



Shiloh Estate

SHILOH VINES & WINES KNOWLEDGE BASE SERIES
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Maintaining a Small Vineyard

by
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Coordination Draft
Comments Welcome

Background

This is a companion piece to “Establishing a Small Vineyard” (March 2002). The material in this paper is based largely on maintaining a small backyard vineyard in Napa Valley (named *Shiloh Vines & Wines*). This 0.12-acre, 263-vine nano-vineyard comprises two blocks:

- **Block 1 (Planted 24-26 May 1998)**—48 Pinot noir (clone 115) on 5C rootstock and 55 Merlot (clone 3) on 101-14 rootstock with 4’ x 4’ spacing, vertical shoot positioning, and head-trained, cane pruned vines. Now in its 9th leaf. Block 1 covers about 1,648 ft² or about 0.04 acres.
- **Block 2 (Planted 28-31 March 2002)**—160 Pinot noir (clones 115, 667, 777) on 101-14 rootstock with 4’ x 5’ spacing, vertical shoot positioning, and head-trained, cane pruned vines. Now in its 5th leaf. Block 2 covers about 3,200 ft² or about 0.08 acres.

The Vintage 2005 grape yield (actual) and wine production (estimated) are shown below:

Yield Statistics	Pinot noir		Merlot
	Block 1	Block 2	Block 1
Harvest	133 lbs	464 lbs	296 lbs
Vines	48	160	55
Pounds/Vine	2.8	2.9	5.4
^o Brix	21.5		24.2
pH	3.57		3.69
Titrateable acidity	5.7 g/L		7.0 g/L
Bottles Wine*	180		90
Cases Wine	15		7.5

* Planning factor: 120 bottles finished wine per ton grapes

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Once established, a vineyard needs to be properly maintained to help ensure that the vines remain healthy and each year’s harvest meets quality and yield objectives. The tasks listed below can be performed by one person with the requisite skills (pruning and maturity analysis and evaluation skills are especially useful); netting for birds is easier with two people but doable with one.

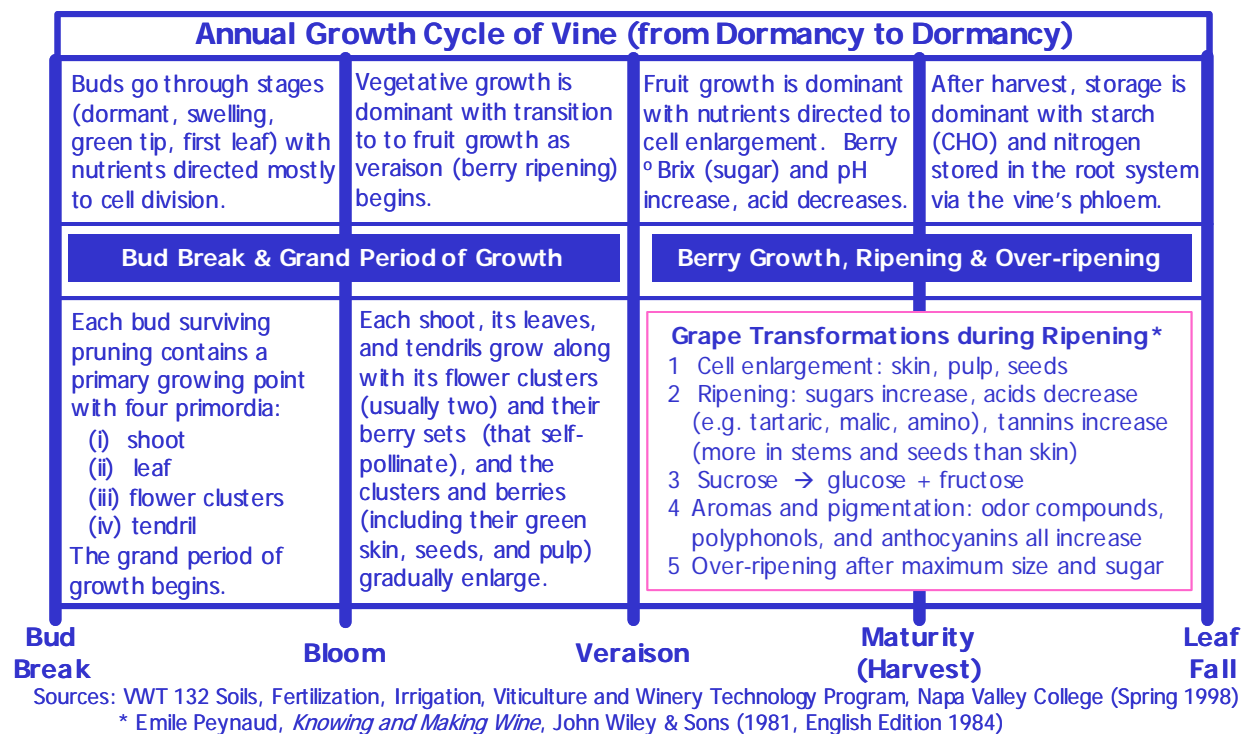
Major Maintenance Tasks by Phase			
Dormant	Spring Growing	Summer Growing	Harvest
Dec-Jan-Feb	Mar-Apr-May	Jun-Jul-Aug	Sep-Oct-Nov
Planning	Planting	Mildew	Maturity eval
Pruning	Mildew	Maturity anal	Harvest
Fertilization	Mgmt of:	Mgmt of:	Netting (off)
Repair/Other	Floor, Canopy, Crop	Floor, Canopy, Crop	Irrigation
		Irrigation	Fertilization
		Netting (on)	Cover crop

It is important to recognize that the timing and duration of tasks within these phases is dependent on the weather and other factors.

Although general tasks like planning and repair are ongoing; the dormant season represents an opportunity to catch up on tasks not accomplished during busier phases.

Interested winegrowers might be interested in the following papers on www.shilohestate.com:

- [Establishing a Small Vineyard](#)
- [Winegrowing](#)
- [Vineyard Irrigation](#)
- [Cover Crops](#)
- [Vine Balance](#)



Dormant Phase (Dec-Jan-Feb)

Planning—Although planning is a continual activity, during the dormant months it is convenient to plan out the coming year (e.g., determine needed repairs and re-plantings, buy selected equipment and supplies).

Pruning—With a small vineyard pruning can be delayed to just before bud break—usually late February or early March. The Pinot noir is usually a couple of weeks ahead of the Merlot. My vines are head-trained, cane pruned. For a few years a unilateral cane (Guyot system) was employed. This means a cane at least four feet long should be available—not always possible. A couple of years ago a switch was made to a bilateral approach that requires two canes of at least two feet in length—usually quite possible. Additionally, the bilateral canes avoid mid-vine decline where the shoots in the middle of the cane are less vigorous than the first few and last few. This year pruning was done in mid-March.

Fertilization—In early March, ½ cup of fertilizer (NPK of 15-15-15) was applied around the base of each vine (the idea is to apply before the rains end and before the vegetative growth begins in earnest). In some previous years Calcium Nitrate (NPK of 15.5-0-0) was used.

Repair & Other—In January any dead or badly damaged vines are replaced via a bare-root transplant to the vineyard (from a ‘spare’ row). In both 2005 and 2006 two vines were replaced (this is fairly typical with gophers the main villains; as the vines grow in size this is less a problem).

After pruning, any broken grape stakes are replaced and the fruit and foliage wires are tightened. Round-Up is applied to the vine rows and the middles are mowed if needed. The drip irrigation system is flushed and tested with any malfunctioning emitters replaced.

Spring Growing Phase (Mar-Apr-May)

Planting—Although this is vineyard establishment, any new vineyard blocks would be planted during this period (if using green-growing or bench grafts)

Mildew—Worldwide, vineyards are generally sprayed with sulfur to prevent powdery mildew from developing.

Spraying Equipment & Supplies

- 1 Solo backpack spray unit (3-gallon capacity)
- 2 Thiolut dry flowable micronized sulfur (wetable)
- 3 Spreader-binder

Method: In small container mix water, 8 oz sulfur, 4 oz spreader-binder. Add 1 gallon water to Solo spray unit, add sulfur mix, and, stirring, add water until full.

In some meso-climates, there is no need to spray very young vines for powdery mildew—say for the first two or three years.

Nano-vineyard managers generally use wettable sulfur but some use sulfur dust. At Shiloh Vines & Wines (*SV&W*), located less than 1000 feet north of the cool Carneros AVA (American Viticultural Area), wettable sulfur is employed; there has never been evidence of powdery mildew. A three-gallon batch is usually sufficient for the entire vineyard.

Vineyard Floor Management—The floor consists of the soil (especially the top-level organic matter and compost), cover crop (usually planted in late October or early November), and weeds that need to be eliminated and controlled in the vine rows and middles. Some cover crops cannot be mowed until the seeds harden and drop to help with next year’s crop. At *SV&W* subterranean clover (subclover) is used; this can be mowed early. Roundup is sparingly used to control weeds in the vine rows. Sometimes compost is applied in the vine rows. Also, near the floor at the base of the vines, shoots that push out are suckered (i.e., removed by snapping off). In vigorous years like 2006, suckering must be done several times. [In addition, at *SV&W*, gophers are a problem but have never been eliminated in spite of some near-valiant efforts; they get one or two vines a year.]

Vineyard Canopy Management—The shoots emanating from the bi-lateral canes and their leaves, tendrils, and the apical meristem comprise the canopy. Shoots can be tipped, topped, or hedged to achieve about eight leaves per cluster (about 16 leaves per shoot); this keeps the vine in balance and avoids undercropping. In addition, some basil leaves can be removed to allow more sunlight to reach the clusters and their berries. At *SV&W* some hedging is done but no leafing. There has never been a problem in maturing the crop. Usually no irrigation until the next phase.

Vineyard Crop Management—Management of the crop and achieving balance between the canopy and the fruit is best achieved during pruning when the proper number of shoots and buds are retained (along with replacement buds near the base of each cane to provide for next year).

To help achieve balance, shoots can be eliminated or clusters can be dropped to achieve the energy the crop needs to reach optimal maturity.

Spraying for Powdery Mildew*

Resistance to infection: Different varieties differ in susceptibility to the disease. Older tissues develop resistance. After *veraison* (berry softening and color change), fruit becomes resistant (over 10-12 °Brix)

Environmental factors: Temperature is the primary factor in disease development with 68-76 °F optimal for infection. On very hot days—above 100 °F for several hours—the conidia is inhibited or killed. The disease is more prevalent under humid than dry conditions. Low diffuse light favors the disease and bright sunlight inhibits the disease.

Control methods: Fungicides, especially sulfur, are used to prevent powdery mildew:

1. Dusting sulfur applied at shoot lengths of 6”, 12”, 18”, and 24”, and then every two weeks until *veraison*
2. Wettable sulfur (with wetting agent) with application as in 1 above
3. There are some other methods with dust-wettable sulfur mixtures that can include sterol inhibitors

* Excerpted from Napa Valley College Viticulture and Winery Technology program handout

Summer Growing Phase (Jun-Jul-Aug)

Mildew—As for the previous phase but usually not into July when the danger is past (at least in the meso-climate enjoyed by *SV&W*).

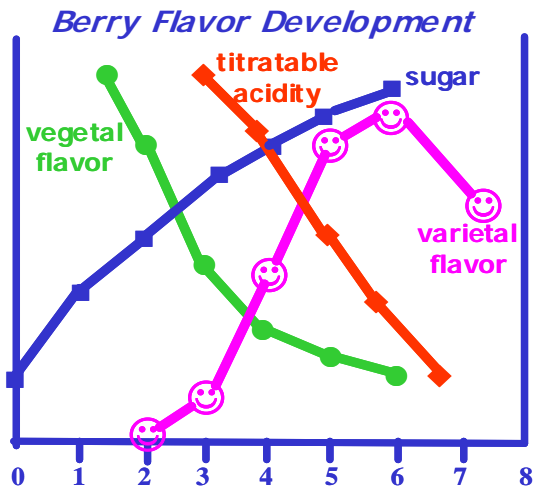
Maturity Analysis (Quantitative)—Beginning in August, *quantitative* measures of the berries can be made. (The more important *qualitative* measures are discussed in the next section.)

Criteria—Quantitative analyses (e.g., °Brix, pH, TA) with the winemaker often establishing a target based on °Brix, an estimator for berry sugar and resultant alcohol content of the wine (although judgment vis-à-vis berry maturity usually trumps °Brix).

Method—Periodically, collect a representative sample of 200 (or so) berries, crush in a plastic bag, and measure °B, pH, *titratable* acidity (TA), and (sometimes) malic acid (from Vintage 2002):

Pinot noir	23 Aug	30 Aug	6 Sep	13 Sep	20 Sep	27 Sep	3 Oct
°Brix	12.6	18.6	19.8	20.2	21.6	22.5	23.8
pH	2.93	3.17	3.21	3.23	3.29	3.32	3.41
TA	16.6	12.5	10.0	9.4	9.1	8.9	8.6

Influences—°B, TA, and pH are associated (mostly) with the wine’s alcohol level, tartness, and microbial stability, respectively.



Source: VWT 180 Fundamentals of Enology
Napa Valley College (Fall 2002)

In June the berries are usually small and green; as time goes by they slowly ripen and begin to turn rose, red, and black and gradually soften. As the berries mature, the sugar (as measured in degrees Brix) goes up (as does the pH), the acid goes down. Vegetal flavors decrease as varietal flavors increase. The time to pick is when the flavor peaks and the °Brix and acid are about right. Harvest nearly always occurs in the next phase in October (give or take).

Floor, Canopy, and Crop Management—The approaches initiated in the previous phase are continued. At *SV&W*, this mostly means mowing the cover crop, positioning the shoots, and hedging for vine balance. Crop has never been dropped.

Irrigation—Winegrowers agree that irrigation is the most important management practice for quality wine grape production known to directly effect fruit acidity, pH, and phenolics, including anthocyanins in red grape berries. Sophisticated techniques are often employed. At *SW&W*, the vineyard is generally not irrigated until version, and then only sparingly. An exception is when a heat wave is expected or encountered; then on the first or second day of the wave from 6 to 12 gallons per wine is applied via the drip irrigation system.

Netting (On)—When the berries exceed 10-13 °B or so, the sugar begins to attract birds. The best defense is netting. At *SV&W*, 14' wide netting, cut to the correct length for each row, is draped over the vines, touching the ground on both sides. This works. Other methods, for example, "scare" tape, have not proved useful.

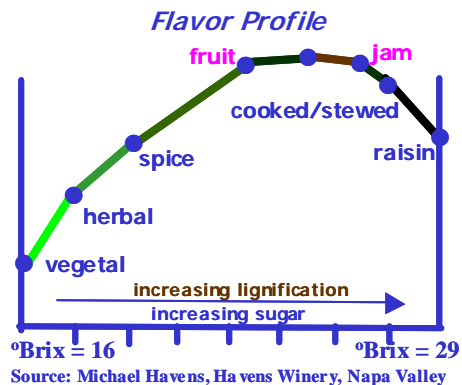
Harvest (Sep-Oct-Nov)

Crop Maturity Evaluation (Qualitative)

Criteria—These evaluations rely on the senses.

Method—Observe, crush, smell, pinch and rub, chew and taste. The pick date is based mostly on the winemaker's qualitative evaluation.

Influences—The crop and berry ripeness at harvest influence nearly all wine components, most importantly, varietal "odors" that contribute to aroma, flavor, and finish—all reflect variety, rootstock, clone, terrior, and cultural practices.



Source: Michael Havens, Havens Winery, Napa Valley

Harvest—Not part of maintenance, but occurs when the crop is judged optimal for picking. The clusters are picked working under the nets.

Netting (Off)—After harvest, but before leaf fall, the bird netting is removed and stored for the next season. Doing this soon after harvest pays off as less leaves get caught in the net.

Irrigation—After harvest, but before leaf fall, a final irrigation is done to help the vines move nutrients into the root system where they are stored for use next season.

Fertilization—After harvest, but before leaf fall, the fertilization step performed during the end of the Dormant Phase is repeated; along with post-harvest irrigation, this helps the vines to move carbohydrates to the root system for future use.

Cover Crop—One of the last tasks to be performed in the annual cycle is to seed the middles and vine rows with cover crop seed. The experience at *SV&W* has been mixed but most years the results have been satisfactory. The seeds are broadcast when a combination of still-warm days and early rains foster germination.

And the cycle repeats—vintage after vintage.