



Shiloh Estate

SHILOH VINES & WINES KNOWLEDGE BASE SERIES
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Establishing a Small Vineyard

by
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Coordination Draft
Comments Welcome

Strategic Positioning

The establishment of any vineyard must include consideration of a complex array of decision variables associated with winegrowing, winemaking, and winemarketing. Many of these decisions are strategic in nature as they must be made now and will not bear fruit (and wine) for several years. Whether your return on investment will be measured in pleasure or treasure—or both—the following variables are among those critical to enterprise success:

- **Place**—Location, climate, topography, soil.
- **Rootstocks**—Each rootstock type (and cultivated variety) has its optimal place.
- **Cultivars and clones**—Compatibility with place and rootstock plus future consumer demand for wine to be produced from the grapes, target markets, price points, etc.
- **Best practices**—Cultural and management practices compatible with winegrowing (and related) goals and objectives.

Shiloh Vines & Wines

This article describes selected decisions and practices associated with the establishment of a very small backyard nano-vineyard in Napa Valley.

The particulars may or may not apply to other vineyard and winegrowing situations.

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Place

The vineyard site is situated in the City of Napa close to the Carneros winegrowing region.

The climate zone is likely somewhere between that of Region I and Region II.

The site is relatively flat with a slight slope (hopefully enough to eliminate the need for a frost-protection system).

Dellavalle lab (<http://www.dellavallelab.com/>) analyses put the soil pH at 6.2 with nutrients within normal ranges for grapes. [Note a smaller vineyard planted nearby in 1998 had a lower pH thus necessitating augmentation with calcium carbonate (oyster shell lime).]

Furthermore, the soil is somewhat shallow (24" - 36") and somewhat clayey.

Rootstock

The 101-14 Mg rootstock was selected based on the place variables outlined above. 101-14 is a *Vitis riparia* and *V. rupestris* cross with a 60° geotropic angle and excellent phylloxera resistance as well as good adaptation to wet feet, fair nematode resistance, high rooting quality, and poor-to-fair adaptation to drought. 101-14 likes clayey soils. The bad news is that irrigation is needed. The good news is that clayey soils retain water and have a high cation exchange capacity.

See my "Vineyard Rootstock Selection" article available from <http://www.shilohestate.com/>.

Cultivars and Clones

Pinot noir and Chardonnay are two most famous cultivated varieties grown in the Carneros appellation several hundred feet south of my place. Pinot noir was selected because it presents special winegrowing and winemaking challenges—it is difficult to grow and make an excellent Pinot noir—and the path of least resistance has never appealed to me.

According to Dr. Stephen Krebs, program director of Napa Valley College's Viticulture & Winery Technology Program (as well as other experts), a field blend is worth considering, especially for small vineyards.

Accordingly, a blend of Pinot noir clones 115, 667, and 777 were planted—all are French (e.g., Dijon, Lyon). A fourth clone—828—was desired but is not yet available in the United States.

These were purchased from Caldwell Nursery in Napa Valley (email: john@caldwellvines.com).

Cultural Practices

Vineyard Size & Yield—The vineyard comprises eight rows of 20 vines each—160 vines planted with 4' x 5' spacing. This equates to 3,200 ft² or 0.0734 plantable acres.

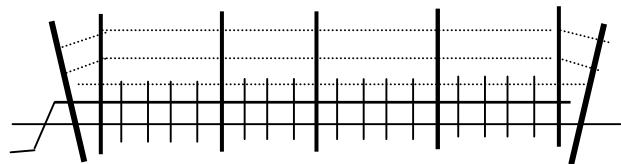
Although the per plant yield target is 4 pounds, the actual yield could be higher or lower. It is prudent to consider several 160-vine scenarios:

	vine	lbs	tons	gallons	750 ml	cases
WRC	2	320	0.16	22.4	113	9.42
MLC	4	640	0.32	44.8	226	18.8
BRC	6	960	0.48	67.2	339	28.3

The most-likely-case (MLC) scenario based on 4lbs/vine yields 226 bottles of wine (at 140 gallons of finished wine per ton vineyard yield; other assumptions could be used). The worst-reasonable-case (WRC) and best-reasonable-case (BRC) scenarios yield 113 and 339 bottles, respectively. Note that vineyards that underpin some luxury wines (e.g., Opus One) target about 4 pounds per vine (so 6 pounds per vine is not necessarily "best"). [Note that the 4' x 5' spacing equates to 2,178 vines per plantable acre and, at 4 lbs/vine, the per acre yield is 4.356 tons.]

Trellis System—Not many trellis systems are compatible with the fairly-tight vine-row spacing. A vertical shoot positioning system is the logical choice.

The system installed for the Shiloh Vines & Wines nano-vineyard has eight identical rows anchored by two angled 8' (3' below ground, 5' above) 4"-diameter loge poles with five 8' steel T stakes (2 1/2' below ground, 5 1/2' above), and 15 4' tomato stakes (32" above ground).



Also suggested by above figure (per row):

- One 12 gauge fruiting wire 30" above ground
- Four 14-gauge foliage wires (two at the high point of T stakes, one on each side on 4" spacers plus two more midway toward fruiting wire)
- Drip line hanging 6" - 8" below fruiting wire and attached with 10" - 12" metal ties (with a 1/2 gph pressure-adjusting emitter 9" or so on each side of each vine for a total of 320 emitters)

Vine Selection—Dormant benchgrafts were selected (other choices include green-growing vines, dormant potted vines, rootstock only with subsequent field budding).

The mix of clones was: 88 Pn 777/101-14, 30 Pn 115/101-14, and 40 Pn 667/101-14 (plus 3 Pn 115/5C replanted from existing vineyard). This totals 161 and includes one spare vine.

Pre-Planting Considerations—Some other things to consider are:

- **Training/pruning**—The most popular combination in Napa Valley is cordon-trained/spur-pruned (although some older vineyards are head-trained/spur-pruned). My nano-vineyards are head-trained/cane-pruned.
- **Laterals**—Bilateral cordons are the most popular in Napa Valley. Other choices include quadrilateral cordons, bilateral canes, and unilateral canes. I use a Guyot unilateral cane method—this results in the one-year-old wood from last season becoming the 4' (or so) cane for the new season (along the fruiting wire) with new shoots rising upwards through the foliage wires.
- **Soil preparation**—Although deep ripping to 3' or more is recommended, this is not practical for very small vineyards. Soil amendments and even fumigation can also be accomplished. For the new 160-vine block, I am doing neither.

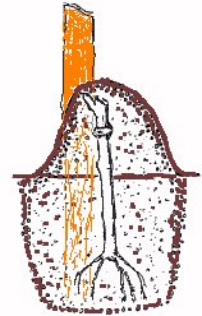
Initial Quality Control—According to the Guidelines for Successful Planting (section of a handout "A Formula for Success" prepared by Ed Weber *et al* for the 1996 Unified Symposium in Sacramento), several steps should be implemented:

1. **Upon delivery (or pick-up)**—Count vines to verify number bought and make sure that they are properly labeled (e.g., source, rootstock, variety, clone, certification tags). Keep all tags and begin record of block to be planted.
2. **Trimming**—For dormant benchgrafts, tops should be trimmed back to two buds. Remove any scion (i.e., variety) roots. Trim basal (i.e., rootstock) roots to 4" - 6".
3. **Inspect Vines**—In addition to trimming, plants should be inspected viz. too short or too crooked, insufficient top or root growth, rootstocks with fewer than three nodes, cracked or broken shafts, graft unions that fail the thumb test (break under modest pressure), obvious presence of crown gall (or other disease).

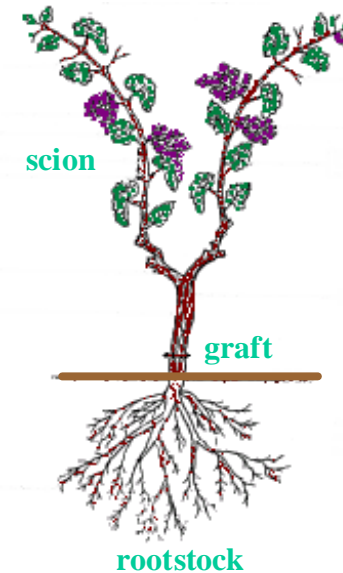
Planting Dormant Benchgrafts—Again from the Guidelines, plant between mid-March and early June. Take delivery from cold storage 7 -10 days

prior to planting and store them in a cool location away from direct sunlight where they become acclimated to the ambient conditions of your vineyard. Keep moist in sand or shavings.

Take a few benchgrafts, let roots get wet in bucket of water. Dig an 18"-hole, place a vine in hole, position it close to stake, spread the roots, fill the hole two-thirds full with soil, and raise the vine to proper height (graft union 3" or so above ground). Tamp soil around roots and fill in rest of hole. Mound over top part of vine with soil (preferred) or protect with a milk carton or grow tube (added later if mounding method used).



If soils are moist, no irrigation is needed. If dry, irrigate sparingly. Do not, however, start regular irrigations until the vines have begun to grow and several leaves have formed. Note that a spaghetti tube is used to transmit water into the side of the milk carton (or adjacent to the vine); do not put water directly on vine.

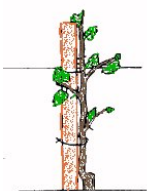


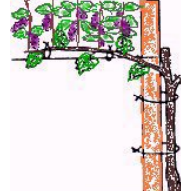


I install one of the two emitters with a spaghetti tube and later, when the shoot or shoots are about 18" high, I remove the milk cartons and add the 2nd emitter.

Usually, shoots from the two buds are retained during the first growing season (clusters are not usually present the first year).

Training—Prior the second growing season (or second leaf), remove one of two shoots, trim off lower lateral shoots, leaving at least two-topmost laterals (some leave three or four). Train the main shoot up the stake and as soon as a reasonable height is attained, place unilateral along fruiting wire (keep two-bud spur for next seasons lateral). It takes three or four years for the first harvest.

Training of Vine up Stake and over Fruit Wire (Unilateral Guyot: Head Trained, Cane Pruned)

			
<p>2nd Growing season—Remove lower laterals (early). Tie topmost laterals to fruit wire (for cordon or cane).</p>		<p>3rd & 4th Growing seasons—Tie one-year-old wood to wire; save two-bud spur (early). Train shoots upwards.</p>	

Management Practices

Costs—The cost to establish a vineyard varies. In the case of the Shiloh Vines & Wines 160-vine Block 2, the cost (net of land and labor) was about \$960 or \$6 per vine. Using Shiloh Estate's Vineyard Planner—based on the UC-Davis 30-acre model but

with a land cost of zero)—the cost per vine (including labor) is \$5.00. See: <http://www.agecon.ucdavis.edu/outreach/crop/cost-studies/99SONOMAWINE.pdf>.

Operational Tasks—Given a small vineyard, the tasks listed in the table merit consideration.

Small Vineyard Management Task Overview by Season (Napa Valley)*

TASKS	Dormant	Spring Growing	Summer Growing	Harvest
	Leaf Fall, Dormancy	Bud break, Bloom, Growth	Veraison, Early Harvest	Harvest, Post-Harvest
	Dec-Jan-Feb	Mar-Apr-May	Jun-Jul-Aug	Sep-Oct-Nov
<p>Site Preparation</p> <ul style="list-style-type: none"> Trellis system Vines 	Strategic plan Budget Annual work plan	New vineyard/block layout Install trellis system Plant vines	Crop yield forecasting Vine training Harvest planning & preparation	Plant cover crop if vigorous site; otherwise wait until late Summer prior to 3 rd growing season
<p>Infrastructure</p> <ul style="list-style-type: none"> Trellis system Irrigation system Frost protection Drainage systems 	Trellis system maintenance Other infrastructure maintenance	Irrigation sys maintenance Irrigation system operation (beginning in May)	Irrigation system operation Fertigation	Post-harvest irrigation Erosion control (including cover crops)
<p>Vine Planting</p> <ul style="list-style-type: none"> Dig, plant, mound Vines (cost) 	Some site preparation (as feasible)	Dig holes Planting Mound	Unmound Milk cartons/growtubes	
<p>Vine & Crop Mgmt</p> <ul style="list-style-type: none"> Install, remove grow tubes Frost protection Hand vine care Training Irrigate Fertilize Disease-pest management Prune vines Pick-up truck 	Pruning (late February or early March) N-fertilize Eutypa dieback work	Mildew control (sulfur) Tying, shoot positioning, thinning Suckering, weak shoot removal Late or double pruning Cluster thinning Soil & petiole analysis Foliar fertilization Eutypa dieback work	Install/remove milk cartons/grow tubes Grape maturity sampling & monitoring (visual, taste, °Brix, pH, TA, etc.) Shoot positioning, hedging, leaf removal, crop thinning, suckering Mildew control (sulfur), Bird netting (by 10 or so °Brix) Monitoring for pests, diseases	Grape maturity sampling & monitoring (visual, taste, °Brix, pH, TA, etc.) Fertilization (K, B, Lime, N) Post-harvest mildew control (if needed)
<p>Vineyard Floor Mgmt</p> <ul style="list-style-type: none"> Disk, plant, mow, chop Hand hoe Weed control 	In-row weed control Gopher control Plant prune trees	Inter- & in-row weed control (mechanical, chemical) Mow, mulch inter-row	Summer weed control (spot)	Whole vineyard removal, fumigation Ripping, erosion control Plant cover crop, add compost
<p>Crop Harvest</p> <ul style="list-style-type: none"> Pick grapes Field QA Transport 	Quality assurance plan	Sampling plan	Pick forecasts Harvest (early varieties) Field quality assurance Transport to winery	Pick forecasts Harvest (late varieties) Field quality assurance Transport to winery

* Based on table developed as part of VWT 232 Vineyard Management class at Napa Valley College.