Eastern Section, in Minneapolis in July 2022, and a paper is being prepared for submission to the American Journal of Enology and Viticulture. Once data from the survey portion of the work is analyzed, a presentation will be prepared for BEV-NY 2024 concurrent to release of a digital bulletin.

Attachments: see below.

SECTION 3:

Project summary and objectives: Anecdotal evidence suggests that wines made from hybrid red grape cultivars have different colors than traditional *V. vinifera* wines, because hybrid grapes have different, and different-colored, pigments. Wine grape breeders and winemakers have expressed strong concerns about customer rejection of red wines with 'non-vinifera-like' color, but to date no consumer sensory studies had been performed. This study assessed consumer perception of color and quality in red hybrid wines with the hope of either relieving fears of consumer rejection or providing a starting point for additional evaluation.

Importance of research to the NY wine industry: Wines made from hybrid grapes form an important segment of the New York wine market, and are often more sustainable and climate-resilient than traditional European wine grapes. Evidence that consumers are unfazed by non-*vinifera* red wine color should ease one concern that some producers have about the perceived quality of wines produced from interspecific hybrid wine grapes.

Project Results/next steps: Consumers showed no preference for the color of red wine produced from *V. vinifera*, but rather generally preferred wines with darker color than lighter. While about 50% of consumers reported that they use visual color to predict how much they'll like a wine, their actual enjoyment after tasting and smelling is poorly predicted by this assessment. While darker colored wines may be more appealing to someone who hasn't tasted it, repeat sales will likely depend on smell and taste.

Supporting attachments:

Figure 1. Consumer wine color preference ranked from least to most liked (top to bottom) with visual reproduction of wine colors as measured by CIE-L*a*b* spectrometry. Wines below the yellow line showed average liking above 6pts on a 9pt scale.