

Yield formation and grape composition: more than meets the eye

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Abstract

Fruit quality in grapes is not well defined but is often depicted as correlating inversely with crop yield. Both fruit yield and composition, however, are made from distinct components that interact in complex ways. Reproductive growth of grapevines extends over two growing seasons. Inflorescences initiated in buds during the previous year differentiate flowers and set and develop berries during the harvest year. Compensation mechanisms ensure that changing one yield component typically results in a less than proportional change in yield. For example, reducing the number of berries per vine may increase berry size. Nevertheless, warm temperatures and ample water during budbreak or bloom will increase both the number and size of berries, and increase or decrease berry sugar while decreasing acidity. Moreover, the time of fruit set and the number of seeds, rather than yield, may drive the time of ripening onset. By that time, berry size is effectively predetermined and can no longer be manipulated by cultural practices. Ripening starts with berry softening and is followed by sugar accumulation, acid breakdown and, finally, anthocyanin accumulation in dark-skinned grapes. Like yield components, these processes can be modified by altering the size and density of the canopy, which changes the fruit-zone microclimate. Unlike vegetative and reproductive growth, fruit composition is much more responsive to temperature than to water supply. This presentation will give an overview of yield formation and grape ripening, and discuss some key environmental and viticultural factors that lead to differences in harvest yield and fruit composition.

Keywords: grapevine, yield components, water stress, temperature, *Vitis*