

IN THE VINEYARD

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Pruning and Vine Balance

There is always a lot of interest in maximizing yield through proper cultural practices, disease and pest management, vine nutrition, irrigation, etc. In recent years, improved fruit quality along with more highly valued appellation and vineyard-designated wines has become important to local growers.

The most important aspect about managing vine growth, whether using an exotic trellising system, a “new” rootstock, or less water and nitrogen, is that a balance is achieved between the vegetative growth and fruit development. A given vineyard in a particular site has a certain capacity to produce a fruit crop and also has a potential capacity of vegetative growth for vine size and leaf area. Questions that seem to come up from time to time are: “How many buds should I leave on these vines?” or “What is a good crop level?” These are good questions that are site specific and depend on grower and winery goals.

If soil depth, water, or nutrients do not limit a vine, there will be a large growth capacity. When there is more available carbohydrate than needed for fruit production, that extra “energy” will go into vegetative growth (more shoots and leaves) and/or into permanent structures: trunk, cordons, and roots.

On the other hand, if there is too much fruit due to excessive bud numbers, there won’t be enough energy produced for the vine’s growth and maintenance requirements and to meet the demand of the ripening fruit. The result might be berries not reaching full maturity, possibly stunted vine growth or even defoliation. Some of this has been seen the last couple of seasons due to the interest in “meeting” demand for premium varietal production, especially in new vineyards that need positive cash flow while prices are good. Late harvests and vine stress in the fall can add to this problem.

Most of this is fairly common sense and has been learned by all grape growers at one time in their life. The reason it’s worth mentioning is that sometimes, basic principles go by the wayside during particularly good times or especially bad times. It’s difficult to predict what the final crop will be in a given year.

One guideline from research in canopy management and trellising systems is balanced vines make for productive vines that can still have quality fruit. Small crops usually mean good quality but “economic” yields can be maintained with quality. The old French philosophy we see a lot of in the maturing California industry says, “Il faut suffrir,” loosely translated as: A vine must struggle to produce quality fruit. On the surface that’s true, but more than once there has been the exception to this rule when there have been balanced vines.

Everything else being equal between two vineyards, smaller crop levels do give more intense color and flavor fruit. However, after a certain point in a vine’s range of capacity, “quality” increases at a diminishing rate as crop load decreases. Most growers are going to want to be in an optimum range of production. Where the goal of maximum yields for “the best quality” is one to three tons per acre, marketing begins to take precedence over viticulture, which can be valid for some growers.

If a vine is in balance, it has just enough shoot growth to produce the crop level the grower needs, while providing the quality the winemaker wants. A very general guideline would be about 42 inches of shoot, give or take 6 inches. A good way to check on your vineyard balance is by annually measuring the ratio of pruning weight to crop weight. This assessment should be a fairly simple process, which can be as accurate as time allows.

From the work done by Dr. Mark Kliewer and others it appears a reasonable ratio of crop yield to pruning weight lies in the range of 5 to 7. In other words, a vine that produces enough prunings to equal 5 pounds of canes should be carrying a crop of 25-30 pounds: 25 pounds of crop per 5 pounds of prunings equal a ratio of 5. Some viticulturists believe a ratio of 3 to 5 is

even better for assuring the highest quality. And they are probably right for situations such as high quality red Zinfandel. A ratio less than 3 would most often indicate under cropping, while a ratio greater than 9 would mean severe over-cropping.

A suggested procedure for measuring pruning ratio would be:

Select a minimum of 3-5 vines in a representative area. (Mark them for reuse).

1. Weigh the prunings from these vines.
2. Determine an average pruning weight for these vines.
3. At harvest, determine an average crop yield per vine. Either weigh each vine's crop or use field average.
4. Divide the average vine crop yield by the average crop yield per vine.

Example: Ten acre block of Cabernet Sauvignon, 7 x 11 feet spacing (565 vines per acre).

Step I. At pruning, five vines have 5, 6, 5.5, 6.5, and 5.25 pounds of prunings.
Average pruning weight = 28.5 total pounds divided by 5 vines = 5.6 pounds per vine.

Step II. The same vines yield at harvest 15, 12, 16, 15.5, 13.5 pounds each.
Average yield per vine = 14.4 pounds.
Or, if the total yield of 40.7 tons was harvested for the 10 acre block, then the average yield is:

$$\frac{\text{total tons}}{\text{total acres}} \times \frac{2000 \text{ lbs}}{\text{ton}} \div \text{number of vines per acre}$$

$$\frac{40.7 \text{ tons}}{10 \text{ acres}} \times \frac{2000 \text{ lbs}}{1 \text{ ton}} \div 565 \text{ vines per acre} = 14.4 \text{ pounds}$$

Step III. Ratio of crop to pruning weight =
$$\frac{14.4 \text{ lbs}}{5.6 \text{ lbs}} = 2.6 \text{ pounds}$$

Therefore, unless there is a nutrient deficiency, lack of water or a disease problem such as fan leaf virus, the vines in this particular block would probably benefit from a heavier crop (as might the grower). Less severe pruning will help leave more buds to reduce vigor and increase crop. How many buds to leave? This is a good question for lots of discussion. A reasonable starting point would be 10 buds per pound of prunings. A better rule for less vigorous or large cluster varieties might be 4 to 8 buds per pound. It also may be necessary to use canopy management such as leaf removal to obtain more fruitful buds as occurs with Sauvignon blanc. Or cluster thinning might be needed for some varieties such as Zinfandel.

A combination of proper spacing, trellising, fertilization, and irrigation management along with proper pruning will eliminate or at least reduce the problem of excess vigor and over-cropping. Keeping an annual record of the ratio of crop to pruning weight should help determine if you are maximizing production of the optimum quality crop, or if you are weakening vines while producing lower quality fruit of less color and flavor.

Wine quality is the future for the industry and for local growers as new vineyards add to the overall supply of grapes. Grape buyers and vintners will be looking for good quality fruit, not prunings. District growers have much to lose with respect to the hard-earned recognition for high quality grapes and the increasing number of premium appellation or vineyard designated wines now being produced from local vineyards.