# New York Viticulture #2 –
# Climate and Site Selection, Vineyard Management Tasks

Assigned Reading:
**http://www.nysaes.cornell.edu/hort/faculty/pool/NYSite-Soils/SiteSelection.html**

Jackson, Chapter 4 pp.96-122 (pruning and training systems), 140-145 (fertilization), 153-159 (disease effect on wine quality) 162-163 (powdery and downy mildew), 173-174 (phylloxera), 184-190 (harvest)

*Please note that the reading assignment provides depth and clarification of many points we will not have time to cover in detail during the lecture. I'll draw on the readings as well as lecture material for exam questions. – TEM.*

-challenging climate and site selection
-grape grower's management tasks

**Site Selection**

We live in a challenging climate for viticulture. Growers in New York annually face the possibility of damaging winter temperatures, late spring or early fall frosts that can shorten the growing season, and unpredictable rainfall that can limit available soil moisture and affect vine water relations.

In many locations, we also face soils that are poorly drained, shallow soils that limit vigor and water holding capacity (leaving vines prone to drought stress), and low soil pH that can lead to nutrient deficiencies and aluminum toxicity.

Since all of these factors can limit profitability of grape production, growers must be careful to select appropriate sites for growing grapes, or be prepared to make investments in improving their sites.

In general, some soil characteristics can be modified by adjusting soil pH, installing drainage tiles, and through irrigation. In NY, and especially the Finger Lakes, having a favorable mesoclimate can be an overriding factor in deciding which varieties to plant and where.

**For a complete discussion of site selection please read Bob Pool's discussion of site selection at:**

**http://www.nysaes.cornell.edu/hort/faculty/pool/NYSite-Soils/SiteSelection.html**

**Vineyard Management**

Grape growers have a challenging job. In order to produce high quality grapes profitably they must accomplish several tasks:

1. **Manage growth and cropping levels.** The first and foremost task of a grape grower is to achieve a balance between vegetative growth and crop level. They must channel a grapevine's growth to achieve maximum interception of light, while avoiding excessive canopy growth that can shade grape clusters and interior leaves, leading to poor quality grapes and unfruitful buds. Leaving too much crop on a grapevine delays maturity, limits vegetative growth, and can lead to reduction in vine size and death of the vine. Leaving too little crop can lead to excessive shoot growth, canopy shading, and lower return crop, because shaded buds are less fruitful than buds exposed to sunlight. The overall goal is to achieve an adequate ratio of leaf area to crop level.

   **Training systems** are used to establish the basic form of the vine during establishment. Goals are to arrange the growth of the vine efficiently to maximize sunlight interception, provide a *renewal zone* for choosing canes or spurs for the following year's crop, and achieve good canopy fill without excessive crowding. Choice of training system depends upon the growth habits of the variety (erect versus procumbent growth), vine spacing and vigor, and cost of pruning (mechanized systems) versus value of the grapes.

   **Pruning** provides the first opportunity to regulate the size of the crop and vegetative growth. Growers set a range of the number of buds to leave on a vine based on experience, pruning formulas (that adjust for the previous years' growth), and anticipated levels of bud injury.

   **Shoot Thinning** is used following budburst to adjust the density of shoots, and to remove weak shoots that may not be able to support cluster development.

   **Cluster Thinning** is the most direct (and expensive) method of regulating the crop, and is generally practiced on only high-value varieties.

   **Shoot Positioning** involves manipulating the position of shoots in order to better distribute leaves for intercepting sunlight or improving sunlight exposure to the vine renewal area. On native varieties with a drooping growth habit, shoots are sometimes combed downward to avoid shading at the top of the canopy. For premium wine varieties, vertical shoot positioning is accomplished with moveable catch wires to promote vertical growth of the canopy.

   **Basal Leaf Removal** involves manual removal of a portion of leaves from the base of the shoots to improve sunlight exposure of the fruiting zone.

   **Shoot tipping** or **summer hedging** involves mechanical or manual removal of shoot tips to prevent them from tipping over and shading the canopy.

2. **Manage Fertility and Weeds.** Fertility and weed management require knowledge of how weed growth affects availability of water and nutrients, and an understanding of nutrient deficiency symptoms and diagnostic methods to guide fertilizer application. Growers must optimize nutrient availability by applying the proper amount (but not too much) of fertilizers, increase nutrient availability by additions of organic matter and adjustment of pH, and by limiting competition by weeds. Floor management options seek to manage (not eliminate) vegetation while preventing soil erosion and soil compaction. One of the greatest changes over the past 10 years has been elimination of clean tillage and use of cover crops to manage vine growth and limit soil erosion. Adoption of modern floor management practices has great environmental benefits for the Finger Lakes watersheds.

3. **Protect Fruit and Foliage.** Growers must have a detailed understanding of diseases and insect pests in order to manage them effectively. No other task during the growing season occupies as much of a grower's time and management expertise. In our humid eastern climates, frequent rainfall, leaf wetness, and humidity make disease management an exceptional challenge, with 5 major diseases (Powdery mildew, downy mildew, black rot, phomopsis, and botrytis fruit rot) having the potential to reduce grape quality and affect photosynthesis. In contrast, growers in arid regions such as California only have to cope with powdery mildew and botrytis in most years.

4. **Harvest at the right time.** In a cool climate region such as ours, deciding when to harvest often involves balancing maturity, the probability of rainfall and further disease development, and scheduling issues. Compromises and discussion with winemakers often are necessary to balance quality, maturity, disease incidence, labor availability, and quantity.

To accomplish these tasks, growers must have a detailed knowledge of vine growth and productivity, be able to diagnose nutrient deficiencies, disease and insect problems, identify weeds, and understand the numerous factors that affect grape maturity and harvest dates. They must be proficient in machinery operation and repair, and be able to manage both a permanent and migrant labor force. They must also have an understanding of financial and time management to balance often-competing demands on their time and the cost of production. Managing vineyards profitably is a great challenge in the Finger Lakes region.

**Profitability.** Lets close with a brief thumbnail sketch of vineyard economics by contrasting cost of producing bulk Native varieties such as Concord and premium wine grapes such as *V. vinifera* varieties. Concords sell for $200-280 per ton, and cost about $1200 per acre to grow. To break even, a producer must produce 7-8 tons per acre, which will provide a return of about $300 per acre. To provide a modest income and utilize equipment fully, the bulk producer needs to grow about 100 acres of grapes. *V. vinifera* varieties sell for $1200 to $1600 per ton, but additional costs (more sprays and hand labor) bring the cost of production to $3000 per acre. Break-even point is about 2.5

T/acre, and growers might expect to produce about 3-4 T/acre on average. Net returns would be about $1000-2000 per acre, so 25-40 acres would provide a similar level of income as 100 acres of native grapes.