# A functional association in *Vitis vinifera* L. cv. Cabernet Sauvignon between the extent of primary branching and the number of flowers formed per inflorescence

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• Botanically, the conical inflorescences of grapevines are considered a *panicle*, that is, a main axis –the rachis- which carries side branches that themselves branch and look like small bunches. In some cases, the branch closest to the stalk –the "outer arm" or "wing"- is so large that it is considered another cluster, whereas in some others the wing is missing all together.

• As we know, the inflorescences that will produce any year's grape crop start differentiating inside the buds in the previous year. There are 2 main stages of development: formation of primary branches starts in Year 1, before the vine goes dormant; secondary and tertiary branching, as well as individual flower differentiation, continues around budbreak of Year 2. Thus, the cropping potential in Year 2 is set rather early during shoot formation in Year 1.
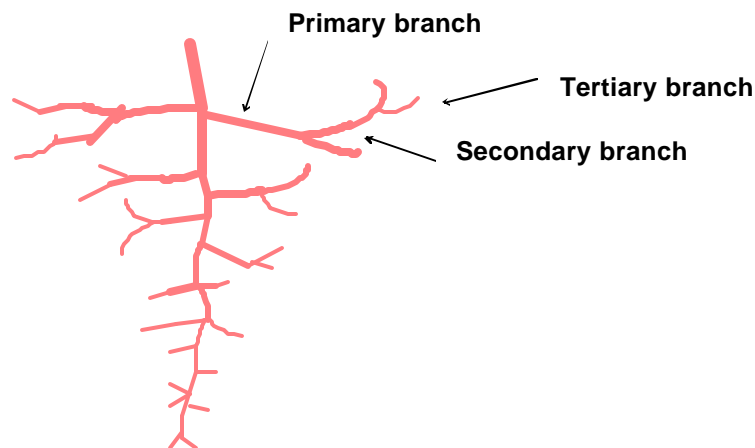
• Previous work showed that the **number of berries per cluster** is a far more important contributor to season-to-season yield variation than the weight of the individual berries. The current authors suspected that there might be a relationship between the amount of early primary branching and the final number of flowers in an inflorescence, in turn affecting the number of berries in the cluster. If this were the case, perhaps an early measurement of primary branches could be used as an indicator of yield potential. So they decided to study whether this relationship indeed existed, and how it might be affected by different climates and by different crop loads.

• During 2 seasons (2001, 2002), the authors collected a large number of Cabernet Sauvignon inflorescences 6 to 8 weeks after budbreak from 3 different sites in South Australia. In addition, for one of the sites in 2001, inflorescences were also sampled from vines subjected to 4 pruning treatments: severe, medium, light, and very light pruning (aiming at 4, 6, 8, and 10 tons per acre, respectively). In all cases, clusters were carried to the lab where the **number of first order branches** and the **number of flowers per cluster** were counted. Actual number of berries per cluster and cluster weights were also measured at all sites just prior to harvest.

• **Results.** Clusters –or inflorescences- carried an average of 290 flowers, and an average of 15 primary branches. There was more variation in the number of flowers (up to 57%) than in the number of primary branches (up to 37%). The authors found a good correlation between these two parameters. The slope of this correlation was very similar in both years, suggesting a good seasonal stability, and also across vineyard sites, giving the authors optimism about the possibility of **using the number of primary branches as an early predictor of inflorescence and, eventually, cropsize**.

• For those sites where vine fertility was measured, **higher fertility was associated with more flowers per inflorescence**. Finally, **increasing the severity of pruning** (fewer buds retained) **increased the number of flowers per inflorescence**, as well as the number of primary branches. (The authors also mention that pruning severity affected bud fertility as well, even though they do not present data). Overall, what this means is that it is possible to modify inflorescence size through pruning. And, as the authors state, there is no better example to illustrate this than the effect of minimal pruning on reducing inflorescence size, as compared to spur pruning. Thus, both the number of nodes retained at pruning and the temperature during budbreak would seem to play an important role on the eventual inflorescence size.

In conclusion, these authors were able to show that the number of primary branches in an inflorescence is a good indicator of the number of flowers in the final cluster. Primary branching is a characteristic that can easily be measured as early as a few weeks after budbreak and could be used as a good indicator of potential crop size. In fact, in another study, these authors were able to detect much of the variation in cluster weight in Chardonnay by counting the number of first order branches on inflorescences. This work is important because it brings us closer to achieving a good, reliable estimator of a given season's yield.