

## ***Fruit and Nut Notes***

- Volume 12 -

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## **SACRAMENTO VALLEY REGIONAL PRUNE NEWSLETTER**



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*Full color articles and photos are available on our Website: [cetehama@ucanr.edu](http://cetehama@ucanr.edu)*



# Prune Orchard Management Considerations in a Dry Winter

*Franz Niederholzer, UC Farm Advisor, Colusa/Sutter/Yuba Counties*

As the end of December approaches, we have received little precipitation this “rainy season” and there is little rain in the forecast. Dry soil and dry trees are not a good way to start the season, so here are some considerations to put your prune orchard in the best position possible to set and grow a good crop.

If we don't get significant rain before March, irrigate ahead of bloom. Roots begin to grow about 4-6 weeks before bloom and adequate moisture in the root zone is needed at that time. Check to make sure the root zone (top 2-4' of soil) has adequate moisture using soil moisture sensors, an auger, or shovel. Don't start out 2014 with a dry root zone.

If it stays dry, skip the oil in your pre-bloom spray for aphid or aphid and peach twig borer (PTB). Even lower rates of oil (2 gallons per acre) can burn prune trees if the trees and/or the soil is dry. Research by Dr. Frank Zalom, UC Davis Entomology Department, has shown excellent control of both aphid and PTB with proper amounts of pesticide – pyrethroid (Asana, Warrior, etc.) or OP (diazinon, etc.) without oil in the tank. Check with your PCA to determine the right material and rate for your orchard.

If you only have access to surface water and are given a limited allocation in 2014, consider removing the vegetation in the orchard ahead of bloom to conserve both winter rainfall and the water you can apply. An orchard with a cover crop – planted or volunteer – can use up to 25% more water than an orchard with no vegetation on the orchard floor. Discing or herbicides can be used to remove the vegetation.

Hopefully, we will start 2014 with significant rain ahead of bloom and this information will not be needed.



SAVE the DATES



**February 7, 2014 — Tehama Walnut Day**

**February 21, 2014 — Tehama Prune Day**

**Register on-line at <http://ceteama.ucanr.edu>**  
**Click on “Orchard Crops”, click on “Upcoming Meetings”**

*For more information call the Cooperative Extension Office 527-3101*

# Prune Out Cankers to Reduce Disease and Reinvigorate Trees

Joe Connell, UC Farm Advisor, Butte County and Franz Niederholzer, UC Farm Advisor, Colusa/Sutter/Yuba Counties

Dormant pruning renews fruit wood and can moderate a heavy crop. It reduces limb breakage, potassium deficiency, small fruit sizes, and high dry away ratios. It is also the first step toward eliminating dead wood associated with canker diseases. Canker diseases that result in twig or branch dieback include bacterial canker caused by *Pseudomonas syringae*, brown rot blossom and twig blight caused by *Monilinia laxa* and *Monilinia fructicola*, and cytospora cankers caused by *Cytospora leucostoma*. Given the number of calls that UC farm advisors received in 2013 regarding canker damage, a quick review of canker diseases common to prunes along with a description of how to manage these damaging diseases is in order.

Some years are worse than others for bacterial canker, and 2013 was a very bad year for this disease in the Sacramento Valley. This is a disease of stressed trees. The degree of infection is usually worst in sandy spots in orchards where populations of Ring nematodes are high, in orchards with low nitrogen fertility, or in blocks with a hard pan near the surface that limits root growth. Symptoms are most obvious in spring, occurring most commonly on trees 2 to 8 years of age. Brown streaking and flecking can be seen in newly affected tissues of active cankers (Figure 1). Last spring's disease may now show simply as branch or limb dieback. Dead wood can be pruned out now but delaying pruning until late in the dormant season sometimes helps to lessen future bacterial canker infections.

Brown rot blossom and twig blight fungus kills fruiting spurs and can also cause twig and occasionally small branch dieback. The fungus overwinters in twig cankers that form at the base of infected spurs and in fruit mummies that remain in the tree so removing these cankers and mummies helps reduce disease pressure in the coming season. When pruning, notice these twig cankers (Figure 2) and remove branches with infected spurs and twigs. Removing fruit mummies from the orchard will also reduce disease inoculum since the fungus can produce spores on mummies left on the surface of the orchard floor. Cultivating to incorporate mummies helps reduce disease.

Cytospora canker is a weak pathogen that's spread by wind and rain to bark damaged by other stresses. To minimize this disease and the loss of fruit wood, scaffolds, and potentially entire trees, avoid in-season stress factors that predispose prune trees to disease spread such as potassium deficiency, water stress, sunburn, and subsequent borer attacks. The fungus shows maximum growth in hot temperatures around 90°F and is particularly active in late summer to early fall. Trees planted on shallow and/or heavy textured (clay) soils are generally more likely to suffer economic damage since the disease spreads more rapidly in water stressed trees.



**Figure 1. Streaking and flecking in tissue infected by bacterial canker.**

To identify limbs killed or weakened by cytospora cankers, look for dark, sunken cankers on the bark of limbs showing dieback or branches where dead leaves are still attached. Active cankers have distinct zonate margins (Figure 3) that are different from the streaking and flecking in newly affected tissue or the dry dead wood characteristic of old bacterial cankers. Small white spots called pycnidia found on dead wood confirm the presence of *Cytospora* (Figure 4).



**Figure 2. Brown rot twig canker on an almond branch showing spore pads around the canker margin.**

Pruning out diseased limbs and burning them will reduce disease pressure and spores that can spread disease to new wood next season. Be sure to cut into healthy wood several inches to one foot below any canker symptoms. Check the cut surface of damaged limbs to ensure that all disease has been removed (Figure 5). Incomplete canker removal wastes time and money and won't control the disease. In older blocks where cytospora is a real problem, consider a using a specially trained pruning crew dedicated to identifying and cutting out the entire cankers.

There are no chemical controls for cytospora cankers. To manage infection and reduce disease spread, avoid tree stress and remove cankered wood from the orchard and burn it. Prune to minimize sunburn potential, and, paint exposed trunks and scaffold crotches with white interior latex paint to further protect them from sunburn. Maintain adequate orchard water status, especially after harvest, and avoid potassium deficiency, spider mite or prune rust defoliation that can increase sunburn and disease potential.

For more detailed information on disease management and for excellent photos of disease symptoms and fungus signs that will help you know what to look for, visit the IPM web page ([www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu)) and click on Agriculture and floriculture; Prune; and bacterial canker, brown rot blossom and twig blight, or cytospora canker (under diseases).



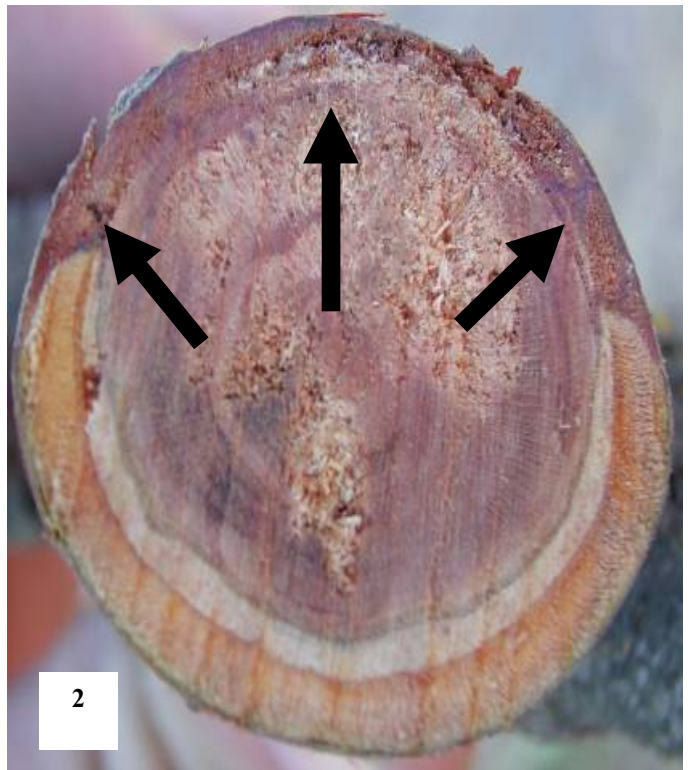
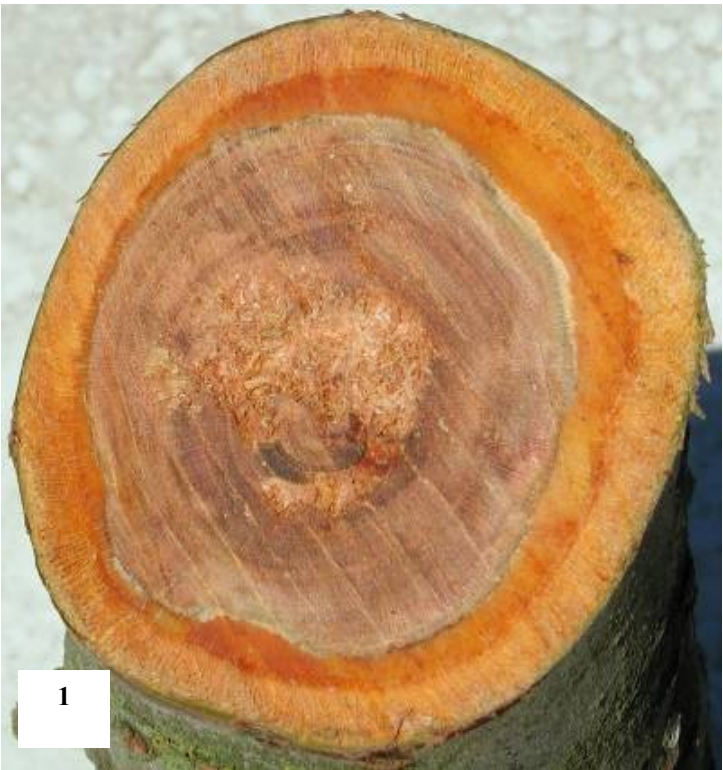
**Figure 3. Cytospora cankers are detected as sunken areas on the branch where bark has been killed. Arrows point to canker edges, revealed by a knife cut in the second photo.**



**Figure 4. Pycnidia, black or white pimple-like spore producing structures found on dead wood.**



**Figure 5. Good cut (1) below canker showing only clean bark. Bad cut (2) not far enough down showing diseased bark (arrows) and canker remaining in the tree.**





# Prune Orchard Fertility Review

Franz Niederholzer, UC Farm Advisor, Colusa/Sutter/Yuba Counties

Winter is a good time to review the past season and plan for the new one. It is a particularly good time to pull out your leaf analysis results from past years and compare them with yield results and orchard observations. Is there a trend in one direction or another? If so, put plans on the calendar to help correct bad trends and perhaps back off on costly practices that are not benefiting the orchard. This review, conducted with input from your PCA/CCA and key staff, is crucial to your bottom line, as adequate prune orchard mineral nutrition is critical to maintaining high yields and good orchard health. Adequate N, K, and Zn are needed across the region for good prune orchard yields. Other elements may be important in some orchards based on local conditions.

The following is a quick prune orchard fertility review with a focus on pre-bloom options, in order of importance to prune production.

**Potassium (K)** is the most important mineral nutrient in prune production since prune fruit accumulate potassium steadily from bloom through harvest. At harvest, fruit can contain 75% of all the K in the tree. In July and early August, as root growth slows and soil moisture is used rapidly, tree K uptake may decrease. However, fruit K needs are unchanged and fruit “pull” K from the rest of the tree, especially leaves. This causes leaf K content to drop, risking potassium deficiency if leaf K levels were not high enough going into summer. Potassium deficiency starts a devastating cascade of trouble -- potassium deficiency → leaf scorch and drop → sunburn → *cytospora* infection → leading to limb or scaffold death and → a loss of orchard production that can last for years. Keeping adequate potassium in a prune orchard is essential to sustainable production and a healthy orchard. The dormant season has traditionally been the time for potassium fertilization in many orchards.

A heavily cropping prune orchard needs a lot of plant –available potassium. Traditional University of California annual K fertilizer maintenance programs suggest 400-500 pounds of potassium sulfate (0-0-50; sulfate of potash) per acre banded in the fall or winter in non-tilled orchards that are solid set irrigated or shanked in where orchards are cultivated or flood irrigated. Orchards with well drained soils that receive significant winter rains can use potassium chloride (0-0-60; muriate of potash) at about the same rate. Those rates cost \$200-220/acre in today’s market – a huge amount of money to ante up before you know what your crop will be like the next year. Orchards planted in sandy soil, with a lower potential to hold the K in the root zone, should receive smaller rates at one time to avoid leaching K below the root zone.

Alternative plans to a big slug of K in the fall are 1) injecting potassium fertilizer through drip or micro-sprinkler irrigation lines in the spring and summer, 2) a steady foliar program of a minimum of the equivalent of 100 pounds of  $\text{KNO}_3$ /acre or 3) some combination of option 1 & 2. In season K fertilization allows growers to check the crop size before putting on any K fertilizer. A light crop may require very little if any K fertilizer.

Traditional fertilizers such as ground applied potassium sulfate and foliar applied potassium nitrate are proven effective. Be careful when looking at new products, as those have risks as well. Here are some examples...

- Potassium thiosulfate (KTS, 0-0-25) is an effective liquid fertilizer that can be injected through micro-irrigation systems. However, high rates of KTS (more than 10 gallons/acre/application) can damage or kill trees depending on the orchard conditions. KTS does have the added benefit of helping reduce soil pH, if that is needed.

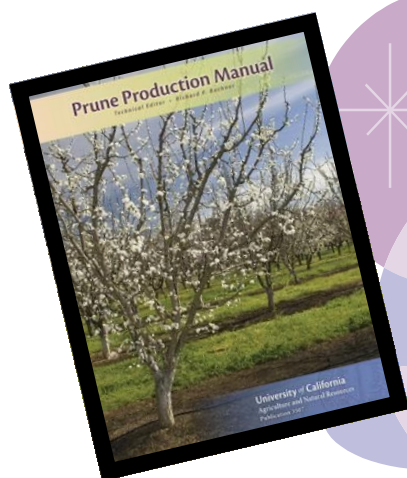
- Alternatives to KNO<sub>3</sub> for foliar K fertilization are available in the market. Many are liquids that are easier to mix than solid fertilizers. Potassium nitrate (KNO<sub>3</sub>) is a good, efficient foliar fertilizer that won't burn leaves when applied at reasonable rates (20-25 lb KNO<sub>3</sub>/acre in 100 gallons. When using liquid potassium foliar fertilizers to replace KNO<sub>3</sub> in a spray-only program (no soil applied K fertilizer) in an orchard carrying a good crop, use the amount of material equivalent to a minimum of 100 lbs of KNO<sub>3</sub>/acre/season. Multiple sprays will be needed, just as in a KNO<sub>3</sub> program. Otherwise you run the risk of under supplying your orchard with potassium.

A solid potassium fertilizer program is a cornerstone of a good prune orchard management program. Cutting corners with your potassium fertilizer program can put the health of your orchard at risk.

**Nitrogen (N)** is essential for good prune production and tree health. Two-thirds of the orchard N need falls between March and June. Winter is not a time to add N to the orchard. However, it is good to review N nutrition ahead of spring needs.

Nitrogen deficient prune trees make fewer flowers and therefore set smaller crops. Prune trees with low N levels are more susceptible to bacterial canker than trees with adequate levels of N. Trees store N over the winter in woody tissue to use in spring growth. An orchard with a good leaf N level in July leaf samples (good storage reserves) shouldn't need N fertilizer until mid-April the next year. At that time, the crop load can be estimated. Light crops mean less N fertilizer need, much like K. If previous year July leaf N levels were low and no additional N was applied while leaves were on the tree in the fall, some fertilizer N application several weeks after petal fall may be needed, regardless of crop load

**Zinc (Zn)** is important to healthy growing points in plants. Bloom thru spring is the time when the most growing points are found on plants and so is the period of highest zinc demand. To meet this timing need, zinc is usually applied as a foliar fertilizer in the fall or spring. A high rate (20+lb/acre) of zinc sulfate ((36%) sprayed in the fall once natural leaf drop begins delivers zinc to prune trees and removes leaves. A good alternative to a high rate of zinc in the fall is 4-6 lb/acre 52% zinc (neutral zinc, etc.) in the spring, preferably before leaves reach full size and no later than mid-May. There are many different zinc foliar materials. Many effectively move zinc into trees, but cost and risk of phytotoxicity vary from product to product. Talk with your PCA about the most cost effective options that supply sufficient elemental zinc.



## PRUNE PRODUCTION MANUAL

from UC Agriculture and Natural Resources

The breadth of expertise and knowledge contained in the 320 pages of this manual, along with the more than 300 photos and 56 color illustrations make this one of the most comprehensive prune production manuals in the world. Inside you'll find the professionalism, expertise and science-based answers you've come to expect from the University of California. Copies are now available to purchase at the Tehama Cooperative Extension Office:

**\$45.00**

• **ANR Pub 3507**



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# FRUIT & NUT NOTES

# SACRAMENTO VALLEY REGIONAL PRUNE NEWSLETTER

*The “SACRAMENTO VALLEY REGIONAL PRUNE NEWSLETTER” is a collaborative effort of prune research specialists working together to provide Sacramento Valley growers and industry leaders the latest research and information effecting walnut production in today’s changing environment. This newsletter will be published quarterly, be sure to look for upcoming issues!*

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