

Vineyard Site Selection and Design in New England

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Wine growing regions with challenging climate conditions require more rigorous vineyard site selection. Because of cold winters and often wet summers and harvest seasons, New England vineyards benefit greatly from careful site selection. Mainly, grape growers should be looking for soils and topography that shed water and air, and depending on the type and style of the wine, grow a small to medium size vine.

New cold hardy hybrid varieties have opened wine growing to cold regions in the U.S., and these varieties are already being successfully grown in New England. A recent cold hardy hybrid workshop with John Thull, the research vineyard manager at the University of Minnesota where many of these cultivars were developed, revealed that many of the same viticultural requirements for successful cultivation of European varieties apply to the cold hardy hybrids as well, e.g. canopy and crop management, trellis and training systems, integrated pest management, etc. That generally infers that site requirements for cold hardy and *vinifera* grapes are also similar.

It might be surprising to ask a grower to determine what kind of wine his grapes are destined to make before the first vine has been planted, but the type, style, and often the price-point of the intended wine will largely determine the characteristics sought for in a site to grow that particular wine. In the Finger Lakes, a production wine like Hazlitt's Red Cat requires very different grapes than a Pinot Noir from Heart and Hands Wine Company. For sure any wines being made from *vinifera* or high quality hybrid grapes will require equally high quality vineyard sites to consistently produce grapes that meet the quality parameters.

Paramount viticultural goals are to grow vines with a short vegetative cycle that will, a) ripen its fruit as quickly as possible, and b) have superior cold acclimation habits. Fortunately, the same site features, vineyard design, and viticulture practices serve both of these goals, but site selection is the most important!

Generally, in a cold area warm sites are desirable, and the converse for warm wine regions. In ancient times, the Romans would always look for areas on a hill that snow would first melt as the best place for grapes. Climate is critical to wine production and, in general, a warm site with warm soils is highly desirable, and certain features will enhance these qualities. A site's climate should be evaluated at the macro- and meso-climate scales for their viticultural potential. If possible, rain shadows should be sought, and low winter temperature records (30 years using interpolated climate data) analyzed for the potential for winter injury to vines. Other key climate attributes include length of growing and rainfall (annual and distribution) amounts.

Drainage and fertility are key features of any viticultural soil. If the intent is to grow a large and productive vine, high water holding capacity and ample fertility are preferred. If a smaller vine is desired, then less soil moisture and nutrients are necessary to limit the vegetative capacity of

the vine. This is referred to as soil capacity. Capacity can be ameliorated only slightly and with great difficulty, so these qualities should already be present in the vineyard site.

New England has, for the most part, fertile soils, which are often at odds with the goal of growing a small to medium size vine. Wine growers should seek soils with well to excessively-well drainage classifications, with up to 50 percent rock content – but the amount and quality of “rock content” should be closely examined. Also, limited organic matter (<2%), and especially available nitrogen, are distinct advantages. In general, it is much easier to “bulk up” a vine than to devigorate it, so lower capacity (lighter and warmer) soils are preferred.

Absolute and relative elevation and topographical features are also very important. High sites are cooler during the growing season which can hamper fruit ripening but they often shed cold air during frost and freeze events better than lower sites. Vineyards should be placed on convex surfaces that tend to shed water and air. Any place that air or water can pool (concave surfaces) will be detrimental to vine health and grape quality – grapevines do not like wet feet, they will harden off slower and be more susceptible to winter injury, and cold air can accumulate and cause frost and freeze damage. Slopes, up to whatever amount is considered safe and efficient to work (usually up to 30%), can greatly enhance soil and air drainage. Flat fields on the top of a hill can make fine vineyard site and east to southwest orientation is preferred.

In general, trees make poor neighbors to vineyards. Of course, New England has lots of trees, so this is a difficult relationship. Trees harbor insect pests and diseases, as well as birds during harvest, and some trees like black walnuts, actually exude a toxin from their roots that prevent vines from growing. Trees also block the breeze that can help vines to dry out after summer rains, so if it's possible: avoid trees.

When site capacity and potential vine size, and meso-climate conditions are determined, the vineyard can be properly designed. Spacing between rows and vines will be influenced by the potential vine size, and this will determine density. More productive sites will have rows and vines spaced wider, typical 9-10' between rows and 5-6' between vines. Lower capacity sites may be 6-7' between rows and 3-4' between vines.

Vine size also influences trellis system choice. A big vine is best grown on a divided trellis like Scott Henry or lyre, which consists of over-under or side by side foliage and fruit panels. This essentially doubles the number of linear feet of trellis in a unit area and allows big vines to spread out more comfortably. On moderate capacity sites single canopy systems are used, like Vertical Shoot Position or high wire cane or cordon. Trellis fruiting wire is usually between 30 to 36 inches, and VSP canopy height is 6 feet, high wire systems are trained at 5-6 feet.

Row orientation is ideally north to south, or perhaps 10 to 20 degrees northeast to southwest to take full advantage of the morning sun and deflect some of the warmer later afternoon sun. On hillside rows should be planted up and down the hill.

Varieties should be carefully considered (see accompanying article). The cold hardy hybrids are a good choice for New England, as are some native and traditional hybrid grapes. They are more cold tolerant and generally more disease resistant than *vinifera*, Frost, especially in the spring,

can hinder crop production so varieties with a late bud break or early maturity may be prudent choices. All *vinifera* and some hybrids may benefit from rootstocks, mainly for protection from the root louse phylloxera but also to manage vine size, or impart some other indirect benefit to the vine.

If a soil is too wet it would be wise to consider installing drain tile to help remove excess water. Conversely, if it is too dry, drip irrigation may be necessary, and an adequate water source must be available.

Almost certainly a vineyard in New England will require a fence to prevent deer from browsing newly planted vines or grapes before harvest. Consider excluding rabbits, raccoons, and other leaf and grape eating pests.

Visit vineyards and wineries that have similar goals for grape and wine production to see what they are doing, and talk to the vineyard manager and/or wine maker about site selection and vineyard design features that might apply to your site.

Site selection and vineyard design resources:

- Wolf, T., et al. *The Wine Grape Production Guide for Eastern North America*.
- Chien, Mark. *A Practical Guide to Developing a Commercial Wine Vineyard*. Available as a PDF document on the Pennsylvania Wine Grape Network Website (new grape grower section).
- Lakso, Alan, et al. *New York State Vineyard Site Evaluation*.
<http://arcsrver2.iagt.org/vll/learnmore.aspx>
- Smart, Richard and Robinson, Michael. *Sunlight into Wine: A Handbook for Wine Grape Canopy Management*.