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"Effect of rachis position on size and maturity of Cabernet Sauvignon berries"

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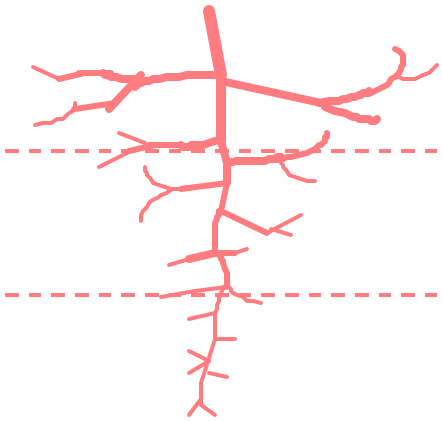
• Using traditional "sugar sampling" techniques, growers and winemakers try to estimate the °Brix of a whole field based on a few berries or a few clusters. According to these authors, the accuracy of these estimates would be significantly improved if we had a clearer understanding of which berries in each cluster yield °Brix readings closest to the actual °Brix of the entire cluster.

• To explore that question, the authors started by randomly selecting 30 vines - 5 from each of 6 rows- in a block of Cabernet in Napa, California. Then, they sampled 5 clusters from each vine. To determine which 5 clusters to pick, they used an elastic band that could be stretched to the length of a cordon that had 5 equidistant marks in it (called *Gaussian nodes*). They selected the cluster (only clusters containing more than 15 berries) closest to each mark on the band as their sample. They also alternated cordon sides.

• For the *berry weight analysis*, the authors weighed each cluster, including the bottom berry that they had separated from each cluster, and then counted the number of berries on each cluster. For the *berry °Brix analysis*, they dissected the clusters in three, that is, they separated the berries into 3 regions depending on their position in the cluster: top, middle, and bottom. Then they measured the °Brix of 4 berries in each region, as well as the °Brix of the entire cluster. The few clusters that were too small to be divided in three were discarded. Cluster wings were also excluded from the analysis.



• **Berry weight**. When the authors calculated "the difference between the cluster average berry weight and the weight of that cluster's bottom berry", its distribution departed significantly from zero. That is, **the bottom berry did not weigh the same as the average cluster berry.**

• **Berry °Brix**. The authors calculated three variables: "top berry °Brix minus cluster average °Brix", "middle berry °Brix minus cluster average °Brix" and "bottom berry °Brix minus cluster average °Brix". The distributions of the first two were as expected (the difference fluctuated around zero), but the distribution of the third variable showed a significant deviation from zero - and towards positive values. In other words, **the bottom berries had significantly higher °Brix than the overall cluster.**

• The traditional viticultural concept holds that the berries with the highest °Brix in a cluster are the shoulder berries, followed by mid-cluster berries, and the lowest °Brix berries are at the tip. This is what a 1975 study found with Thompson seedless clusters in which, of 14 vineyards studied, only one had a "tip °Brix" greater than the "shoulder °Brix". In that work, several variables were compared (multivariate analysis), whereas in the current work, only one variable, which was actually the difference of two, was studied (univariate analysis). By using paired measurements that allow for univariate analysis, statistical power is greatly improved.

These authors find that the bottom berries in a cluster have significantly higher °Brix than the whole-cluster average. Thus, they recommend that sugar sampling be confined to the top region of a cluster - if it must be a berry sample, rather than a cluster sample. While middle berries may, in their opinion, also give an accurate reading, the bottom of the cluster should be avoided. Since their results contradict some previous data, they point out further research is needed to explore whether the relationship they found is consistent across varieties, seasons, and growing regions.

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