COOPERATIVE EXTENSION • UNIVERSITY OF CALIFORNIA
SACRAMENTO COUNTY

# Tree and Vine Newsletter

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## NEW STUDIES DETAIL ESTABLISHMENT AND PRODUCTION COSTS

UC Cooperative Extension has produced several new or revised cost of production studies, which complement dozens of others already available. The costs and practices detailed in these studies are for a hypothetical farm and are intended to be used as guides only. They can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. A blank, *Your Cost,* column is provided on which to enter your actual costs.

The new or revised studies, published in 2002, are available from the Department of Agricultural and Resource Economics, University of California, One Shields Ave., Davis CA 95616, or call (530) 752-1515 to order a hard copy. A $3.00 handling fee is charged for each report mailed from the department. The studies can also be downloaded from the department's Web site at http://coststudies.ucdavis.edu. The new studies include:

**Pears:**
Sacramento County (due out early July 2002)
North Coast (2002)
North Coast, using puffers (2002)

**Wine Grapes:**
Sacramento River Delta – Chardonnay (2002)
Lodi – Cabernet Sauvignon (2001)
Sierra Nevada Foothills – Zinfandel (2000)

**Cherries:** Northern San Joaquin Valley (2001)
**Apples:** Granny Smith – No. S.J. Valley (2001)
**Walnuts:** Sacramento Valley (2002)
**Almonds:** Sacramento Valley (2001)

## DNA ANALYSIS OF GRAPE VARIETY SERVICE MADE AVAILABLE BY UCD

Carole Meredith, Professor in the Viticulture & Enology Dept. at UC Davis, has announced that her lab is now expanding their DNA analysis service for private parties who require objective varietal identification of grapevines.

Although a number of research laboratories in several countries have the capability to perform grape DNA typing, a commercially available variety identification service has only been available from the Australian Wine Research Institute. The availability of that service, however, has had problems related to sample preservation and transport, the Australian plant importation regulations and a limited reference database of varieties. The Australian service has now been suspended until further notice.

Here are the particulars of the UCD service:

In a uniform vineyard of unknown identity, Dr. Meredith recommends testing 2 or 3 vines. In a mixed vineyard, test at least 1 vine of each type. They prefer to work with tiny leaves at the shoot tip, while the shoot is still actively growing. But they can also use older leaves and other tissues if necessary.

The lab provides materials that are used to quickly dry the leaf samples chemically. Not only does this process preserve the DNA in excellent condition and eliminate the need to keep the samples chilled and moist, but also the samples are dead and thus not subject to federal quarantine regulations governing the importation of living grapevine tissue.

The lab identifies varieties by comparing the DNA profile of the sample to their database of over 700 grape varieties, by far the largest such database in the world. The database includes all the wine, table, raisin and rootstock varieties grown in California and most of the varieties grown in other major viticultural regions.

The cost of this service is $300 per vine. This is comparable to the $455 Australian charged by the Australian Wine Research Institute. For more information or to arrange to have vines tested, contact Gerald Dangl (530/752-7540, gsdangl@ucdavis.edu).

## Tissue Sampling for Nutrients

It's a good idea to sample leaves or petioles periodically to determine if any nutrients are lacking or excessive. Soil sampling is useful to determine if potential nutrient or salt problems may occur, but only tissue sampling can tell you what the plant is actually taking up. Annual sampling is ideal, but if trees or vines are growing and producing adequately on a maintenance program, sampling every two to four years may be adequate. However, if deficiencies such as nitrogen or potassium occur periodically, annual sampling is best.

**Sampling in orchards**. The best time for sampling deciduous fruit tree leaves is July. Use fully expanded, mature leaves, preferably from non-fruiting spurs; on peaches, use basal to mid-shoot leaves. Take separate samples from different blocks, varieties, and areas with different soil types. Problem areas are often compared to good areas in an orchard.

Leaves may be picked 4 to 6 ft. from the ground and should come from different sides of the trees. Adequate samples consist of at least 40 leaves from small plots, or 100 leaves from orchard blocks of 10 to 20 acres. Most standards are based on samples of 60 to 100 leaves. Take no more than one leaf per tree while walking randomly or up one row and down another.

Normally, leaves are collected in paper bags and stored in portable ice chests. Plastic bags can be used, especially for samples that must be kept fresh for several days until washed. Leaves in plastic bags must be placed immediately in a cooler and protected from direct sunlight.

Leaves to be analyzed for macronutrients usually need not be washed. If micronutrient analyses (B, Cu, Mn, and Zn) are to be made, leaves should be washed in water containing a small amount of detergent followed by rinsing in tap water and by two distilled water rinses. Leaves should be dried in forced-draft ovens at 65 to 70 C.

Spray residues of micronutrients cannot be washed off leaves satisfactorily, so it is worthless to analyze micronutrient-sprayed leaves. Where N and K sprays are used, the amount of spray residue is small compared to total content of N and K in the leaf, and therefore analyses can be safely made a week after application.

**Sampling in vineyards**. To determine the nitrogen status or general nutrition levels of vineyards, samples must be taken in May during full bloom. Sample 75 to 100 petioles (removing the blade) from each block or uniform area, using leaves opposite the clusters, toward the base of the shoot. Put the petioles in a paper bag and keep cool until they are dried in a forced-draft oven. If they are allowed to air dry, some of the nitrate metabolizes, resulting in an inaccurate analysis. Do not sample after a foliar spray if sampling for a nutrient applied.

Sampling for troubleshooting vine disorders can be done whenever the abnormal appearance is noted. For midsummer resampling of an area with a questionable bloomtime potassium level, sample in mid-July at berry softening. This petiole sample should be taken from the most recently matured leaf on a shoot (5 to 7 leaves from the tip). To diagnose toxicities of chloride, sodium, or boron in mid to late summer, collect both the petioles and the blades for separate samples, since greater amounts of elements like boron may accumulate in the blade.

The following table shows appropriate levels of several nutrients, which should be used as ballpark figures only.

Table 1. Critical nutrient levels in tree crop leaves.

| | N (%) | P (%) | K (%) | Zn (ppm) | Boron (ppm) | | | Na (%) | Cl (%) |
|---|---|---|---|---|---|---|---|---|---|
| | ----------Adequate---------- | | | | Defic. | Adequate | Toxic | Toxic | Toxic |
| **Apple** | 2.0-2.4 | 0.1-0.3 | >1.2 | 18 | <20 | 25-70 | >100 | N/A | >0.3 |
| **Cherry** | 2.0-3.0 | 0.1-0.3 | >1.0 | 14 | <20 | N/A | N/A | >0.20 | >0.3 |
| **Pear** | 2.3-2.8 | 0.1-0.3 | >1.0 | 18 | <15 | 21-70 | >80 | >0.25 | >0.3 |
| **Walnut** | 2.2-3.2 | 0.1-0.3 | >1.2 | 18 | <20 | 36-200 | >300 | >0.10 | >0.3 |

Table 2. Critical nutrient levels in grapevine petioles, unless blades are specified.

| $NO_3$-N (ppm) | P (%) | K (%) | Zn (ppm) | Boron (ppm) | | | Na (%) | Cl (%) |
|---|---|---|---|---|---|---|---|---|
| ----------Adequate---------- | | | | Defic. | Adequate | Toxic | Toxic | Toxic |
| 500-1,200 | >0.15 | >1.5 | >26 | <25 | >30 | 100-150 pet.<br>>300 blades | >0.5 pet.<br>>0.25 blades | >0.5 bloom<br>>1.0-1.5 summer<br>>0.5 blades |

**Sources:**

Soil and Plant Tissue Testing in California (1983), Univ. of Calif. Division of Agricultural and Natural Resources, pub. no. 1879.

Grapevine Nutrition and Fertilization (1982), Univ. of Calif. Division of Agricultural and Natural Resources, pub. no. 4087.

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*This article was adapted from the winter 2002 edition of Foothill Marketing, a newsletter from UCCE Placer/Nevada Counties. It was summarized from the UC Small Farm Center website (www.sfc.ucdavis.edu).*

The blueberry is delicious as a fresh fruit snack or in a variety of foods such as blueberry pies or muffins. Although most large-scale commercial blueberry operations are in either Michigan or New Jersey, Southern highbush blueberries can be cultivated throughout the Central Valley – with careful site selection and proper cultural practices. Blueberries are deciduous shrubs that grow to 6 ft. or taller.

Highbush blueberries fit nicely into small-scale farming. By selecting early and late varieties, harvesting can begin in late May and last into July. Local marketing by pick-your-own (PYO) customers, at farmer's markets, or ready-picked sales to nearby stores is particularly feasible for small-scale operators in close proximity to metropolitan areas. Blueberry sales can supplement income from primary sources.

Growing blueberries is labor and management intensive, and a substantial investment in time and money is required. Plantings require 2 to 3 years to establish and may not be harvested until the third or fourth growing season.

Per-acre returns can be high. A mature planting can gross $5,000 per acre and return $3,000 or more with correct marketing, management, and growing.

**Site and Pre-Planting Considerations**. Blueberries should be planted on slopes or 1-ft. high berms to provide good drainage. Roots are very sensitive to standing water so they need good drainage. Although a sandy soil is best for drainage, heavier soils may be used if drainage is adequate.

Blueberry plants are very sensitive to soil pH and require acidic soils for success. Optimum soil pH is 4.8 to 5.2, although levels as high as 5.5 are acceptable. To lower soil pH before planting, incorporate soil sulfur or

sulfuric acid 6 months to a year before planting, and keep the pH low through the use of acid-reaction fertilizers such as N-Phuric or ammonium sulfate. The amount of soil sulfur to use depends on several soil factors, such as current pH, soil texture, and calcium carbonate (free lime) content. With little or no calcium carbonate, a sandy soil might require about 1 ton/acre (~45 lbs./1000 sq. ft.), whereas a clay soil might require about 1.5 tons/acre (~70 lbs./1000 sq. ft.), depending, of course, on the existing pH. For best results, have a soil sample analyzed by a lab and have them recommend the quantity of acidifying agent to use.

Planning should begin at least 1 year prior to planting blueberries. This time schedule allows for adjusting soil pH, tilling and berming, providing drainage and irrigation, and controlling perennial weeds, which may be difficult to stop with herbicides registered for use on blueberries after planting. A green manure mixture of a cereal grass with bell beans and common vetch may be grown and turned under to improve soil tilth and fertility. If herbicides are used to manage weeds during the preparation of the site for blueberry production, be aware of the time limits for degradation of the herbicide residues in the soil.

**Planting**. Containerized nursery stock are usually planted in early fall or early spring. The roots of these fall-set plants will continue to grow until soil temperatures fall below 45ºF. Spring plantings are often delayed because of wet weather. Fall-set plants are already in place and have the advantage of early spring growth, which is often missed in spring plantings due to wet weather delays. Bare root plants can also be planted. Varieties differ in their chilling requirement; most are 400 to 700 hours below 45°F.

**Field Layout**. Blueberries are self-pollinating but will benefit from cross-pollination, so plant two or more cultivars in alternating blocks every 2-4 rows. Row spacing of 10-14 ft. or more ensures that mowing and spraying can be done by tractor. Planting for a PYO operation should allow for customer convenience and handling.

**Mulch and Irrigation**. Because blueberry roots are shallow and fibrous, mulching improves growth and production. Mulch goes on newly set plants soon after planting and irrigation should be ready before newly set plants dry out. Many materials are suitable for mulching blueberries, but sawdust, compost, or wood chips are common. Mulch keeps soil temperatures cooler during summer, reduces weeds, and helps maintain uniform soil moisture.

Blueberries are very sensitive to drought. Drip or microsprinkler irrigation is preferred, but if severe spring frosts are possible overhead sprinkler systems may be necessary.

**Bird Damage**. Bird depredation can be the biggest problem of small-scale producers, sometimes causing crop losses of over 70 percent. Scare devices and exclusion by netting are commonly used to reduce losses.

**Marketing the Crop**. A high percentage of blueberries are direct marketed in local communities. The potential trade area for blueberries tends to be larger than for strawberries. Blueberries also offer other advantages over strawberries for PYO operations. Blueberries require little stooping. Customers find them easy to freeze, requiring little preparation other than washing, and easy to use. Sales of ready-picked blueberries at the farm or local markets bring higher prices to producers from consumers who desire farm fresh produce, but do not wish to PYO.
The blueberry crop is usually sold within 60 days, depending upon weather and varieties. Weekends are usually the busiest. Coordinating sales advertising and promotion with peak harvests challenges even experienced growers.

## Young Vine Decline Is Present Here

Nearly every year I get called out to fairly young vineyards in which poor growing vines are interspersed with healthy, vigorous vines. There's a good chance that this symptom is "young vine decline" caused by any one of several types of stress, including poor planting resulting "J" rooting, lack of water, fruiting in the first two years, and viruses causing

incompatibility. Doug Gubler, Extension Plant Pathologist at UC Davis, believes that any of these stresses can lead to a disease complex known as young vine decline, Petri (pronounced like the dog or cat pet) disease, or black foot disease, and sometimes called black goo. The disease is caused by *Phaeomoniella*, *Phaeoacromonium*, *Cylindrocarpon*, or other fungal species.

The only way to know for sure if the disease is caused by one of these organisms is to have vines tested in a lab. You can tentatively determine for yourself whether the disease is present by digging up the vine and cutting off the belowground portion of the trunk just above the roots, exposing a cross-section of the trunk. Petri disease results in a darkened ring of vessels around the central pith. The ring is usually about 3/16" to 3/8" in diameter and it slowly oozes a tar-like substance. The pathogen cannot always be isolated in the lab, and occasionally it can be isolated without seeing the ring. Unfortunately, the only remedy is to replace infected vines. Be sure to test some apparently healthy vines too. I have seen blocks in which healthy looking vines among stunted vines were also infected but had not shown stunting yet.

Viruses can cause similar symptoms of collapse and often result in death of tissue just above or below the graft union. This usually also results in reddening of the leaves, vein clearing, and stunting. Poor watering or "J" rooting results in stunting, decline and leaf dieback, and early fruiting often results in poor shoot growth, uneven shoot growth, decline and poor fruiting the next year. Call me if you'd like me to help determine if your vines have young vine decline or similar problems.

## GLASSY-WINGED SHARPSHOOTER UPDATE

The Glassy-winged Sharpshooter (GWSS) quarantine area in Rancho Cordova continues to be monitored by the Sacramento County Agricultural Commissioner's office. In 2001, an encouraging drop in the number of GWSS was a welcome discovery. Evidence of GWSS was confined to a small portion of the originally infested area. Pesticide treatments were last applied in September 2001, and no further GWSS activity has been seen. In order to declare the pest eradicated, monitoring of the area must continue for a year beyond the last find with no GWSS detected. Insect traps and visual searches are currently being done in the quarantine area as well as the uninfested areas of the county. Infestations in other Central Valley locations are also coming under control.