



Characterization of berry softening and sugar accumulation dynamics in a slow-ripening genotype and its response to abscisic acid treatments

Pietro Previtali^{1*}, Kenneth Shackel², [Peter Cousins](#)¹, Nick Dokoozlian¹

¹ Winegrowing Research, E. & J. Gallo Winery, Modesto, 95354 CA

² Department of Plant Sciences, University of California Davis, Davis, 95616 CA

*Corresponding author: Pietro.Previtali@ejgallo.com

Abstract (250 words)

In the current viticultural context, global warming leads to advanced and possibly accelerated ripening which can alter the balance among desirable grape quality traits sought for winemaking. Evaluation of genetic material that displays delayed and/or slower ripening could uncover a potential “slow ripening” trait for incorporation into commercial varieties through breeding. In this study, we evaluated a white-fruited selection discovered in the Grape Breeding and Genetics program at E. & J. Gallo Winery that displayed an unusual ripening pattern compared to standard varieties. Vines of the slow-ripening selection did not differ in their visual appearance, water status or gas exchange characteristics compared to vines of its normal-ripening sibling. Sugar accumulation, berry growth and berry firmness were monitored weekly during ripening for two consecutive years to characterize differences in fruit maturation rate between the selections. Compared to the normal-ripening selection, the slow-ripening selection exhibited a 30-day delay in the onset of ripening and required longer to complete veraison, resulting in an extended lag phase. This was confirmed by berry firmness measurements, which revealed that berry softening was delayed and occurred at a reduced rate in the slow ripening selection. Exogenous abscisic acid treatments partially restored normal rates of ripening, but timing and dosage effects were observed. In this attempt to explore the slow ripening trait of grapes we discovered a possible imbalance in the hormone pool thought responsible for the onset of ripening. Further investigations are required to fully characterize and quantify this trait.

Keywords: berry softening, climate change, slow ripening, sugar accumulation, veraison.