



COOPERATIVE EXTENSION

UNIVERSITY OF CALIFORNIA



## TREE AND VINE NOTES



November 2008

### North San Joaquin Valley Cling Peach Seminar

December 4, 2008

8:00 a.m. – Noon

**Stanislaus County Agricultural Center**  
Service and Crows Landing Roads, Modesto

- 8:00 – 8:30 Registration, coffee, snacks & socializing
- 8:30 Cutting Labor and Input Costs, Notes on Rootstocks
- 9:15 Control Strategies & New Materials for Insect Control in Peaches
- 10:30 Cling Peach Board Business
- 11:00 Regulation Changes for Orchard Crops-Laws & Regs.
- 11:30 Mechanical Pre-Thinning
- 12:00 - Lunch hosted by the Cling Peach Board

1.25 hours of Continuing Education Credits, including 0.5 hour of Laws & Regs. applied for.  
CCA credit approved.

#### **PRUNING TIMES**

Maxwell Norton, UC Cooperative Extension

Many almond growers have already started or even completed pruning. Peach growers will prune as soon as more of the leaves are off. This is NOT the time to begin pruning apricots, cherries nor grapes. Eutypa disease can enter the larger fresh pruning wounds on these species. If apricots and cherries were not pruned in August or early September then it is best to wait till early spring or at least late winter when there are few Eutypa spores in the air and the pruning wounds are less susceptible to infection.

#### **ORGANIC WEED AND NITROGEN MANAGEMENT FOR TREE FRUITS**

Chuck Ingles, UC Cooperative Extension, Sacramento County

Organically grown tree fruits generally sell for a substantially higher price than conventional produce. Whether the price premium actually results in greater profitability depends on yields, fruit size, and fruit quality, as well as the cost-effectiveness of the growing practices. Organic production often requires more labor, bulkier fertilizers and amendments, and increased monitoring than conventional.

Far fewer insecticides and fungicides are available in organic pear production, so during high-pressure years (such as for diseases in wet springs), insect pests and diseases can reduce marketable yields. In most years, however, growers find that in-row weed control and providing sufficient nitrogen are the greatest

challenges, and the two are linked. Surveys conducted in Washington have shown that the top three production issues in organic tree fruit production were crop load management, weed control, and soil fertility.

### Organic Fertilizers

Organic fertilizers tend to have fairly low nitrogen (N) content. The most cost-effective fertilizer is often poultry manure, which generally includes wood shavings and rice hulls. It averages about 3% N, and also has phosphorus, potassium, calcium, and magnesium. Feather meal is sometimes used in Pacific Northwest orchards. It has up to 13% N, but is still much more expensive than poultry manure and it has no other nutrients. Compost is an excellent soil amendment, but the N in it is largely unavailable during the first year. To maintain organic certification, uncomposted manures may not be applied within 90 days of harvest.

A portion of the N contained in manure and compost will volatilize into the atmosphere (up to 30%) if not disked into the soil. With most orchards in this area being no-till, applied manure will lose N to the air, although less is lost if it is irrigated fairly quickly. Manure and compost also release plant-available N at different rates, which is largely based on the C:N ratio – the lower the ratio, the faster the release. With poultry manure, the majority of the N will be available to plants in the first year; poultry also has the highest volatilization potential. The “decay series” of manures was studied by UC researchers in the 1970s, and the proportion of N availability over a 3-year period (years 1, 2, and 3) was shown to be:

- Chicken (.90, .10, .05)
- Dairy (.75, .15, .10)
- Feedlot (.35, .15, .10)

These values may vary widely for any given manure based on many factors. Composts generally fall well below feedlot manure in N availability in year 1.

Cover crops often provide the most cost-effective way to add N. A vetch cover crop, often used with peas and/or bell beans, can supply up to 150 lbs. N/planted acre. But this mix is usually used in disked orchards. The reseeding annual subterranean clover, with or without other annual clovers or medics, can provide similar amounts of N, but N loss through volatilization can result from leaving the clippings on the soil surface. Perennial clovers have been shown to add large amounts of N also, but they are invasive and they compete with trees for water. All clovers also attract gophers.

### Organic In-Row Weed Management

The greatest concentration of tree roots is under the canopy in the tree row, so weeds in the tree row compete with trees for nutrients and water. This competition is especially problematic for young trees, but yields and fruit size of mature trees can also be reduced by in-row weeds, especially warm-season grasses.

Organic weed management practices include mowers and cultivators that move around trunks and sprinklers, organic herbicides, flame or steam weeders, geese or sheep, and organic and synthetic mulches. In-row mowers are generally cost effective, but weeds still grow and compete with trees for nutrients and water. In-row cultivation can effectively control weeds, although tree roots near the surface can be damaged. Some implements are hydraulically driven with a vertical axis cultivating head, whereas others are ground-driven, rolling cultivators that can be used at speeds up to 8 mph. Growers have found that some implements tend to break down fairly frequently. In a 2002 Yakima Valley orchard study, cultivation-based weed control was more than four times the cost of a typical herbicide program of two applications per season.

Available organic herbicides, mostly based on clove or cinnamon oil, or acetic and citric acids, are effective mainly on very young weeds so they must be applied often, and they have limited efficacy on perennial weeds. Flame weeders are fairly effective on young weeds, but they often require multiple passes for some species, and they use substantial amounts of fuel. Sheep or geese can be very effective; they require fencing and they must be removed 90 days before fruit harvest.

Mulches, either organic or landscape fabric, provide a practical – but expensive – method of preventing or greatly reducing weed growth in tree rows and improving the nutrient and moisture status of trees. Wood chips add organic matter and nutrients but they are less effective against perennial weeds. A 2004-2006 Washington study showed that the total cost for applying a 5-foot wide, 6-inch thick layer of wood chips was \$924/acre. In this study, wood chip mulch provided the best weed control in all 3 years, although it needed re-application in year 3. This treatment also produced the greatest tree growth and fruit size.

In a related trial, a Gala apple block was used to compare a 4-inch wood chip mulch in the tree row with a herbicide strip. In the first year, mulched plots consistently had 15 to 20% higher soil moisture at the end of each irrigation cycle than the bare ground plots. In the second year, the 2 treatments were watered independently according to need, and mulching reduced cumulative irrigation application by 20 to 30%.

Synthetic fabric allows water penetration but it excludes light to act as an effective barrier to weed growth. A 3 to 4 ft. width of fabric is placed on either side of the row and they overlap and are pinned where they join, although weeds sometimes grow between the overlapped fabric. The outside edges are buried or pinned. Weed seeds may germinate on top of woven fabric and roots may grow through and establish in the soil, so some growers pull back the fabric each year and apply fertilizer or compost before re-pinning the fabric. Mulches, especially fabric, can also lead to the buildup of voles (meadow mice).

In a 5-year study begun in a newly-planted cherry orchard in Hood River, Oregon, researchers reported over 30% greater tree growth and fruit yield where 6-foot wide, in-row synthetic fabric was used compared to herbicide strip alone. Cumulative cash costs for the first 4 years before fruit production were \$2,123/acre higher with ground cover relative to no cover; however, these costs were offset quickly by the increased returns from enhanced fruit yield and size.

References:

Weed management in organic pear orchards, <http://www.ipm.ucdavis.edu/PMG/r603700511.html>

Organic weed management in walnut orchards,  
<http://www.sarep.ucdavis.edu/bifs/organicweedmanagement.pdf>

Organic Orchard Floor Management – Papers and presentations from the WSU Tree Fruit Research & Extension Center, <http://www.tfrec.wsu.edu/>. Click on Organic and Integrated, then on Orchard Floor Management.

### **FARMING PRUNES ON THE SKINNY IN 2009**

Franz Niederholzer, UC Cooperative Extension, Sutter & Yuba Counties

At least the last five years have not been easy for Sutter/Yuba prune growers. Light crops due to heat or frost have been the norm, not the exception. With current good prices for large fruit, prune growing still has potential for a good return to growers in the future. How can you bridge from the bad years to better economics? Here are some ideas to reduce costs for 2009.

Key points:

Forget a year-in, year-out “prune program”. Wait until you know what you have before spending money and/or time.

Be flexible. This helps spread the risk and lower overall costs.

Protect your investment. Don’t abandon key practices such as fertilization and pest management. Spray and fertilize on the “Chevy” program, not the Cadillac or “forget it” plan.

Specific ideas:

Do you need to prune? Pruning every year is a good idea, but it is expensive. Without knowing your crop for the next year, paying for pruning is an expensive investment that you can only hope pays off.

Skipping pruning for a year is OK, but you have to count fruit and thin in May if a big crop is set. If you skip pruning and don’t thin, you could grow a huge crop of worthless fruit while breaking up the trees. If

fruit set is light in 2009, the unpruned trees should have more fruit than pruned trees. Don't want to leave all your orchard(s) unpruned? Why not prune some part and leave the rest for next year?

Wait on fertilizer. Potassium and nitrogen fertilizer prices are way up. However, these nutrients are needed to feed a crop. If you wait until you know what the crop looks like (in mid-April) then you will know how much fertilizer to use. If you have a good crop, you still have time to apply fertilizer. Potassium sprays in spring and summer (at least 4x) can replace ground applied potash fertilizer, so tree health will not suffer. Fertilizer is expensive, but adequate nutrient levels protect trees from diseases such as cytospora and bacterial canker. Don't skimp, but only use it when you know you need it.

Do a dormant spur sample. This practice will tell you if you need to spray for scale. [Only 20% of prune orchards in Sutter/Yuba had enough scale to spray in a recent UC survey.] If the dormant spur sample shows no scale, and aphids have been a problem, consider a "lite" dormant spray for aphids between November 1 and March 1.

Cheap prebloom aphid spray. Prune aphids are the key insect pest in prune. A low ("lite") rate of pyrethroid (Asana, Warrior, Baythroid, etc.) will control aphids all next year if applied between November 1 and March 1.

Manage risk at bloom. Adding a high rate of oil (4-5 gallons/acre) to a low pyrethroid rate/acre spray in early January should advance bloom and help manage risk of bad weather (hot or cold) at bloom. Spray half the orchard with a low rate of pyrethroid in November and the other half with oil + low rate of pyrethroid in early January to spread bloom dates across the orchard. Don't spray with high rates of oil if trees and/or soil are dry.

Don't forget weed management. High weeds also make a great home for meadow mice (voles). These pests can kill trees by girdling the tree at the ground level. In blocks that aren't disced regularly, use herbicides to keep weeds down in the tree rows. Wait until close to bloom to decide whether to mow or disc in the tractor aisles. High weeds make a colder orchard at bloom. If cold nights are forecast at harvest, then mowing weeds is a good idea. If warm temperatures are forecast, leave grass long.

### **FALL ORCHARD ACTIVITIES IN ALMONDS**

By: Mario Viveros Retired Farm Advisor, UCCE Kern County

We don't have slow months in almonds. November and December are as busy as any other month. At this time, almond growers should be occupied in planning or doing the following: zinc sprays, pruning, pre-emerge herbicide applications, dormant spray and winter sanitation.

Fall application of zinc is effective in maintaining adequate levels of zinc in the tree. This means that there is no need to include zinc fertilizer with any of the cover spray during the growing season. In addition, fall application of zinc will cause tree defoliation, permitting the tree to go into dormancy. In the Southern San Joaquin Valley in mild winter, almond trees can maintain their leaves well into January. Leaves on the tree can interfere with the dormant spray coverage. Another benefit of defoliation is the elimination of shot hole disease inoculum for the following spring.

Pruning is a cultural practice that should be done after harvest. In the Southern San Joaquin Valley, we don't have any problems pruning young trees in the winter. However, this can be a problem in the Northern San Joaquin Valley.

Young trees are pruned to create a strong structure. All limbs with narrow angles containing embedded bark should be eliminated during the first three years of training. Light should cascade down to the tree head. This is accomplished by eliminating some of the limbs growing through the center of the tree. One should thin out some limbs to allow light into the canopy, but not be aggressive enough to open windows around the canopy.

Pruning doesn't increase yields. This was demonstrated by John Edstrom, Colusa County Farm Advisor. If pruning doesn't increase yields, why prune then? Mature trees are pruned for light and height management.

An almond orchard is considered mature when it gets to be seven or eight years old. At this age, if light doesn't penetrate the inside of the lower canopy, the lower fruiting wood starts dying. This can be prevented by having upright scaffolds. Heading cuts and tying during training encourages upright scaffolds. If upper limbs come down and lay over each other, then, one must thin out some of the branches. This will eliminate some crop, but it will promote upright growth. This pays off when the orchard matures.

In Kern County, the highest reject levels occur in old orchards that are impossible to clean due to their height. Mature trees should be maintained to a height of 20 ft. At this height, during sanitation, the worker will reach mummy-containing branches. The lowering of an orchard height should be done gradually using a pruning tower.

Foliar applied herbicides have been effective in controlling weeds on the berm area. Unfortunately, for this method to be effective, it requires multiple applications. This has made this weed control method very expensive. Furthermore, this method has created control problems with the following weeds: silverleaf nightshade, morning glory and postrate knotweed. To overcome these problems, pre-emerge herbicides can be used in some orchards. There are new regulations by the Department of Pesticide Regulation that regulate the use of pre-emerge herbicides. Before you use them, you need to check with your local Agricultural Commissioner.

The dormant spray should be done in the first week of January. At this time, the trees are fully dormant, beehives will not be in for more than four weeks, and insect pests are just beginning to be active. The dormant spray is effective in controlling San Jose Scale, peach twig borer, brown and European red mites.

Sanitation is the removal of leftover nuts from trees. It is the key to the control of navel orangeworm. Research projects have shown that sanitation and early harvest can eliminate the need for in season sprays. Sanitation should be done in December-January or as soon as the rain or fog season begins. Mummy nuts can be removed from the tree by mechanical shaking or by hand poling. The trees should be cleaned to less than one mummy per tree.

Sanitation should not be delayed until just before bloom. By this time, sanitation can lose its effectiveness in reducing navel orangeworm infestation. Furthermore, the shaker at this time, can cause major damage to the root system, since by bloom time, we have major root activity in almond trees.

## **ESTIMATING NITROGEN USAGE FOR 2009 ALMOND CROP YEAR**

David Doll, Merced County Farm Advisor

Nitrogen is considered an essential element of plant growth. It is necessary for proper leaf, fruit, and wood development. As trees come into production, their need for nitrogen increases due to the physiological processes involved in fruit development, foliage formation, and the formation of tree

reserves. Meeting the tree's demand for nitrogen during these processes is critical since a shortage of this element can reduce yields.

Previous research has shown that most of the nitrogen applied to an orchard becomes part of the hull, shell, and kernel. The nitrogen in these tissues is lost at harvest. By estimating the crop load for the coming season and calculating the nitrogen needed by this crop, determination of the orchard's nitrogen needs for the coming year is possible. This process can be simplified as follows: apply approximately 1/10 pound of actual nitrogen for each pound of kernel (meat) yield. Example, if an orchard is expected to yield a ton of meats, apply 200 pounds of actual nitrogen per acre.

To further help with this estimation, a new nutrient model has been developed at UC Davis by Dr. Patrick Brown and colleagues. This model, taking into account yields, July leaf sample analysis, and point sources of nitrogen, can predict accurately the amount of nitrogen needed. Nitrogen application rate estimates are based on reaching the optimal levels of leaf nitrogen content (2.2-2.5%). Annual potassium applications can also be calculated. This model can be found at:  
<http://ucce.ucdavis.edu/rics/fnrnc2/almondNKmodel/almondNKmodel.htm>

To help increase the efficiency of nitrogen applications, the following tips are advised:

1. Apply nitrogen only when leaves are present and the tree roots are active.
2. Apply multiple applications of nitrogen throughout the growing season. It is better to apply less nitrogen more frequently, than a large application of nitrogen once or twice a year.
3. Fertigate if possible. Fertigation is the most efficient means of delivering nitrogen to the root zone.
4. If fertigation is not possible and nitrogen is surface applied, disc or irrigate the nitrogen into the root zone shortly after application.
5. Don't over irrigate after nitrogen is applied. Since nitrogen is soluble in water, excessive runoff of tail water will cause leaching of nitrogen and possible groundwater contamination. Apply a uniform application to carry the nitrogen into but not past the root zone.
6. Analyze leaves in July each year to determine nitrogen levels in the orchard. Maintain the tree levels within the range of 2.2% and 2.5% by increasing or decreasing nitrogen applications.
7. Fertilize the tree, not the covercrop. Evaluate how best to bypass the covercrop. This may be by applying the fertilizer to the herbicide sprayed strip, mowing, or cultivating the covercrop.

### **TAKING INTO ACCOUNT GROUND-WATER NITRATE CONTAMINATION IN NEXT YEAR'S NITROGEN BUDGET.**

David Doll, Merced County Farm Advisor

Many aquifers throughout California have been determined to contain the contaminant nitrate-nitrogen (NO<sub>3</sub>). NO<sub>3</sub> contamination of aquifers is more common on coarse soils, in which leaching of nutrients commonly takes place. This contaminant, however, can provide a benefit to the production of orchard crops by providing a source of nitrogen fertilizer. By testing the wells present on the orchard property and taking into account the amount of nitrogen present in the groundwater, one can prevent the over-application of nitrogen.

To determine the amount of NO<sub>3</sub> within the groundwater, sample the water coming out of the pump and submit it to an analytical lab. The analysis will test for an array of minerals and nutrients and will report the amounts in parts per million (PPM). Once the NO<sub>3</sub> PPM has been determined, use the following equation to calculate how many pounds of nitrogen per acre are being applied through groundwater:  
(PPM NO<sub>3</sub>) \* (0.23) \* (Inches of water applied in irrigation) = X Pounds of nitrogen per acre  
For convenience, table 1 contains commonly calculated numbers.

Table1: Pounds of nitrogen per acre applied through varied amounts of irrigation water and nitrate concentrations.

Inches of Water Applied Through Irrigation	Parts per Million (PPM) of Nitrate-Nitrogen detected in Ground-Water							
	5	10	20	30	40	50	60	75
1"	1.15	2.3	4.6	6.9	9.2	11.5	13.8	17.25
2"	2.3	4.6	9.2	13.8	18.4	23	27.6	34.5
4"	4.6	9.2	18.4	27.6	36.8	46	55.2	69
8"	9.2	18.4	36.8	55.2	73.6	92	110.4	138
12"	13.8	27.6	55.2	82.8	110.4	138	165.6	207
36"	41.4	82.8	165.6	248.4	331.2	414	496.8	621

From viewing the table 1, we can see that significant amounts of nitrogen can be applied unknowingly over the course of a season. If the amount of nitrogen applied through groundwater is not taken into consideration, tree damage through nitrogen burn and leaching of nitrogen may occur.

If NO<sub>3</sub> contamination of your groundwater is suspected, please submit a water sample to a diagnostic lab to determine the amount present.

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