

OUT AND ABOUT

A REPORT FROM MARYLAND COOPERATIVE EXTENSION



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According to a common axiom in viticulture and enology, "the wine is made in the vineyard," and therefore "to make a great wine you need to start with great grapes." Even though wine quality can vary from vintage to vintage, most wineries try to maintain a quality standard as well as a particular wine making "style." However for most vineyards in the Eastern U.S., producing the great grapes needed to maintain that style every year can be a challenge. Variables such as weather, pests, vegetative (canopy) development, crop load, and timing of harvest influence fruit quality parameters that ultimately influ-

ence the wine quality. Grape pH, total acidity (TA), sugar content, organic acid profile, and varietal aroma and flavor characteristics can vary considerably depending on conditions during the growing season. Some of these variables are beyond human control but many can be adjusted or mitigated through common viticultural management practices.

The key is to take an Integrated Viticultural Management (IVM) approach to grape production practices, as opposed to treating each practice as a separate entity. Each practice in the vineyard can influence another parameter, so understanding the interaction among the practices is critical to producing the highest quality fruit possible. The following IVM components can be used to compensate for various idiosyncrasies of a particular growing season.

Nutrition management. Vineyard nutrition is arguably the most important component of IVM, as it affects all others, but in many vineyards it does not receive adequate attention. Excess nitrogen (N) will encourage high vegetative vigor leading to shading of fruit, which can delay ripening and decrease varietal aroma and flavor. If vegetative vigor is too high, annual N ap-

plication rates should be suspended or decreased. It is also suggested to wait until after fruit set to apply N, so vegetative vigor can be assessed and the rate adjusted accordingly.

Adequate potassium (K) is necessary to maximize cold hardiness, however excessive K will promote high pH/high TA fruit that will complicate winemaking and decrease wine stability. Boron (B) and zinc (Zn) are critical for good fruit set and quality, and deficiencies should be corrected immediately, preferably before bloom.

Vine training. Overly vegetative vines typically produce low yield and poor quality fruit due to shading, as described in the nitrogen discussion above. An important way to minimize annual variation in vegetative vigor is through proper vine training and annual pruning. When dealing with soil types (e.g., heavy, fertile soils) and varieties (e.g., Cabernet Sauvignon) that are prone to high vegetative vigor, vines spacing should be increased or the vines trained to systems that manage the vigor, such as the open lyre system or Geneva Double Curtain. When a vine is trained to the appropriate trellis system, the desired seasonal canopy management and consistent fruit quality is more easily achieved.

Fruit set. The better the conditions at bloom, the better the pollination and fruit set, and the greater the number of seeds in the fruit. In a year with good pollination, berries will have a greater number of seeds, and the berries will be larger with lower sugars and higher TA than berries produced with fewer seeds.

Crop management. It is imperative to maintain the proper interactive balance between fruit load and vegetative vigor. A heavy fruit load will keep vine growth in check, but the fruit will not ripen evenly, will have poor color, and will not accumulate high sugar content and desirable flavor and aroma components. Excessively control of fruit load (leaving too few buds) will result in increased vegetative vigor leading to shaded fruit with increased disease incidence and fruit lacking desirable flavor and aroma components.

Maintaining four to six canes per linear foot of trellis with one cluster per cane is a good baseline. If the crop is higher than desired, as is often the case with French Hybrid varieties, thin the crop down after fruit set to reduce risk of increased cluster compactness. Post-set thinning is especially critical for varieties, such as Riesling, that are prone to Botrytis due to tight clusters.

If vegetative vigor is high due to soil and nutrition, leaving "extra" clusters will reduce subsequent growth.

Acid, Color, and Tannin Content and Maturity. The types and

relative amounts of organic acids are very critical for flavor, balance and stability in wine. These acids are affected by many factors, from nutrition to climate. In general, fruit produced in hot, dry seasons are typically lower in TA and specifically lower in tartaric and malic acid than fruit developing under cool, wet conditions, so harvest timing adjustment may be necessary.

Achieving adequate color (anthocyanin pigment content) of red grapes is critical, since darker red color is usually associated with higher quality. Long hot growing seasons tend to produce fruit with low pigment content, so crop control is even more critical. High pH levels also have a negative impact on color. As fruit pH rises, anthocyanin pigment hues change from the desired red to a brownish-purple, so harvesting grapes and producing wine within the optimum pH range is also critical for color stability as well as wine longevity.

Mature or ripe tannins are necessary to produce high quality "soft" red wines with good aging potential. Thinning crop clusters and pulling leaves to increase sun penetration to clusters can accelerate ripening and production of desirable aroma and flavor components, especially during cool, wet growing seasons when fruit and tannin ripening is delayed.

Disease and Pest Management. The presence of pest damage will greatly diminish grape quality. Bunch Rot (Botrytis) infection can decrease color and aromatics, and increase oxidation, off flavors and volatile acidity (acetic). These negative characteristics follow through the fermentation and persist in the finished wine. Maintaining an open canopy (shoot positioning/leaf pulling) will help minimize Botrytis pressure by promoting rapid drying of morning dew and precipitation on leaves and clusters as well as improving fungicide penetration and cluster contact.

Harvest adjustments. Adjusting time of harvest is a way of compensating for specific fruit characteristics during a specific growing season. As previously discussed, in a hot and dry season, the grapes will typically be lower in acids, so the crop should be harvested early, before the acids decrease below the desired range. In contrast, for red grapes in a cool wet year, harvest should be delayed as late as possible to promote proper tannin maturity.

The bottom line is that we cannot control all growing conditions; therefore grape quality in the East will vary from year to year. However, with an understanding of how specific growing conditions affect the crop, one can alter viticultural management practices to maximize quality and minimize seasonal variation.

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