Grape Growing 101

Location Location Location

To create great wine, the location must dictate the choice of grape variety, as the wine is shaped by the land from which it comes. The perfect site is one that brings out the grape's unique nuance and compliments the requirements of the grape variety.

In addition to the proper soils and water quality and availability, characteristics such as air flow, drainage, and adjacent uses should be considered when determining the perfect location.

Soils

The vineyard soil composition is of paramount importance for wine type and quality produced from the grapes. What constitutes suitable soil is hotly debated and studied.

The soil composition, specifically its mineral composition can give the wine its style and character, depending whether the grapes were grown in granite, sandstone, or limestone soil.

However the ground's texture and structure can also shape the wine's character and quality. We believe that the soil's rocky structure at LDV Winery will produce grapes and wines with more intense aromas, flavors, and complexity. To grow quality vines, certain conditions must be met: light, warmth, and dry soil with just the right amount of organic material to maintain healthy vegetative growth, but not too much or too little. Beyond that, a certain type of soil, with certain type of mineral composition, can be particularly compatible to a specific variety of grape -- --that is to say, it can determine the superiority of a specific wine.

Drainage

It is critical that the grapes are grown in well-draining soils. However, the absorption rate is an important soil attribute. Too compacted soils can starve the roots of water. Grapes typically tend to be stressed in the short-term but need adequate water to ensure a strong root system, stems, and quality grape clusters. Good drainage at LDV Winery is critical particularly during the summer monsoon months. Our vineyards have a one- to two-percent overall grade draining toward Ash Creek.

Terroir

The European philosophy of wine quality was developed by the French; they describe it as "terroir."

Terroir is much more than just soil. Bruno Prats, owner of Chateau Cos d'Estournel in Saint-Estephe, once expressed this concept of quality as follows:

"An infinite number of factors influence wine: temperatures, both day and night, the distribution of rain over the year, number of hours of sunshine, the deep structure of the ground, its pH value, its ability to retain water, its mineral composition, the shape of the terrain, the direction of the sun, to name only a few. The effect of the interaction of all these factors is what we in France call *terroir*."

Grafting Grapevines

Grafted vines are rootstocks to which the scions of noble grapevines have been attached. The scion bears the genetic code of the desired grapevine variety; the rootstock contributes the qualities needed to form an appropriate root system.

Although the rootstock variety is not critical, its genetic makeup must be suitable to the soils into which it is to be set; above all, it must be genetically resistant to pests and viruses.

At LDV Winery, rootstock is tailored to the Chiricahua Mountain region in southeastern Arizona and the grape variety clone such as Petite Sirah, Syrah, Grenache, and Viognier are grafted to the rootstock. We typically use rootstock 1103P or 110R. The grafted grapevines are planted in California for a year before being transported to the vineyard before planting. It is critical to choose the right rootstock and clone for our region and to plant within days of receiving the new vines.

Grapevines

The grapevine is one of the toughest, most un-demanding, and most adaptable plants in the world. But that doesn't mean it is easy to grow great grapes. It grows well in poor soil, lacking in nutrients, and under extreme temperatures.

Grapes are grown in every state of the U.S. The wood of the vine is able to withstand winter temperatures as low as -4° F.

Grapevines tend to build a strong root system. Their roots not only anchor them firmly in the soil but also serve to store nutrients. In dry regions, the principal roots will penetrate deeply to reach moisture. Thanks to this root characteristic, the grapevine bears fruit even in climates that other cultivated plants could not withstand.

Grapevines carry an abundance of leaves, and much of the energy they need to grow is obtained through this canopy. The process is called photosynthesis, and it occurs not only in grapevines but in all plants. The green pigment in the leaves (chlorophyll) combines carbon dioxide from the air with water to form sugar. Light is the catalyst for photosynthesis, so the grapevine uses its tendrils to climb upward toward the sun. Even under otherwise ideal circumstances, the creation of sugar in the fruit can be reduced by stress due to a shortage of water. The grapevine, however, is resistant to moderate drought, so is well suited for the arid Arizona climate.

Training the Vines

The grapevine is a climber. To grow, it needs something its tendrils can cling to – stakes, a trellis, or stretched wires. The design of these climbing aids determines whether the vine will produce many clusters or only a few.

There are dozens of grapevine training systems. Which is used depends on the climatic conditions, on the structure and composition of the soil, and on whether the vineyard is worked by hand or by machine.

The cordon training system is the one most widely used around the world and is the one used at LDV Winery. It makes pruning and vine tying relatively easy, requiring little experience or skill. The cordon system entails leaving one or two arms of the vine permanently attached to a wire.

Irrigation

At LDV Winery the grapes are watered using drip irrigation. Water is monitored closely and changes are made depending on the amount of rain falls. LDV Winery uses a sophisticated system that can be monitored from anywhere in the world via a smart phone.

During the first two years of the vine's life, the plants receive slow irrigation directed through plastic tubes that are protecting the lower vines segments so that water reaches the roots directly.

As the vine matures, drip irrigation changes in order to allow the roots to spread wider. Many would think that the reason for irrigation is to increase the plants yield. But in reality the purpose of effective watering is to preserve this precious resource and to ensure the crop's survival.

Mulching and Fertilization

Monitoring soil composition over time is important to ensure that plants are receiving adequate nutrients from the soil. Therefore, there are times when some type of augmentation is needed.

Some growers spread manure, green fertilizers, grapevine chips, or straw; the choice and frequency of fertilization (annually to every three years) depends upon the soil composition.

At LDV Winery, the ground between the rows is plowed during the spring and summer. The soil is aired and the weeds are mulched under. This is important because in dry seasons, the grass between the vines absorbs surface precipitation, creating serious competition for available water.

Art of Grape Growing

Balancing quality vs. quantity is a constant issue as the grapes mature. Some say that the wine's quality improves when the vine carries fewer clusters.

At LDV Winery we constantly monitor the vigor of each vine to determine if we have to "green harvest" or drop some of the green fruit when nature does not limit the quantity.

If the fruit production is impacted naturally by disease, hail, frost, or damage to the flowers, we will obviously skip this task. The quantity/quality rule is one we struggle with every day because a plant can only bring a certain number of grape clusters to full ripeness.

Vines are pruned during the winter dormant period. Pruning is really important because is helps to control how many buds will develop and therefore, how many grape clusters will be produced. We believe that pruning is a balancing act between ensuring high-quality bunches while producing enough to receive an adequate return on the investment.

Bud Break or Budburst refers to the opening of the buds that remained after winter pruning. When the buds burst, small green leaves emerge, quickly unfolding. This happens when daytime temperatures begin to average about 46° to 50°F. Some varieties such as Chardonnay break their buds somewhat early; others, like Cabernet Sauvignon, open later. Until bud break, the grapevine has obtained its nourishment from the stores of carbohydrates it laid down in the fall. Once the leaves have developed, the vine begins to nourish itself through photosynthesis.

In the vineyard the signs of oncoming budburst some days before it begins can be detected. The cuts that resulted from the winter pruning begin to show little drops of sap, a sign that dormancy is over and the plant juices are beginning to flow. Soon, the nodes swell up, and are ready to burst.

Plant Lifecycle - Like every other plant, the vine has its own growing cycle that includes a growth phase followed by a ripening phase followed by a dormant phase. This last phase begins after fall harvest, when the vine has an adequate store of carbohydrates in its trunk and roots. At that point the leaves yellow and fall off. Only in March do rising temperatures bring budding and the start of a new cycle.

Fruit Development is when the pollinated pistils begin their transformation into berries, while unfertilized blossoms wither and fall. In early spring, the fruit is very small, green, and hard, but the grapes increase in size rather quickly.

Veraison - The French word *veraison* has become internationally accepted as the technical term for grape coloring. In warm summers, veraison begins earlier, in cold summers later. This process is triggered when a certain level of sugar has been reached within the berry juice. Not all grapes take on color at the same time. Those that have received the most sunlight and heat color first, while grapes growing on the shady side still remain green. Mid to late July veraison begins at LDV Winery.

Determining Sugar Levels - At LDV Winery our winemaker begins monitoring the grapes sugar and acidity levels beginning in late summer to determine when harvest might occur.

This monitoring is critical because the levels can change rapidly depending on the weather. If weather stays warm into September it allows the sugar levels to increase and acidity to decrease. Hail at this time can damage the grape clusters, heavy rains can cause the grapes to swell diluting the sugar levels, and cold temperatures can keep acidity high and sugar levels low.

The ultimate goal is to allow the grapes to reach their full varietal potential so that Syrah grapes have the characteristics of Syrah and Viognier tastes like Viognier.

LDV Winery uses a refractometer to determine sugar levels by measuring the brix or degrees of sugar. When held against the light, a drop of juice on the glass causes light to be refracted in proportion to the concentration of the grape's sugar. These scientific measurements of the brix levels are augmented by tasting the fruit in different parts of the vineyard. These techniques collectively provide important data about sugar levels.

Acidity Determination - Acidity values are another important determination of when grapes are ready to harvest.

During the ripening phase, the fruit accumulates sugar, and the grape loses acidity. This process occurs simultaneously, but not necessarily at the same pace.

If the grapes did not lose some of its acidity, all wine would be far too sour to drink. Some acidity has to be retained to provide wine complexity.

Harvest – Selecting the date to harvest is both nerve-racking and exciting. There are so many things that are out of the winemaker's control.

Once the harvest date is decided, we harvest the grapes as quickly as possible during the coolest part of the day. It is critical to get the grapes to the winery and processed.

Picking the grapes is a simple process – the grape bunches are cut from the vines by hand and placed in 1,000 pound plastic picking bins that are used to transport the grapes to the winery. Small bins are used so that the grapes are not crushed from the weight and natural fermentation does not begin in the field.