

## Vine Balance

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### Vine Balance Principles:

The term “vine balance” refers to the balance between a grapevines vegetative and reproductive growth. Too much vegetation leads to shaded canopies and unripe / poor quality fruit; too much fruit leads to unripe fruit and a weakened vine. Understanding the principle of vine balance and how to use vineyard management practices to achieve and maintain vine balance are some of the most important factors in producing high quality wines.

The concept of vine balance was first conceived by Newton Partridge. Nelson Shaulis later expanded on the concept and better defined what was meant by “balance”. Shaulis showed that opening the canopies of Concord grapevines created more fruitful buds the following season. Additionally, he showed that vigorous vines could carry more crop, and better mature that crop, when vines were balanced and canopy density reduced so fruit was exposed to sunlight. A Key concept – part of vine “balance” has to do with canopy density or the number of shoots per unit row length and number of leaf layers.

Winkler et al. discuss at some length the relationship between vine vegetative growth and yield and suggest the goal of the grower is to achieve a “proper balance” between the two in order to maximize both yield and fruit quality.

Richard Smart (a student under Shaulis) went to first-growth vineyards in Bordeaux and Burgundy and measured vine canopy metrics: leaf layer number, leaf size, shoots per unit row length, shoot length, percent fruit exposure and canopy gaps. He also measured vines in vineyards that were not rated first growth. He demonstrated that the best vineyards had vine metrics that were indicative of balanced vines – short internodes, small leaves, few laterals, 4 to 5 shoots or less per foot row length, shoots 1.5 meters in length or less, a high percentage of exposed fruit, gaps in the canopy, a fruit yield to pruning weight ratio of 5 to 10 and 1.5 leaf layers or less. Vines in vineyards that produced fruit of lower quality had longer shoots, larger leaves, fewer canopy gaps, more leaf layers and less-exposed fruit or fruit that was shaded in the vine canopy interior.

Based on these and other data, Smart developed a manual of vineyard Quality Assurance practices that he published as “Sunlight Into Wine”. It is still the foundation for Vineyard Best Practices used today. Every viticulturist should either own the book or understand the concepts outlined by Smart and how to use them in vineyard management.

In order to grow balanced vines one must first evaluate the growth potential of a given vineyard site. Macro climate effects describe the general growing region: growing season length, heat

accumulation, rainfall amount, frequency and distribution, day length and sunlight intensity combine to determine the growth potential of a region. Meso-climate factors describe those variables which affect a particular vineyard site. Slope, aspect, soil type, water holding capacity, cation exchange potential effect vine growth directly. A careful evaluation of macro and meso-climate variables will guide the decision making process for choice of rootstock, vine spacing and trellis type. Correct vine spacing and trellising in a given environment will produce vine canopy micro-climates conducive to the production of high quality fruit.

Row spacing and trellis type ultimately determine the exposed leaf surface area of the vineyard which determines crop potential. A properly designed vineyard will produce balanced vines that require less canopy management intervention and relatively good yields of high quality fruit. The key is in the design – variety choice for the macro-climate, rootstock, vine spacing and a careful and honest assessment of exposed leaf area based on trellis type will guide decisions in crop adjustment.

A grapevine idiootype is a description of a hypothetical “perfect” vine in terms of shoot length, leaf size, percent exposed fruit, number of laterals, shoots per unit row length, cane prunings per unit row length, buds per unit pruning weight and other metrics. We will discuss a grapevine idiootype, how to monitor your vineyard and steps that can be taken to manage vine canopies. Shoot thinning, hedging and leaf removal are widely used tools to produce a grapevine canopy environment where fruit is exposed along with sufficient leaf area to mature the crop.

#### References:

Winkler, A.J., J.A. Cook, W.M. Kliewer, L.A. Lider. General Viticulture. 1974. 710 pp. University of California Press.