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Pomology Notes

September 2003

Post Harvest 2003

PRUNES:

POST HARVEST IRRIGATION IN PRUNES

Irrigation costs money, but some meteorologists are forecasting a dry fall. What, if any postharvest irrigation program should prune growers follow? The following points may help growers in making their own decisions for individual blocks:

CURRENT/PREDICTED CONDITIONS:

- Some meteorologists are predicting a dry fall.
- Prune trees can use a lot of water between harvest and leaf drop. In the dry fall of 2002, mature orchard water use in September and October = 8.3"! More than half of that water use (60%) was in September. (Trees used 7.3" of water in all of July, 2002— in the heat of the summer!)
- Prune fruit buds for the 2004 crop began forming before harvest. Growth won't stop completely until bloom next year.

RESEARCH RESULTS:

- *UC research has shown no reduction in yield the next year following irrigation cutoff after harvest.*
- One UC study done in the 1960's in the Santa Clara Valley reported slightly smaller buds in prune trees that were not irrigated at all after harvest.
- Dr. Ken Shackel, UC Davis Pomology Department, recommends a tree-based moisture (measured with a "pressure bomb") stress level of -14 to -15 bars during September.

THOUGHTS TO CONSIDER:

- Beware of sunburn on water-stressed young orchards in a hot fall! Whitewash trunks of young trees with interior grade latex paint or Surround WP.
- Bacterial canker attacks weak trees – including those under water stress. This disease is especially tough on young trees. If you are battling bacterial canker in a block, you might consider at least some irrigation to that block after harvest.
- Dry prune trees may need to be irrigated before dormant oil applications are applied to avoid burning trees.

Please call me (822-7515) if you are interested in having your orchard water stress level tested with a pressure bomb. I can come out to your orchard, take a measurement and talk with you about what it means.

Every grower must make their own decisions on a block by block basis. If I were farming a flood irrigated block, I would put on one irrigation as soon after harvest as possible and call it good. If I were farming a micro-irrigated block, I would use the pressure bomb to track tree water stress and irrigate per Dr. Shackel's guidelines.

BACTERIAL CANKER CONTROL

Bacterial canker can cause extensive damage in prune orchards. It is extremely difficult to control for several reasons. The bacterium that causes this disease is common in orchards. It most commonly infects weak trees or damaged trees, and can develop resistance to many spray materials. Since eradicating the disease from an orchard is virtually impossible, the best strategy is to keep trees as healthy and to avoid practices/situations that facilitate infection. Bill Olson, UC Farm Advisor in Butte County, recently published this four point program to help fight *(not control or eradicate)* bacterial canker in prunes:

1. Fumigate replant sites to control ring nematode.
2. Use multiple copper sprays starting in early fall and up to bud break in blocks with bacterial canker symptoms. Note: The pathogen has developed resistance to copper and antibiotics in Oregon.
3. Prune early or late to avoid infecting trees via rain splash containing the disease bacteria. *Don't prune* blocks with bacterial canker symptoms when rain is in the forecast. Prune young trees after petal fall.
4. Avoid any and all tree stress. Irrigate when needed, and maintain adequate (not excessive) nutrient levels in the orchard. UC research has shown that trees with low leaf nitrogen levels are more vulnerable to bacterial canker.

FALL NUTRITION PROGRAM IN PRUNES

- ✓ PRUNE TREES USE MORE POTASSIUM THAN ANY OTHER MINERAL NUTRIENT. Potassium fertilizer is expensive, but using it on a regular basis is essential to maintaining good fruit yield, and good yield is essential to staying in the prune business. Bill Olson recommends 300-500 pounds/acre of potassium sulfate or chloride as an annual maintenance program in blocks with adequate potassium (1-1.3% leaf potassium). [There is more potassium in potassium chloride (0-0-60) compared with potassium sulfate (0-0-50), so less of the chloride material can be used to deliver the same amount of potassium.] In potassium deficient blocks (leaf potassium less than 1%), to 2000 pounds of potassium sulfate (not chloride!) is recommended to correct the situation. (Bill doesn't recommend more than 500 pounds of potassium chloride per acre per year because of the risk of root burn in the spring if the potassium chloride has not leached from the root zone.)

- ✓ A FALL ZINC SULFATE (36% ZINC) SPRAY CAN CORRECT ZINC DEFICIENCY (indicated by leaf zinc levels less than 18 ppm) plus it "drops" leaves to allow early pruning and avoid tree blow over in late fall storms. In addition, 20-25 pounds of zinc sulfate per acre in 100 gallons of water applied to prune leaves on or about October 1st may help control aphids (see next article).

- ✓ PRUNE TREES DON'T NEED MUCH, IF ANY, NITROGEN AFTER HARVEST. Any nitrogen applied in the fall should be a light dose -- at the most 50 pounds actual nitrogen per acre – and that much should only go to a block that showed nitrogen deficiency (leaf nitrogen level at 2.2% or less) during the summer. Adding more than 30-50 pounds of nitrogen to a block after harvest is a waste of money and may hurt the environment. Tree nitrogen needs are limited after harvest, since there is no fruit or shoot growth to "feed". So, since *prune roots absorb virtually no nitrogen after normal leaf drop*, any excess fertilizer nitrogen left in the root zone at leaf drop will be leached out of the root zone with winter rains and may

move down to pollute the groundwater. Note: Trees that have defoliated due to rust or mites could benefit from a ***small*** shot of nitrogen right after harvest to replace nitrogen lost in the leaves.

- ✓ High or low soil pH reduces the availability of many essential nutrients, thereby making a fertilizer program inefficient. The fall is a very good time to apply sulfur to decrease soil pH (avoiding iron and zinc deficiency) or lime to increase soil pH and increase phosphorous and zinc availability. Gypsum has virtually no activity on soil pH, although it is a good tool to improve water penetration when applied during the summer.

PRUNE APHID MIGRATION STARTS IN OCTOBER

Aphids move out of prune orchards for "greener pastures" when shoot growth stops in the late spring or summer. In the fall, they return to prune orchards to feed, mate, and lay eggs. Those eggs hatch during bloom the following year. Research by Dr. Nick Mills, Entomology professor at UC Berkeley, with support from Carolyn Pickel, UCCE Regional IPM Farm Advisor, and Bill Olson, UCCE Farm Advisor has shown that prune aphids, at least mealy plum aphids, move back into prune orchards around the middle of October. Research by Bill and Carolyn suggests that if an orchard is defoliated by mid-October, then the aphids have no food source and lay no eggs. The end result is very little to no aphids in that block the following year. The zinc spray mentioned above (20-25 pounds of 36% zinc sulfate in 100 gallons of water per acre around October 1) has done a good job of removing leaves by October 15 and eliminating or dramatically reducing aphids next year. This practice could save growers the cost of a dormant spray if it proves to be a consistently effective aphid control practice. While this practice is still in the trial stages, ***growers interested in testing this practice on a portion of their orchard are encouraged to call Franz (822-7515)***

PAYING FOR DETAILED PRUNING

An old hand in the prune business tells me that the two most important activities in a prune orchard are pruning and irrigation. The current status of the prune market makes a good pruning job almost unaffordable. Given the value of a good pruning job, here are a couple of ideas of how, possibly, to balance the need for good pruning vs. its cost.

ADJUST THE DORMANT SPRAY TO MATCH NEEDS: The traditional full-rate dormant spray of oil and diazinon every year is a Cadillac program, in, at best, a Chevrolet Geo market. A reduced rate of diazinon or Asana gives effective control of prune aphids – the key target in many prebloom prune orchards pest management programs. The material cost difference between a full shot of oil and diazinon and a reduced rate of insecticide and oil is around $25/acre. Could an extra $25/acre make a difference in a pruning program? That works out to $0.15/tree in a 16'x16' planting, $0.19/tree in an 18'X18' planting, or $0.23/tree in a 20'x20' planting.

The key to cost cutting in dormant spray materials is 1) knowing what pests are in a block and 2) how many of them are there. A dormant spur analysis can give growers and managers this information. Growers interested in learning how to do this evaluation of their dormant spray needs or have an employee trained to do this are invited to attend one of the six regional field meetings in November (see the listing below).

EVERY-OTHER-YEAR PRUNING. Another cost-saving approach that may be worth considering is alternate year detail pruning. Several growers I have talked to have adapted this every-other year program as a way to do a good, careful job of pruning on part of their orchard every year and guaranteeing their skilled pruning crews work every winter. These growers use shaker-thinning and pruning as part of their cropload management program. In the late 1980's, research by UC Cooperative Extension Farm Advisors and Dr. Steve Southwick,

UC Extension Specialist for prunes, showed no statistical difference in yield or dry fruit size difference between alternate year and every year pruning in a four year trial at three locations around the state.

IS PAYING PRUNERS BY THE TREE BETTER THAN BY THE HOUR?

In a recent article, Greg Billikopf, UC Labor Management Farm Advisor, wrote that "a grower can reduce total labor costs and pay crew worker more in an effectively designed piece-rate system." He argues that paying by the piece (i.e. paying pruners by the tree) rewards the good workers and keeps them on the farm compared to paying by the hour. More information from Greg on incentive pay for farm workers is available on the web at tinyurl.com/99cq. The information contained at this site may help growers cut labor costs while improving the quality of work done by their employees.

ALMONDS:

POST HARVEST IRRIGATION IN ALMONDS

Adequate irrigation from mid-August through September is essential for good nut production the following year. *Growers should monitor soil or tree moisture status to make sure that severe water stress does not occur during that time.* It is possible that this crucial window of time should include early October this year, due to the delay in crop development from late spring rains. Please call me (82-7515) if you would like to evaluate tree water stress level using the pressure bomb. I can come to your orchard to take a measurement and talk about the results.

Orchards that defoliated preharvest may releaf with postharvest irrigation. This is good as long as flowering does not occur with growth of new leaves. Any flowering that occurs in the fall reduces the number of flowers at normal bloom time the next year. Limiting irrigation after mid-October may reduce premature flowering.

FALL NUTRITION PROGRAM IN ALMONDS

- ALMOND TREES USE MORE POTASSIUM THAN ANY OTHER MINERAL NUTRIENT. If summer leaf analyses indicate less than adequate potassium levels in trees in a block (less than 1.4% leaf potassium) then apply a maintenance rate of 300-500 pounds of potassium fertilizer (sulfate or chloride) in the fall in a band on the soil surface. Potassium chloride (muriate of potash) can be used if the trees are dormant and light soil texture will allow leaching of chloride down out of the root zone with winter rains. In potassium deficient blocks (leaf potassium less than 1%); apply up to 2000 pounds of potassium sulfate (not chloride) to correct the situation. Potassium deficiency will reduce bloom and nut yield the following year. It is essential to avoid potassium deficiency to sustain good yields year in and year out. Potassium can also be applied in-season as potassium sulfate injected through micro-irrigation (drip or micro-jet) systems. Fertigation via solid-set irrigation or flood irrigation is the least effective (most expensive) way to apply potassium to almond orchards.

- A FALL ZINC SULFATE (36% ZINC) SPRAY CAN CORRECT ZINC DEFICIENCY (indicated by leaf zinc levels less than 15 ppm) plus it "drops" leaves to help avoid tree blow over in late fall storms. Use 30 pounds of zinc sulfate in 100 gallons of water per acre at the beginning of natural leaf drop for best results.

- BORON MAY HELP IMPROVE FRUIT SET AND YIELD. Almond trees boron requirement is highest at bloom to fruit set. A hull sample analysis for boron at harvest is the best way to determine almond tree boron status. If hull analyses show a need for boron, a foliar application to almond trees between harvest and pink-bud (see table below) can lead to significant yield increases. This result is not seen every year, but the cost of soluble boron fertilizer is so small that growers with low hull boron levels should consider applying boron between harvest and bloom when green tissue is present. Boron is readily absorbed through healthy leaves and expanding flower buds and will accumulate in almond fruit – especially in the hulls. So, boron applied preharvest accumulates in the nuts, and is lost out of the orchard in the nut carts. Only postharvest or prebloom (pink bud) applications are helpful in boosting boron levels in the flowers at bloom. *Boron should not be applied to trees at full bloom*, so the cut off timing for adding boron to almond trees is pink bud (tank-mixed with fungicide sprays). *Do not apply boron to almond trees at full bloom, as set can be REDUCED.*

TABLE 1. INTERPRETING ALMOND HULL ANALYSES RESULTS.

Hull Boron Level at Harvest	Boron Status	Recommended Practices
Less than 80 ppm boron	Deficient	0.2-0.4# boron/acre*
80-150 ppm boron	Adequate?	0.2-0.4# boron/acre* may improve set.
150-200 ppm boron	Sufficient	Nothing
More than 200 ppm boron	Excessive	Treat soil to reduce boron levels**

**Apply as a foliar spray (in 100 of water at 100 gpa) between harvest and leaf fall or at pink bud for best results.*
***Adding excess irrigation water to leach boron from the soil or treating the soil with calcium (lime or gypsum) may reduce potential for boron toxicity.*

- ALMOND TREES DON'T NEED MUCH, IF ANY, NITROGEN AFTER HARVEST. Summer leaf nitrogen levels of 2.2-2.7% mean that almond trees should have all the nitrogen they need for good production. Levels in excess of 2.6% leaf nitrogen have actually been linked to reduced yields in UC research because of an increase in hull rot infections and loss of fruiting wood from this disease. Almond trees with deficient leaf nitrogen levels in the mid-summer could benefit from a small postharvest fertilization (less then 50 pounds actual N). With no crop to feed and shoot growth shut down after harvest, any nitrogen absorbed between harvest and leaf drop can only go into storage in woody reserves for use the next year – and the size of that "storage pool" is relatively small. *Almond trees absorb very, very little nitrogen after normal leaf drop, so nitrogen fertilization from November through February is a waste of time and money.*

- High or low soil pH reduces the availability of many essential nutrients, thereby making a fertilizer program inefficient. The fall is a very good time to apply sulfur to decrease soil pH (avoiding iron and zinc deficiency) or lime to increase soil pH and increase phosphorous and zinc availability. Gypsum has virtually no activity on soil pH, although it is a good tool to improve water penetration when applied during the summer.

ALMOND LEAF SCORCH PUBLICATION AVAILABLE

Almond leaf scorch is a potentially devastating disease, which is transferred from tree to tree by sucking insects (sharpshooters in particular). While I know of no cases of this disease in Yuba or Sutter counties, it was found

in Butte and Stanislaus counties in 2002. The symptoms of this disease are very distinct, and all almond growers and their employees should be able to recognize them. To help growers and field reps recognize this potentially devastating disease, UC Cooperative Extension, in cooperation with UC Ag and Natural Resources division and the Almond Board of California have just published a FREE publication (#8106) titled "Almond Leaf Scorch". This publication is available at the UCCE office in Yuba City. It is also available (free) on the web at: http://anrcatalog.ucdavis.edu.

MID-SEPTEMBER PRUNE MEETINGS CANCELLED DUE TO LATE HARVEST

The prune orchard management meetings scheduled for September 15 and 16 are cancelled due to late harvest. Please consider attending one of the November field meetings and the grower tour on September 29 to UC's Wolfskill Experimental Orchard in Winters.

FIELD MEETING SERIES

A series of field meetings in grower orchards is planned for mid-November. The following topics will be discussed:

- Dormant spur sampling (prunes or almonds)
- Orchard sprayer calibration (prunes or almonds)
- Pruning
- Other topics (please call me at 822-7515 if you would like a topic addressed at this meeting).

Location	Date	Time
Live Oak	Nov. 10	9-11AM
District 10	Nov. 12	9-11 AM
North Wheatland	Nov. 12	1-3 PM
West Sutter County	Nov. 13	10AM -12 noon
North Yuba City	Nov. 13	1-3 PM
Tudor	Nov. 14	9-11 AM

Locations will be announced in a later newsletter.

NEWSLETTERS IN CYBER-SPACE!

THE YUBA SUTTER UCCE IS ON THE WEB!! CHECK OUT MY NEWSLETTER AS WELL AS INFORMATION FROM OTHER COOPERATIVE EXTENSION PROGRAMS AT HTTP://CESUTTER.UCDAVUS.EDU. WANT TO RECEIVE NEWSLETTERS MORE QUICKLY? SUBSCRIBING IS FREE! – AND IT HELPS CUT DOWN ON THE COST OF PRODUCTION AND MAILING. SUBSCRIBING IS EASY, JUST GO TO THE WEBPAGE AND YOU CAN SUBSCRIBE THERE OR CALL THE OFFICE AND YOUR NAME AND E-MAIL ADDRESS CAN BE ENTERED BY THE STAFF.

Franz Niederholzer, U.C. Farm Advisor

YUBA/SUTTER PRUNE GROWER TOUR TO UC WOLFSKILL EXPERIMENTAL ORCHARD (UC WEO) IN WINTERS, CA. – SEPTEMBER 29, 2003

Agenda

9:00 a.m.	Arrive at Wolfskill Experimental Orchard, Winters, CA in private cars
9:00 a.m.-noon	Tour commercial production plots of Dr. Steve Southwick, UC Extension Specialist for prunes. We'll discuss: o Buried drip irrigation o Landscape cloth for sucker control o Surround WP for pest control o Higher density plantings o New production practices in general o Economic survival in prune production
Noon – 1:00 p.m.	Box lunch at Wolfskill field lab. *Please RSVP with Franz for lunches by returning the form at the bottom of this page.* Cost of lunch is $6.00. Carolyn DeBuse, U.C. Pomology Department, will display fruit from new prune varieties developed by U.C. with California Dried Plum Board support.
1:00 – 2:00 p.m.	Tour new prune variety block with Carolyn DeBuse, to view the new variety trees,
2:00 – 2:15 p.m.	Leave Wolfskill, drive to high yield, commercial prune orchard east of Winters.
2:15 -- 3:15 p.m.??	Discuss block with grower, with focus on prune production practices. *Carolyn Pickel, UCIPM Area Advisor, will be there to discuss prune pest management*
3:15	Leave to return to Yuba City.

WOLFSKILL TOUR RSVP

- ❑ I would like to attend the prune tour to the UC Wolfskill Experimental Orchard on September 29th*. (a map will be mailed to those who RSVP)*
- □ I am not interested in purchasing a lunch
- ❑ I will go on the tour and stay for lunch, price of lunch is $6.00. I would prefer the following lunch option:

□ Ham and cheese □ Turkey □ Vegetarian

How many will be on the tour _____ Total enclosed for lunch $_____

_____ _____

(name) (phone number or e-mail)

PLEASE MAIL WITH CHECK PAYABLE TO **'UC REGENTS'** FOR LUNCH (IF YOU WILL STAY FOR LUNCH) TO:

WOLFSKILL TOUR RESERVATIONS, UC COOPERATIVE EXTENSION, 142A GARDEN HWY
YUBA CITY, CA 95991