

## **Critical Issues in Early Vineyard Establishment**

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Grapes are a very capital-intensive crop, and established vineyards can be productive for many years. Therefore, decisions made in the vineyard establishment phase can have long-standing consequences. Some cultural practices can be changed as a grower accumulates experience, but many pre- and post-planting decisions are permanent, and so should be carefully considered when establishing a vineyard.

### **Deciding whether to plant at all**

The very first thing to consider is whether or not to plant a vineyard at all. This seems obvious, but one should do a thorough economic analysis of the consequences of committing a large amount of money and time. Poorly managed vineyards usually produce yields that are either uneconomical and/or of low quality. Vine health may decline over several years, leading to a low rate of return on investment. Well-managed vineyards require substantial expenditures, but are capable of yielding good crops of high quality fruit throughout the life of the vineyard.

The economics of growing grapes for others, versus growing grapes for your own winery, are substantially different. Wine production is another expensive endeavor; however, the added value from selling your product as wine may more than offset this expense. If you are growing grapes to sell, the price that you will receive will be determined by the market, which may fluctuate greatly during the life of the vineyard.

### **Site selection**

The ability of grapevines to perform well depends greatly on the characteristics of the particular site where they are grown. Each site should be evaluated individually; there are few absolute criteria for grape growing.

Grapevines require well drained soils. Soils where water stands after a heavy rain, and soils with a layer of heavy clay within 30-36" of the surface, should be avoided. Soils with a single clay (or hardpan) layer can sometimes be partially broken up with heavy equipment, but this should be done prior to planting. Obtaining or renting the specialized equipment may be difficult and expensive.

Grapevines are subject to damage from both spring and autumn frosts. Most severe damaging frosts occur on clear, still nights. Generally, low spots should be avoided; since cold air is denser than warm air, cold air tends to collect at the bottom of a slope. Moisture can also collect at the bottom of a slope, which can promote disease during the growing season. Generally, the middle of a gentle slope with southerly orientation is best.

If there is sufficient time to monitor the prospective vineyard site prior to making planting decisions, thermometers that record the minimum and maximum values (widely available at garden and home improvement centers) should be placed at various spots (shielded from direct sunlight) throughout the site, and monitored at least weekly and the data recorded. Over time, this will provide an indication of where the warmer and cooler sites in the prospective vineyards are.

### **Soil Preparation**

Soil preparation prior to planting should be viewed as a critical factor in vineyard establishment. Proper preparation will yield significant benefits throughout the life of the vineyard. Simply put, you only have one opportunity to do it right. Lack of initial major soil preparation may be unfixable. At best, it will be more expensive and possibly detrimental to the grapevines than if it had been done properly prior to planting.

Soil tests to determine fertility and soil reaction should be done well in advance of planting. In order to get accurate results, it is critical to employ accurate sampling procedures. Consult with your soil testing agency for their methodology prior to sampling.

The main problem with soils in New England, besides lack of drainage, is high acidity (low  $pH$ ). The ideal soil  $pH$  for most grape species is about 6.0-6.8. Grapes growing in soils outside this range may have trouble obtaining nutrients from the soil even if the nutrients are present. Soil  $pH$  below the desired values can be raised by the addition of lime; soil tests will indicate how much to add. It is important to do this prior to planting—lime does not move much in the soil, so needs to be incorporated in advance of planting. If the land has been used as farmland previously, it has probably been limed for many years, and may not require adjustment. If other nutrients need to be applied to the soil prior to planting, this should also be noted on the soil test results.

A confounding factor in incorporating any material into soils in New England is the abundance of rocks in the soil. This is usually more of a problem on previously uncultivated land. There is, unfortunately, no remedy for this problem short of removing the rocks.

### **Cultivar Selection**

It is essential to select cultivars that will consistently ripen good quality fruit in your vineyard with no detrimental consequences to long-term vine health. There are many resources that can provide information on which cultivars may do well in a given area, but market forces are frequently at least as important. If there is no market for the fruit or the wine made from it, there is no point in growing it. Keep in mind that market forces may shift, and that a cultivar that was in high demand when you planted the vineyard may not be so during much of the vineyard's production period.

### **Planting**

Planting is done in the spring (usually mid-April through May in most of New England). The vineyard is not productive the first two years, and only a small crop should be

harvested in the third year. However, substantial expenses (plants, trellising, farm equipment) are incurred during this period. A general rule of thumb is that the initial investment is recouped about seven years after vineyard establishment.

Plants are obtained from nurseries as dormant plants. Grafted plants should be placed in the planting hole so that the graft union is about 1-1.5 inches above the soil level; non-grafted vines should be planted at the level that they were previously planted. This should be apparent from their appearance.

There are many opinions, some based on data and others based on tradition, as to the spacing of vines within the row(s). The important factor is that the vines should, when mature, fill the trellis without crowding each other. The generally accepted spacings are 6 feet for *Vitis vinifera* cultivars, and 8 feet for most other species and hybrids. This may vary with soil fertility, water availability, cultivar, rootstock, and a myriad of other factors. If possible, consult with growers in your area to see what has and what has not worked for them. Spacing is another factor that cannot be undone (short of removing alternate plants).

Grapes, especially in cool climate areas, require maximum sunlight. The rows should be no closer to each other than the height of the trellis, i.e., if the trellis is 6 feet high, the rows should be no closer than 6 feet. Practically, the rows should be as far apart as needed to allow easy access for farm machinery; while there are specialized (and expensive) tractors especially designed for vineyards that can accommodate between row spacings as little as 4 feet, most vineyards are planted with 9-10 feet between rows to accommodate the average farm tractor and associated equipment.

### **Trellising**

Grapevines, being vines, are natural climbers that perform best with some type of support. Trellising materials frequently constitute the single greatest expense in vineyard establishment, and it is critical to select appropriate materials and install them correctly. Because the end posts bear most of the stress of the trellis, they should be strong and well-anchored. Unless a horizontally divided canopy, such as a Geneva Double Curtain, is used (in which case between-row spacing may need to be adjusted), the training system does not necessarily need to be settled upon during the first year of vineyard establishment.

### **Water**

Young grapevines do not have well-established root systems, and young vines may die if they do not have sufficient water during at least the first two growing seasons.

Grapevines, like all other plants, do not “seek out water”, but roots grow and flourish when moisture is available. Most New England vineyards get adequate rainfall during the growing season to maintain the health of mature vines. Some provision should be made to ensure that water can be supplied to young vines during the first two years in case of water stress. Drip irrigation is the best method, but many growers do not want to invest in the labor and expense since it would only be used occasionally after establishment (and not at all in many years). Drought stress during establishment will

negatively impact the long-term health of the grapevine. Once vines are established (3-5 years), drought stress is rare (although still possible) in New England.

### **Weed Control and Grow Tubes**

These are two separate concerns that can overlap from a practical perspective. Plants are in constant competition with each other for nutrients, water, and sunlight. Weed control is essential during vineyard establishment. The use of grow tubes (there are several types on the market) can enhance early vine growth by elevating the temperature and CO<sub>2</sub> concentration in a young grapevine's microclimate. They also promote upright growth of grapevines with no training, and help protect the vines from herbicide damage. There are concerns that grow tubes, if left on too long, can predispose vines to winter cold injury (and subsequent crown gall). Therefore, they should probably be removed by early September to allow the vines to harden off.

Weed control can either be manual or chemical. Especially in rocky soil and/or with grow tubes, chemical is usually easier and cheaper, but the critical factor is that weeds are controlled. Young plants have relatively weak root systems that compete ineffectively with aggressive weeds, and can easily be overwhelmed by them in a very short period of time. It is not uncommon for newly planted vines to be almost invisible by late June due to weeds. There are several pre-emergence herbicides that are approved for use in vineyards to help prevent weed seed germination. There are also post-emergence herbicides that are very effective on existing weeds, but they need to be used with caution to avoid damaging the grapevines. It is very important to control weeds before they get established and begin reseeding.

### **Disease Control**

Foliar diseases at all stages of grapevine growth can reduce overall vine health, subsequent yields in future years, and cold hardiness. This can be especially important in young vines, that have not developed adequate carbohydrate reserves to overcome loss of functional leaf area. The main foliar diseases on young vines in New England are powdery mildew (caused by *Erisiphe necator*) and downy mildew (caused by *Plasmopara viticola*). Black rot (caused by *Guignardia bidwellii*) can also be a problem, but is usually more of a problem in producing vineyards. Powdery and downy mildews can be controlled with a variety of sprays. It is important to read the product labels thoroughly. Some products that control one disease are ineffective on others, and some products that control one disease are incompatible with some products that control others. It important to keep as much healthy foliage on the grapevine as possible for as long as possible.

### **Hilling up and other winter protections**

Grafted grapevines that may be subject to cold damage during the winter may be hilled up with soil or other material to keep the scion (the portion above the graft union) alive. This should be done prior to the onset of potential lethal weather, generally November through mid-December. Hilling up may avoid the prospect of replanting. Organic materials such as wood chips or hay can be effective for insulation, but they can harbor rodents that can cause as much damage as the cold weather. Snow is an excellent

insulator, but cannot be relied on in New England. Covering the graft union to a depth of at least 3 inches (after settling) with soil is the best method of hilling. This can be done manually or with machinery. Some types of farm machinery can be adapted for de-hilling in the spring. De-hilling after the danger of lethally cold temperatures have passed, whether manually or mechanically, is usually more difficult and time consuming than hilling.

### **Training**

Vines should be trained to a basic training system as their growth indicates. Most *V. vinifera* cultivars do not require training in the first (and sometimes second) season except to establish straight trunks. Other species and hybrids that grow much more rapidly may require some training the first season. Installation of at least a basic trellising system during the first season of growth will make initial training much easier. If grow tubes are not used, some type of training support such as bamboo stakes should be used to encourage straight trunks.

There are differences of opinion regarding whether to establish two or three shoots, which will eventually become trunks, as soon as possible, or to “let everything grow”. Data suggest that long term vine health is best achieved by retaining as much growth as possible. There are logistical advantages to establishing permanent shoots as soon as possible, however, so this should not be ruled out as a strategy if it is more compatible with vineyard management requirements.

### **Cropping**

Maturing fruit on grapevines requires the plant to partition the majority of its carbohydrates to the fruit at the expense of other plant organs. Allowing fruit to mature early in a vine’s development can result in long-term weakened plants and reduced productivity. All fruit should be removed during the first and second growing seasons. Only a light (<50% of eventual normal yield) crop should be matured in the third year; the crop should be thinned prior to veraison to accomplish this. It is very tempting to overcrop the third season, but doing so can result in long-term reduced productivity.