

## ELUCIDATING CONTRIBUTIONS BY VINEYARD SITE ON VOLATILE AROMA CHARACTERISTICS OF PINOT NOIR WINES

Ron Runnebaum<sup>1\*</sup>

<sup>1</sup>*Department of Viticulture & Enology and Department of Chemical Engineering & Materials Science, University of California-Davis, California, USA*

*\*Corresponding author: Runnebaum. E-mail: rcrunnebaum@ucdavis.edu*

### **Abstract**

Correlations between vineyard site and wine have, historically, been limited due to lack of uniformity in scion and rootstock clone and lack of controlled pilot-scale winemaking conditions, particularly temperature. Our work aims to minimize these sources of variation by using a single combination of scion and rootstock. In addition, we maintain highly controlled fermentation conditions by using automated 200 L fermentation vessels at the UC Davis Teaching and Research Winery. Grape clusters were hand-harvested from 10 vineyards comprising the same combination of scion clone, Pinot noir clone 667, and rootstock clone, 101-14 Mgt. The vineyards were located from as far south as Santa Maria, CA, USA to as far north as Mendocino, CA, USA (a distance of more than 650 km). American Viticultural Areas (AVAs) represented in this work include Santa Maria Valley, Arroyo Seco, Carneros, Sonoma Coast, Russian River Valley, and Mendocino. Because of the location of this conference, data will also be shared characterizing two wines made from the Willamette Valley AVA from the same Pinot noir clone 667 but on a different rootstock clone. The fruit from each vineyard was destemmed into the fermentation vessels and inoculated with the same strain of *Saccharomyces cerevisiae* yeast. These vessels offer a high degree of automated temperature control, facilitating relatively uniform fermentations across vineyard replicates and across vineyards. After primary fermentation, wines were inoculated with the same strain of malolactic bacteria. Upon completion of MLF, wines samples were obtained for analytical characterization.

In this presentation, we will share data characterizing wine volatile compounds by using an automated headspace solid-phase microextraction (HS-SPME) gas chromatography–mass spectrometry (GC-MS) method combined with synchronous selected ion monitoring (SIM)/scan detection. The chemical data were analyzed using an analysis of variance (ANOVA) measuring for the effects of vineyard. 45 volatile compounds were identified that significantly differentiated the wines. The compounds included terpenes, esters, norisoprenoids, organic acids, aldehydes, and alcohols. Principal component analysis (PCA) was used to characterize individual vineyards using only significant volatile compounds. AVAs were generally separated by their volatile compound profile, however, some vineyard locations within an AVA led to dramatically different volatile aroma profiles, suggesting that factors such as unique microclimates or soil conditions may have an effect. These details will be explored in future work as will the consistency of volatile compounds from these sites in subsequent vintages.

**Keywords:** *Terroir, wine, Pinot Noir, aroma compounds*