

Warren J. Baker Endowment

for Excellence in Project-Based Learning

Robert D. Koob Endowment for Student Success



FINAL REPORT

Final reports will be published on the Cal Poly Digital Commons website(<http://digitalcommons.calpoly.edu>).

I. **Project Title**

Sensory Evaluation of Pinot noir Wines Subjected to Crop Reductions During the Growing Season

II. **Project Completion Date**

December 2018

III. **Student(s), Department(s), and Major(s)**

(1) Vegas Riffle, Agriculture and Environmental Plant Science, Fruit and Crop Science

(2) Claire Villasenor, Wine and Viticulture, Viticulture

IV. **Faculty Advisor and Department**

Dr. Jean Dodson Peterson, Wine and Viticulture Department

Dr. Federico Casassa, Wine and Viticulture Department

V. **Cooperating Industry, Agency, Non-Profit, or University Organization(s)**

Chamisal Vineyards, California Polytechnic State University

VI. **Executive Summary**

Cluster thinning, a method of crop load reduction, is anecdotally considered to improve the sensory and chemical aspects of wines through the manipulation of vine source-sink relations. This management technique is used widely across various regions and cultivars. Studies examining cluster thinning have historically varied greatly as a function of region and cultivar. Additionally, the majority of cluster thinning research has primarily been done in the warmer growing regions of California's North Coast where production focuses on Cabernet Sauvignon.

Unfortunately, Pinot noir is the primary production focus in much of California's Central Coast. Compared to Cabernet Sauvignon, Pinot noir has a lower concentration of polyphenols responsible for the color and mouthfeel. Therefore, it is inappropriate to consider the majority of cluster thinning studies applicable to the Central Coast or to Pinot noir. Despite this, growers in California's Central Coast have continued to

implement this practice into seasonal vine management.

The purpose of this study was to evaluate the relationship between the timing of crop level reductions on the chemical composition of wine and berry composition in *Vitis vinifera* L. cv. Pinot noir with specific attention given to the effects of thinning on wine sensory.

In this study, cluster thinning was implemented in Pinot noir clone 667, grafted on rootstock SO4 (*V. berlandieri* x *V. riparia*). This study took place in a commercial vineyard in California's Central Coast, in the Enda Valley American Viticulture Area (AVA). Crop reduction of 50% was applied to Pinot noir at four stages during fruit development (Bloom, 4 weeks post-bloom, 8 weeks post-bloom, and 12 weeks post-bloom). All other vineyard management techniques were held to industry standard and kept consistent throughout treatments. Each treatment consisted of five, 100-vine replicates that were randomly distributed throughout the vineyard. The vine rows ran East to West and were on 8 ft. x 4 ft. (vine x row) spacing.

Fruit from each vineyard replicate was hand-harvested when the vineyard sampled at commercial ripeness (22.5 ± 0.5 Brix), destemmed, and independently made into wine at an experimental scale (60 L fermenters, $n = 3$). At pressing, wine chemistry, phenolics and color were measured. The juice was destemmed and inoculated with a commercial yeast strain and fermented.

For the sensory panel, 12 panelists were trained over the course of five weeks. They were exposed to the experimental wines, asked to determine the tastes and aromas in the wines, and then using standards for those tastes and aromas, calibrated their ratings using a 10cm unstructured line scale. Once they completed training, a descriptive analysis method was used to finalize the results of the experimental wine tastes and aroma profiles.

VII. Major Accomplishments

- (1) Designed (sensory component) and maintained (vineyard component) experiment which resulted in statistically significant findings.
- (2) Trained panelists for a sensory analysis of the wines over the course of five weeks.
- (3) Performed descriptive analysis with a trained sensory panel and determined the effects of cluster thinning on wine quality.
- (4) Analysis of non-structural carbohydrates of thinning vines. Data currently being analyzed.

VIII. Expenditure of Funds

Total funds allocated to this project was \$5,000. This included student travel for conferences (registration, lodging, food and mileage) and operating expenses (enzymatic kit, oven drying, sensory standards and laboratory consumables). Student researchers received additional Department funding, so not all Baker Koob funds were exhausted.

Black Wine Glasses	\$902.04
Student Conference Registration	\$65.00
Precision Drying Oven	\$2101.73

IX. Impact on Student Learning

This experiment allowed undergraduate student researchers to have hands on experience with a largescale research project and sensory panel. The students were tasked with all components of maintaining the trial: implementation of treatments, working with industry professionals, collection of data, analysis of data, training of the sensory panelists, conduction of the sensory trial, writing and presentation of the project's findings. Student traveled to American Society of Enology and Viticulture with the project PIs and graduate student. Through management of the experiment's responsibilities, the students gained valuable knowledge in this field of study that is applicable to many other courses in this major. Of the two students on this project, one has used this experience as a catalyst for her graduate school application.