HOW TO ESTIMATE GRAPE YIELDS

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Crop estimation also called crop prediction is the process of projecting as accurately as possible the quantity of crop that will be harvested. Why estimate the crop? Obviously, growers need to know how much crop they produce and whether their vines are overcropped or undercropped in order to conduct the necessary adjustment. Vintners would also like to know how much fermentation tank space is needed.

The method described here is simple and has been used successfully in other winegrape growing regions. Growers interested in trying this method should begin collecting data this season. This method provides only an "estimate" of yield which should never be considered "final". Components of yield vary each year depending on the year, site, variety, and cultural practices. The following formula can be used to estimate yield with reasonable accuracy:

PY = (ANV x NC x CW) / 2000

Where:

PY = predicted yield (tons per acre)
ANV = actual number of vines / acre
NC = number of clusters per vine
CW = cluster weight (in pounds).

According to the formula, the grower needs to measure 3 parameters each year; the actual number of vines per acre, the number of clusters per vine, and the cluster weight. These parameters are discussed below with examples.

***1) Actual number of bearing vines per acre*:**

The maximum number of vines per acre is determined by the row and vine spacing. For example, a spacing of 6 x 9 feet vineyard will have 807 vines per acre. Almost always the "actual number" is lower than the "maximum number" of vines per acre due to missing vines for several reasons such as diseased vines (crown gall), winter-injured vines, replanting, etc. For these reasons, each year, growers need to physically count the missing vines, subtract the number from the maximum number to get an accurate count of bearing vines. If 5% of the 807 vines/acre (i.e. about 40 vines) were missing or nonbearing then the actual number of bearing vines/acre is 767.

***2) Number of clusters per vine*:**

This number will depend on how many nodes (buds) are left after pruning. Counting clusters per vine can be determined as soon as they are visible (before bloom) or as late as pre-veraison. The advantage of early count is that clusters are readily visible and are not obscured by leaves. This information is also needed by vintners so they can plan on the quantity to purchase

from each grower. The number of vines on which to count clusters depends on vineyard size and uniformity. For example, in 1 to 3 acre-vineyard with vines of a uniform age, size, and pruned to the same bud number, only 4% of the vines need to be counted. In practice, a minimum of 20 vines is counted. Growers need to bear in mind that the higher the number of vines selected for cluster count the more accurate the yield estimate will be. In larger, non-uniform vineyards, more vines should be selected. All the clusters on the sample vines should be counted. Also, the vines should be selected methodically; e.g. select every 10th vine in every other row.

***3) Cluster weight*:**

It is the component of yield that varies the most from year to year. It is affected by environmental conditions. For example, wet weather during bloom could cause poor set and may lead to low cluster weight; also a dry summer tends to reduce berry size and thus may decrease average cluster weight. Other factors that may affect cluster weight include cultural practices (irrigation, fertilizers), diseases, insects, and birds. Cluster weight at harvest is a key part of any yield prediction program. The goal of obtaining cluster weight at harvest is not to predict the yield that year, but to provide records for yield prediction in subsequent years. AT HARVEST, it is best to sample clusters from vines rather than from bins. The same vines used for cluster counts could be used for cluster weights. Average cluster weight is obtained by sampling at least 100 clusters throughout the vineyard, weigh the total, and divide by the number of clusters sampled. Growers who do not have these data (hopefully will in the future) may use estimates of cluster weights shown in the following table. *MAINTAIN RECORDS OF CLUSTER WEIGHTS FROM YEAR TO YEAR IN ORDER TO IMPROVE ESTIMATION.*

4) Example: Crop estimation of Cabernet franc

- Spacing = 6 x 9 feet or 807 vines/acre
- Missing/nonbearing vines = 5% or about 40 vines/acre
- Actual number of bearing vines: 807 - 40 = 767 vines/acre
- Average cluster count = 40 clusters/vine
- Average cluster weight = 0.23 lbs
- Predicted yield = (767 x 40 x 0.23) / 2000 = 3.5 tons/acre.

Even with thorough sampling, accurate vine counts, and many years of average cluster weight data, the actual crop tonnage at harvest can vary significantly from that which is predicted. Consider a good estimate if it is within 15% of the actual yield. Do not get discouraged if first attempts at crop estimation are inaccurate, because the more experience and data acquired, the more accurate the estimates will become.

Average cluster weight (in pounds) of common grape varieties

Variety	**Small (< 0.3)**	**Variety**	**Medium (0.3 -0.4)**	**Variety**	**Large (>0 .4)**
Cabernet franc	0.23	Concord	0.30	Chambourcin	0.42
Chardonnay	0.23	Chardonel	0.36	Marquis	0.50
Pinot gris	0.22	Lemberger	0.30	Neptune	0.53
Riesling	0.18	Niagara	0.35	Seyval	0.43
Traminette	0.24	Vidal blanc	0.34		