



## Principles and Practices of Vineyard Establishment

New wine growers only have one chance to develop their vineyard correctly. Any changes down-stream are very expensive, time consuming and frustrating. While every vineyard site is different, there is a common protocol to vineyard development that should be followed. We are trying to give the new vines every opportunity to get properly established to begin a long, productive life. In the case of a vineyard it starts with good planning proper field preparation.

Perhaps the greatest impediment to high quality vineyard development is a lack of knowledge. New growers simply have not done it before and therefore are prone to mistakes in planning and installation. It is important to fill this knowledge gap with experience, whether it is your own through education and training or another's hired experience, such as a consultant. It is always helpful to have a visual sense of the type and style of vineyard you wish to achieve. Looking for, examining and emulating fine examples of vineyard development can help tremendously to achieve a credible end product. Of course, the objectives may be related to the size and scope of the project. If only a few vines are concerned then precision may not be a strict requirement but if a large commercial vineyard is at hand, the demand for accuracy and quality is increased. A high quality commercial vineyards begins with a good site > good design > good construction > good work > good grapes. Vineyards are built to last, hopefully generations into the future. They should be designed, established, and appreciated with this perennial intent in mind.

The field should be in pristine condition for planting. This will make everything go easier and faster. An open field is the best time to make any wholesale changes to the vineyard site such as soil additions, drip irrigation, tile installation, frost protection, weed control, etc. Adjustments to the soil chemistry (based on test results and expert recommendations) such as nutrients and pH should be done at this time. The amelioration of a field for grapes should be based on test results or experience, not a guess or instinct, particularly that of a novice grower. Always ask "why and for what benefit" is anything added or done to a field. The site evaluation process is critical to proper field preparation and should be done with the help of a viticulture consultant, soil scientist with viticulture experience or a viticulture extension educator. It is very helpful to develop a check list of evaluation and preparation tasks in correct sequence prior to any actions in the vineyard.

This is your best chance to clear the field of obstacles that may later impeded vineyard operations. Remember, once trellis and vines are in, large equipment cannot access the field. Remove all trees, rocks, old fences, junk piles, etc. Beware of old fence wire that can hide in tall grass since it can get wrapped tightly in any kind of mower. Trees are generally a problem for vineyards since they harbor insect pests and diseases and deer, create shade and block wind into the vineyard and are a roost for birds at harvest. You don't want to indiscriminately cut trees, but a buffer zone around a vineyard will be very helpful.

The objective is to prepare a surface for planting and an environment for the new plants with small root systems to take hold and thrive. This will require working the soil to be worked on and below the surface. Cultivation is done prior to planting and depending on the results of the site evaluation, special treatments such as deep ripping of the soil may be necessary. Any buried materials such as irrigation or drain tile must be installed before planting. Layout and marking the field, if by hand or non-laser, machine planting is critical for straight rows and uniform alignment. If a laser planter is used, the field must be prepared to the exact standards given by the operator. Receiving, storing, preparing and planting vines is a very delicate and precise process. The condition of the soil is critical to successful planting results, neither too wet or too dry. A properly planted vine has a chance for a long and productive life. A mis-planted vine may cause problems for the grower for many years and reduce quality and production. Having the proper equipment, supplies and labor resources will help to improve the quality of job enormously.

Chances are you do not have the specialized big equipment to spread amendments or clear and cultivate your fields. Often neighbors growing row crops will have equipment suitable for these jobs or you may have to find a contractor to do the work. Just make sure they use the right equipment for the job or it may not get done properly.

Once the field is properly prepared, it is necessary to mark it. The vineyard design should be done as part of the site evaluation and planning process. The layout is according to the design that incorporates topographical and other features with the correct varieties, clones and rootstocks. You may have one large square field which is ideal for operations efficiency or lots of small, oddly shaped blocks if the site is highly variable. It is easy to mark a field with corners on a flat surface but if it on uneven terrain you will want a professional surveyor to draw the lines for you. You have just one chance at straight rows and proper block layout. If you are doing it yourself, you will need a transit, distance wheel, various measuring devices, marking flags, some kind of marking line (like fence or electrical wire), stakes, hammer and other tools. It helps to have at least one person on the crew who can see a straight row. A single reference line is created and other lines drawn from this. The transit assures that corners are square and rows and end lines are straight.

There is hardly a more critical component to successful establish and enduring productivity of a vineyard than the quality of plant materials. To new growers this can be a mine field. The site evaluation process has assigned the proper species, varieties, clones and rootstocks. Now the grower must source the best quality and correct plants. With the classic European varieties the vines will most likely be dormant bench grafts but now some high quality hybrids are being grafted for both phylloxera resistance and improved performance characteristics. It is important to deal only with a reputable nursery and to all extent possible, purchase and plant only certified plant materials. There are many woody pathogens that affect grapevines, from fungi to viruses, these often latent problems can express themselves many years after the vines are planted and ruin even the very best and most carefully installed vineyard. While nurseries are valuable sources of information about varieties-clones-rootstocks they should never dissuade you from the recommendations based on careful site evaluation. Plant what you decided to plant. Plant the vines correctly. There are many methods for planting vines, from a shovel to a laser planter, all

can work well if done properly and carefully. The soil condition must be correct for best results and follow up care is critical to a successful take. Order a few percentage overage on all varieties for replants, either in the first or second year.

The vines will need a support system. They are designed by nature to grow upwards towards the sun. Even droopy native varieties are great climbers. The trellis system should be designed according to ambition of the project and the results of the site evaluation. In most cases, it should be very stout, able to withstand the maximum crop load and high winds. It should be intended to last as long as the vines do. It is easy to underdesign and overdesign a trellis system. Get some experienced advice on the best materials and design for the trellis system you select.

Vertical Shoot Position (VSP) is the choice of most these days for high quality wine production on vinifera and quality hybrid varieties. Hybrids can also perform very well on high-wire systems. Divided-systems are used on more vigorous sites and require special attention to strength and construction due to the added load they are expected to carry. It is important not to skimp on materials. Simply put...buy the best you can afford. If you find yourself taking shortcuts in any area of vineyard development to save time or money, then reduce the size of the vineyard to compensate. It is the best decision you will ever make.

There is always the question about when to install the trellis. If a laser planter is being used, it needs to be built after the planting is done. If a drip irrigation system is installed and the vines need water after planting, it is best to get the trellis up before planting so drip hose can be hung and made ready for use after planting. If the vines are planted and no drip is necessary, it is possible to wait until the winter after planting to build the trellis, although this is not recommended.

The trellis should be built by experienced installers. If it is not built properly, problems will begin to occur almost immediately. The posts should be pounded, not augered into place for greater rigidity and firmness. Throughout the process, the proper installation equipment should be used. Both plants and trellis should be installed in straight lines, on the row, perpendicular and diagonals, for best efficiency and appearance.

Safety is a major concern in the field. Always take the maximum safety precautions. For example, when driving end posts or line stakes, heavy gloves, ear and eye protection must be worn. Proper training in the use of equipment must be made available. It is never worth risking an accident.

Much of the perception of quality in wine is related to aesthetic appreciation, whether it is an elegant label, a heavy bottle, or a neat and tidy vineyard with straight rows. Wine maker and consumers alike will judge the quality of the fruit that comes from a vineyard by its appearance. A well-established vineyard will pay real and perceived dividends.

Mark L. Chien  
Statewide Viticulture Extension Educator  
Penn State Cooperative Extension  
Updated July, 2010