2015 San Joaquin Valley Bud Fruitfulness Survey

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Grape yield per vine is the result of three factors: 1) the number of clusters per vine, 2) the number of berries per cluster, and 3) berry weight. Bud fruitfulness and the number of buds left after winter pruning determine the potential number of clusters per vine, whereas the number of berries per cluster is determined during the period of fruit set, when environmental factors such as temperature and precipitation, and overly vigorous shoot growth may reduce fruit set. Final berry size is affected by many factors, including genetics, water and nutrient availability, crop load, rootstock, and, in table grapes, girdling and the use of certain plant growth regulators. The number of clusters per vine, berries per cluster, and berry weight have the dominating effect on the yield of all grapes, but fruit quality has a major effect on marketable yield of table grapes, and soluble solids (sugar) content strongly affects yield and quality of raisins.

For grapevines, the potential number of clusters per node is determined the year before, as cluster primordia are initiated on pre-formed shoots that develop on the buds of green-growing shoots that can be left as spurs or canes in the following season. Good light exposure and optimal (77 °F) temperature increase the number of cluster primordia. Water deficit stress can reduce bud fruitfulness starting from current bloom. Excessive or deficit nutrient supply (especially nitrogen) might also limit the inflorescence initiation.

Grape has the compound bud and one dormant compound bud includes a primary bud and two secondary buds (Fig. 1.). In this survey, the potential bud fruitfulness per node included cluster primordia from the primary and secondary buds.

In order to track the potential fruitfulness of grape vines, I conducted a field survey at the beginning of 2015 for different varieties.

Buds were collected from one cane-pruned raisin variety, Selma Pete, and two spur-pruned wine grape varieties, Cabernet Sauvignon (CS), and Chardonnay in Parlier, Easton, and Kerman, at the beginning of Feb. 2015. For Selma Pete, 50 canes were randomly selected in the field and sampling was done to avoid any edge effect (Fig. 2.). Buds from nodes 0 to 15 were selected from each cane and dissected with the razor blades. For spur-pruned varieties, 100 spurs with 3 nodes each were also randomly selected in the field and also dissected with razor blades. Bud fruitfulness data were averaged per node.

Results

For Selma Pete, buds on nodes from 0 to 5 were not as fruitful as buds on nodes 6 to 13 (Fig. 3). Less than one cluster (0.2 to 0.7) primordia per node was found in each of the first five nodes, whereas nearly 2 cluster primordia per node were found in more apical nodes (6 to 13) on the cane.

Buds from Cabernet Sauvignon in Easton were very fruitful (Fig. 4.), perhaps because of the vine's young age. More than 2 clusters per node were observed on non-count node (position 0) and on the first count node (position 1). Fewer primordia were noted on position 2, and this could be due to non-uniform pruning (not enough samples). It might suggest that bud wood sampling next year will be better to conduct right after the harvest of 2015. In general, average 2 cluster primordia per node have been found in this ranch.

Buds from Chardonnay and Cabernet Sauvignon in Kerman (Fig. 5. And Fig. 6.) were less fruitful compared to Cabernet Sauvignon in Easton. Between both varieties, Cabernet Sauvignon (average 1.6 cluster primordia per node) is relatively more fruitful than Chardonnay (average 1.1 cluster primordia per node).

Conclusion

The usefulness of bud fruitfulness data increases with each year if the data are repeatedly collected from the same vineyard. For example, comparing next year's data with the data from this year will provide some evidence to suggest yields might be similar, higher, or lower, and this information can inform pruning decisions since the data can be collected at any time after harvest. However, actual yield per vine can vary due to any changes of one of three yield components. Therefore, I will continue to collect these data each year, as a service to SJV growers.

I would like to acknowledge the technical support from Dr. Matthew Fidelibus, Department of Viticulture and Enology, UC Davis and the San Joaquin Valley grape growers that allowed me to use their vineyards.

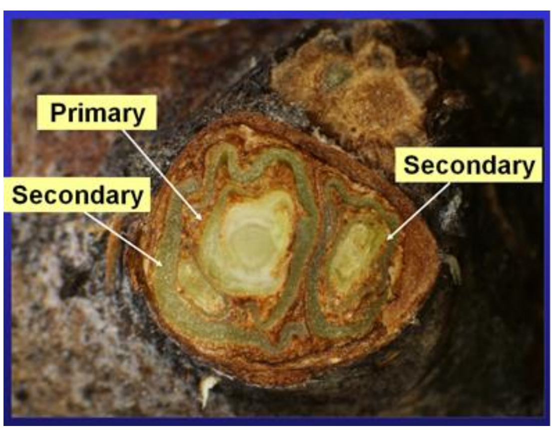

Fig. 1. Bud anatomy (image sourced from Dr. Luis Sanchez).

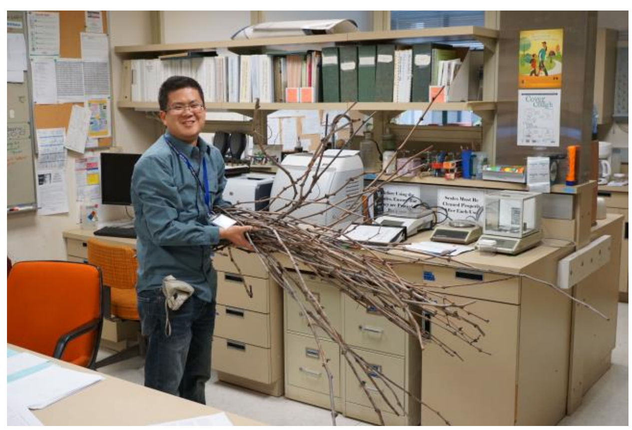

Fig. 2. Bud dissection wood collection.

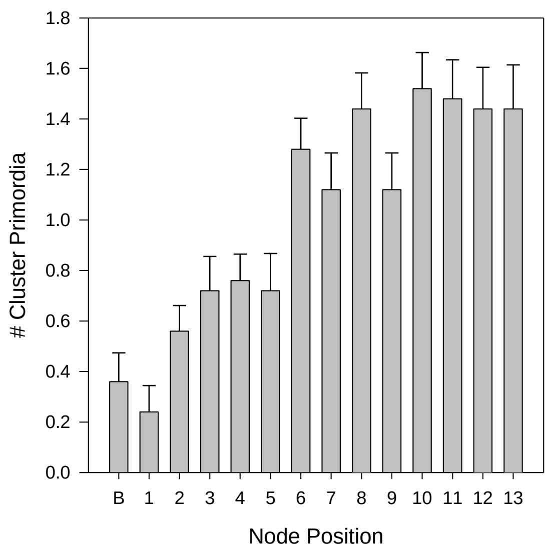

Fig. 3. Selma Pete potential bud fruitfulness, Parlier.

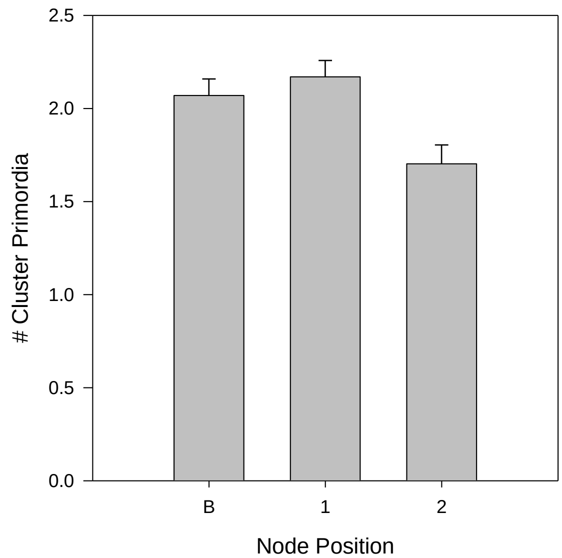

Fig. 4. CS potential bud fruitfulness, Easton.

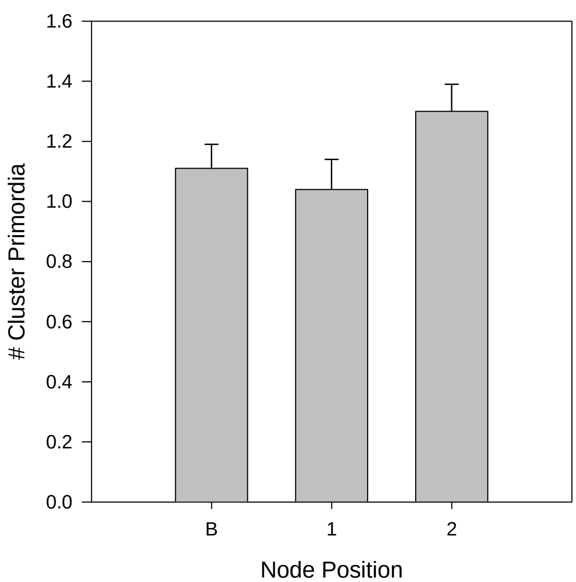

Fig. 5. Chardonnay potential bud fruitfulness, Kerman.

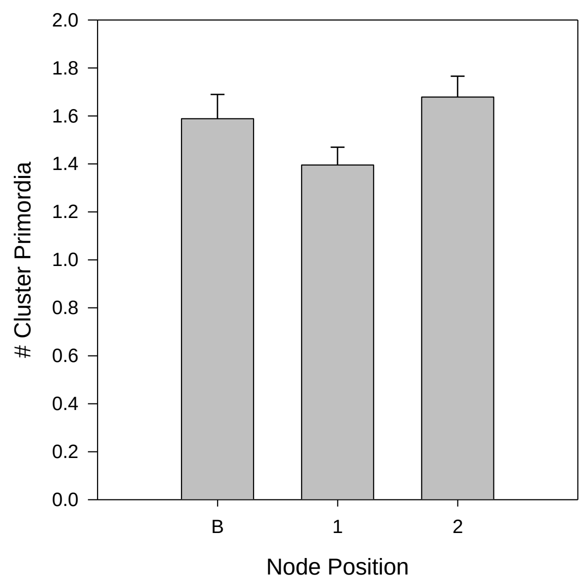

Fig. 6. CS potential bud fruitfulness, Kerman.