

III. Vineyard Management

In the humid Northeast, vineyard management is closely linked to the dual goals of pest management and production of quality fruit. With major challenges inherent in cool climate viticulture, vineyard management practices must be fine-tuned to achieve quality goals. From vine spacing and training system choices to pruning practices, canopy management practices and winter protection methods, vineyard cultural practices affect profitability and fruit quality, and need to be applied in a flexible manner to confront each season's unique and different challenges. One overall goal is to strike a balance between cropping levels and vegetative growth to ensure achievement of optimum yield of mature, high quality fruit.

This section addresses variety, rootstock and vine spacing choices, timing and application of winter injury protection, adjustment of cropping levels and shoot density, timely application of canopy management practices, and crop estimation as components that influence environmental sustainability and profitability. For bulk native and hybrid producers, questions address mechanical crop estimation and thinning and vigor management.



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Plant Material and Planting					
	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
Is certified plant material used for vinifera and hybrid selection where possible?	A reputable nursery providing certified plant material (scion + rootstock) is used.	A reputable nursery is used; either the scion or the rootstock is certified.	The nurseryman harvests scion material from a reputable grower whose vines were certified.	Vine scion and rootstock are non-certified material.	
<p>Currently, the primary vine certification program in the U.S. is the Foundation Plant Service (http://fps.ucdavis.edu/). They provide budwood and rootstock that is true to type and virus disease-tested. Generally, CA nurserymen buy material from FPS to create certified increase blocks. Budwood from increase blocks is then used for grafting. The use of certified plant material can reduce the incidence of leaf roll virus. However, certification is not a 100% guarantee against viral infection due to many issues including the difficulty in detecting virus in vines, the possibility of transmission by nematodes or mealybugs and transmission from non-certified virus infected material.</p> <p>Native varieties are included in certification programs. FPS offers Concord, Niagara, Ontario, Catawba and others in limited quantities, as these varieties are not grown in CA. Several nurseries also offer crown gall-free Niagara vines.</p>					
Are the variety and rootstock appropriate for the given site?	Variety and rootstock are appropriate for the given site based on winter hardiness, soil type and site characteristics.	Variety and rootstock are appropriate for the region.		No consideration is given to the appropriateness of variety/rootstock to the specific site or region.	
<p>On replant sites, hybrid varieties susceptible to tomato ringspot virus should be grafted onto resistant rootstock. This includes varieties such as Vidal blanc, Baco noir and DeChaunac.</p>					

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Plant Material and Planting					
	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
Is fungal resistance considered when selecting varieties for planting?		Fungal resistance is considered and varieties resistant to most fungal diseases are selected.	Fungal resistance is considered and varieties moderately resistant to some fungal diseases are selected.	Vinifera varieties that are highly susceptible to fungal diseases are selected.	
Is the row orientation appropriate for the site?	Rows are oriented N-S to maximize sunlight interception. Where necessary, rows are perpendicular to slopes to minimize erosion.			Row orientation is not appropriate for the site and variety/rootstock.	
Does a map of the vineyard exist?	A detailed map exists of the vineyard, allowing accurate calculation of acreage. The map includes varieties, drainage tiles, irrigation mains/submains, buildings, roads, areas of runoff, water bodies (lakes, ponds, streams) and wells. Map information is tied to production records.		A map exists but is inaccurate or incomplete.	No map exists.	
Aerial photo enlargements of your farm can be obtained from local NRCS offices, and many other mapping options, including GIS (Geographic Information System) mapping of soil types, are available to growers.					

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Vineyard Management					
	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
Are there any on-farm experiments evaluating plant material or trellising options?	Experimental varieties, rootstocks and/or training systems are being evaluated on a small scale. Data is taken to evaluate performance.	Experimental varieties, rootstocks and/or training systems are being evaluated on a small scale. Evaluation is anecdotal, data is not taken.		No experimentation is being done.	
<p>On-farm experimentation can encompass almost anything from informal evaluations to formal, replicated field trials. Key ingredients that must be used to make field comparisons useful are: 1) vary only one practice at a time; 2) leave a portion of the same vineyard block ‘untreated’ or with your standard practice; 3) measure something objective; and 4) record your observations. Area extension programs may be useful in helping growers design informal or formal trials. Here are a couple of publications that may be useful for setting up on-farm trials:</p> <p><i>How to Conduct Research on your Farm.</i> Northeast Sustainable Agriculture Research and Education Program (SARE) http://www.sare.org/publications/research/research.pdf</p> <p>Sundermeyer, Alan. 1997. <i>Guidelines for On-farm Research</i>, ANR-007-97, Ohio State University http://ohioline.osu.edu/anr-fact/0001.html</p>					

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Is the training system appropriate for the site and variety/rootstock? <i>Modified from Ohmart and Matthiasson (2000).</i>	Training system accommodates vine vigor allowing optimum canopy density and fruit exposure without extensive canopy manipulation.	Training system accommodates vine vigor but remedial steps are necessary to deal with vine vigor.		Training system is not suitable.	
Most vinifera and many hybrid winegrapes are suited to Vertical Shoot Positioned systems. More vigorous winegrapes may be trained using the Scott Henry system. Native and bulk hybrids with procumbent growth habits are suited to top wire systems such as the Hudson River Umbrella or Geneva Double Curtain. The optimum shoot density for single curtain systems is 4-5 shoots/ft of row. Systems with more than one curtain, such as GDC and Scott Henry will have twice the shoot number.					
Is vine size monitored?	Prior to pruning each vineyard block, randomly-selected, permanently-tagged vines are pruned and the brush is weighed.	Prior to pruning each vineyard block, a few representative vines per acre are pruned and the brush is weighed.	Though vine size is monitored, averages exist on a whole farm basis rather than block by block.	No attempt is made to monitor vine size or track pruning weights.	
One of the key measures of vineyard performance is vine size. Vines must be balanced to facilitate light and air penetration. They must also facilitate the production of economical yields of high quality fruit, whether dealing with labrusca, hybrid or vinifera vines. This topic is addressed in many texts including the classic work, <i>Sunlight Into Wine</i> , by Smart and Robinson (1991). Vine size assessment is done primarily through the weighing of dormant vine prunings. Typically, the weight of canes on a per vine basis ranges from 0.2 – 0.4 lbs pruning weight/ft of row. The ideal weight is related to variety, yield goals, inherent vigor of the scion, etc. For labrusca and hybrid varieties grown on divided canopies, pruning weights would reflect the doubling of linear feet of canopy.					

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If vines are determined to be unbalanced - too small or too large - are steps taken to increase or decrease vine vigor?	A plan is set forth to increase or decrease vigor of unbalanced vines.	A formal plan does not exist but several steps to modify vigor are being taken.		There are no plans to adjust vine vigor.	
To increase vine size: leave fewer buds at pruning, increase nitrogen fertilization, reduce crop level, till row middle cover in spring, and/or increase irrigation. To decrease vine size: leave more buds at pruning, reduce nitrogen fertilization, delay cluster thinning until veraison, establish permanent cover in row middles, and/or decrease irrigation.					
Is shoot density appropriate? <i>Note: these three guidelines apply primarily to training systems that require shoot positioning.</i>	A shoot density of 4-5 shoots per linear foot of row is achieved without extensive shoot thinning.	Where necessary, shoots are thinned to 4-5 shoots per foot of row using the following guidelines: <ul style="list-style-type: none">• Thinning should be done when shoots are <6" in length.• Consideration should be given to the maintaining of the training system.• If possible, sterile shoots should be eliminated first.	Shoot thinning is done though guidelines are not followed conscientiously.	Shoot thinning is not done. Shoot density exceeds recommendations, resulting in a dense, shaded canopy.	
A delay in shoot thinning/shoot positioning leads to poor air and light exposure, important for both pest management and fruit quality.					

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	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
Is shoot positioning done in a timely manner?	Catch wires are lifted on a timely basis, shoots are properly tucked and shoot positioning is conscientiously done.	Canopy maintenance is good but improvements could be made in timing and method.	Catch wires are not always adjusted in a timely manner.	Adjusting of catch wires is perennially behind schedule, leading to poor penetration of air, light and spray.	
Shoot positioning and the straightening of tangled, intertwined shoots, improves air, light and spray penetration. Along with appropriate adjustments in catch wires, these practices facilitate cluster thinning and leaf removal. If these practices are delayed, costs increase due to the lignification of shoots and presence of tendrils.					
Are the canopy management practices of leaf removal and hedging done properly?	Canopy density is such that approximately 50% of fruit is exposed to sunlight. Little or no leaf pulling/hedging is necessary to achieve a canopy of 1.5 leaf layers in thickness.	Leaf removal in the cluster zone is done so that no more than 50% of the fruit is visible. Hedging is done only one time per season. There is no significant growth of lateral shoots.	Leaf removal in the cluster zone is done so that no more than 50% of the fruit is visible. Hedging is done 2-3 times per season with some growth of lateral shoots.	Leaf pulling and hedging are insufficient. The canopy never stops growing, leading to a large canopy with poor air and light penetration.	

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Crop Management					
	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
Is the yield appropriate for the vineyard block?	<p>Yield is adjusted according to the following:</p> <ul style="list-style-type: none"> • Variety • Vine size • Vine health • Historical yield/quality data <p>Guidelines below are followed for respective varieties.</p>	<p>Yield is adjusted according to the following:</p> <ul style="list-style-type: none"> • Variety • Vine size • Vine health <p>Guidelines below are not necessarily followed.</p>		Crop level is not adjusted according to variety, vine size or vine health.	
<p>Labrusca and bulk hybrids: yield is determined by crop estimation at 30 days postbloom. Crop reduction takes place at that time if necessary. For every 3 days the bloom date is earlier or later than the long-term average, an additional ton of fruit can be ripened (when it's early) or must be removed (when it's late).</p> <p>Vinifera and premium hybrids: yields are adjusted according to the parameters above. In general, due to our cooler eastern climate, lower yields are necessary to ripen late-maturing varieties such as Cabernet sauvignon.</p>					

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Crop Management					
	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
Is crop thinning done in a thorough and conscientious manner?	If necessary, crop is thinned according to the guidelines below.	Crop thinning guidelines are followed though improvements can be made in timing and/or execution.	Crop thinning is done without knowing the potential crop or what percentage is taken off.	Crop thinning is not done even when necessary to maintain fruit quality and vine health.	
Labrusca:			Vinifera:		
<ul style="list-style-type: none"> • Thinning is done between 30 days postbloom and veraison. • If done mechanically, there is minimal leaf removal and damage to berries and shoots. • Crop is adjusted to ensure ripening to processor quality standards. 			<ul style="list-style-type: none"> • Thinning is done soon after fruit set. Prebloom cluster thinning is avoided except where improvements in berry set are desired. • For vigorous varieties, thinning is delayed until veraison. • When thinning takes place, diseased or damaged clusters are first removed, overlapping clusters are thinned to facilitate airflow and drying, and clusters on short shoots are thinned or removed totally. • A target number of clusters per vine is determined based on estimated cluster weight. The number is adjusted up or down depending on vine size. 		

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Crop Management					
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Is yield estimated properly?	Yield estimation is based on historical average cluster weights and mid-season sampling of clusters.	Yield estimation is based on cluster counts and historical average cluster weights.	Yields are estimated by looking at the vines and guessing or counting clusters on a few vines.	Yields are not estimated.	
<p>Labrusca: Yield estimation is based on crop estimation practices done 30 days postbloom.</p> <p>Vinifera: In the Finger Lakes, long-term records are used in conjunction with average cluster weights taken at 1200 growing degree days (50°F base). At that point, clusters should weigh approximately half of their final weight. This method is somewhat less reliable on Long Island due to heavy cluster thinning and the use of irrigation.</p>					

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Maintaining Vineyard Profitability					
	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
Are grafted vines hilled up in regions prone to damaging winter temperatures?	<p>For all NY regions except Long Island, all grafted vines are hilled up every year.</p> <p>AND</p> <p>The most cold-sensitive varieties (Gewürztraminer, Pinot noir, Merlot in Finger Lakes) have additional canes buried under the berm to preserve fruiting potential.</p>	<p>For all NY regions except LI, vinifera varieties are hilled up every year.</p> <p>AND</p> <p>Grafted hybrids are hilled up for the first 4 years.</p>	<p>For all NY regions except LI, grapevines are hilled up for the first 4 years but sporadically thereafter.</p>	<p>For all NY regions except LI, cold sensitive grafted vinifera and hybrid vines are not hilled up.</p>	
<p>Although time consuming, hilling up prevents exposing the vineyard to an unacceptable risk of vine and production losses. Hills should be removed during the growing season to avoid scion rooting. Hilling up is generally not necessary on Long Island though periodic episodes of winter injury do occur.</p>					

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Maintaining Vineyard Profitability					
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Are missing vines counted and replaced regularly?	<p>Missing vines are counted and replaced every year. For non-grafted vines, layering is done to replace vines.</p> <p>AND</p> <p>Yield records are adjusted to account for missing vines.</p>	<p>Missing vines are replaced every other year; where appropriate, layering is practiced every other year.</p> <p>AND</p> <p>Yield records are adjusted to account for missing vines.</p>	<p>Missing vines are replaced every few years; layering is practiced every few years.</p>	<p>Missing vines are replaced sporadically or not at all.</p>	
Missing vines reduce vineyard profitability and lead to inefficiency in use of pesticides and fertilizers. Yield must be estimated with missing vines taken into consideration. If overall yield is 4 tons/acre but 50% of vines are missing, functional crop is therefore 8 tons/acre, a potential overcrop.					
Are adequate production records kept to evaluate vineyard profitability?	Vineyard expenses and income are recorded for each individual block.	Vineyard expenses and income are recorded by variety but not by individual block.	Vineyard expenses and income are not broken out by variety and block but overall farm income and expenses are known.	Overall farm income and expenses are recorded only when tax returns are filled out.	
Many growers in NY have a wide range of varieties with different prices and inputs. Knowing what is spent in each individual block is crucial for making vineyard management decisions and improving profitability. This is particularly true for natives and bulk hybrids.					