UC Cooperative Extension
Tehama County
1754 Walnut Street, Red Bluff, CA 96080
Phone (530) 527-3101
Website: cetehama@ucanr.edu

Fruit and Nut

University of California
Agriculture and Natural Resources

July 2022

Volume #9

PRACTICAL • CONNECTED • TRUSTED

Richard P. Buchner
UC Orchard Crops Farm Advisor -Tehama County
- Emeritus -

Luke Milliron
UC Orchard Systems Advisor
Butte County

SACRAMENTO VALLEY REGIONAL PRUNE NEWSLETTER

IN THIS ISSUE:

- **Summer and Fall Prune Orchard Considerations 2022**
- **Late-season Irrigation Management in Prune**
- **Five Practices to Help Prevent Bacterial Canker**
- **Pre-harvest Management of Brown Rot**
- **2022 Summer Field Meeting– August 4, 2022**

ANR NONDISCRIMINATION AND AFFIRMATIVE ACTION POLICY STATEMENT: It is the policy of the University of California (UC) and the UC Division of Agriculture and Natural Resources not to engage in discrimination against or harassment of any person in any of its programs or activities (Complete nondiscrimination policy statement can be found at http://ucanr.edu/sites/anrstaff/files/169224.pdf). Inquiries regarding ANR's nondiscrimination policies may be directed to John Sims, Affirmative Action Compliance officer, University of California, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618, (530) 750-1397.

To simplify information, trade names of products may be used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

Cooperative Extension Work in Agriculture and Home Economics, U.S. Department of Agriculture, University of California, and County of Tehama, Cooperating.

Summer and Fall Prune Orchard Considerations 2022

Becky Wheeler-Dykes, Orchard Researcher, CSU Chico
Franz Niederholzer, UCCE Farm Advisor, Colusa and Sutter/Yuba Counties
Luke Milliron, UCCE Farm Advisor, Butte, Glenn and Tehama Counties

July

- **Leaf pests:** Continue monitoring for late summer (preharvest) outbreaks of rust and/or spider mites. These outbreaks cause leaf drop that weakens trees, creates extra work at harvest, and exposes limbs to sunburn post-harvest. If spider mite pressure is building right before harvest, consider a potassium nitrate spray to "top off" potassium levels and possibly suppress adult spider mites for 2-3 weeks.
- **Brown rot**: Clustered fruit is more vulnerable to brown rot infections as harvest approaches. Learn more about brown rot management in this newsletter and at the UC IPM Prune Fungicide and Treatment Timing Guide.
- **Monitoring Fruit Maturity:** Fruit should be mature roughly 30 days after the first color shows on the suture. Begin measuring fruit internal pressure once fruit shows color.
- **July leaf samples:** In a year with high input costs, it is more important than ever to carefully tailor fertility programs. Mark your calendar for July leaf sampling. Details at sacvalleyorchards.com.
- **Clean up orchard ahead of harvest for faster operation.** Removing dead and dying limbs and any woody suckers will minimize tree shaker damage and improve harvest efficiency. When cutting out diseased wood, it's essential to prune below the diseased wood into healthy wood.

Pre-Harvest

Harvest decisions. If you have a light crop, consult with your insurance company about whether to harvest. Some policies deduct the value of the fruit in the orchard from your payout.

- **Anticipating harvest timing.** The UC prune harvest date model predicts Sacramento Valley harvest to be mid-August based on regional bloom dates and CIMIS weather station data. However, this model has historically been late for the North Sacramento Valley; **we anticipate harvest in the region likely in early August**. Exact date varies from block to block.
- **Time your irrigation cut-off** to improve dry-away ratios, reduce premature fruit drop and decrease shaker bark damage at harvest. Find a detailed pre-harvest irrigation article in this newsletter.
- **Monitor fruit maturity development.** Fruit are mature when internal pressures are 3-4 lbs. Fruit pressure, not sugars, determine fruit maturity. Fruit over 4 lbs internal pressure has not finished accumulating sugars (dry weight) and will be worth more if harvested when the internal pressure drops below 4 lbs.
- **Field sizing.** To reduce dryer costs, run at least a small sizer (for example 15/16-inch) to remove garbage and damaged fruit, keeping the delivered fruit clean. With small and medium fruit holding much less value than large fruit, some growers are using larger sizers to eliminate smaller fruit. Double check with your packer about dried fruit value by screen size to help decide if a large sizer (1" or larger) would be a good idea. If you run a sizing chain, regardless of the size, run the receiver belts slowly enough to allow all the fruit to be run directly over the chain and properly sized.

Examine fruit pre-harvest to evaluate damage. Two to four weeks before harvest, evaluate 40 fruit per tree from 25 trees throughout the orchard for worm, scale, and brown rot damage. Fruit can be picked or evaluated on the tree. If you only take samples at harvest, you may miss damaged fruit that dropped early and may indicate room for improvement in your IPM program.

Post-Harvest

- **Manage post-harvest irrigation** to minimize water stress. Following harvest, water stress measured as stem water potential using a pressure chamber should be mild to moderate (-12 to -16 bars). Cytospora canker grows faster in orchards under severe water stress.

- **Fall nutrition program.** When making fall nutrient management decisions consider your July leaf sample results and crop load. If nitrogen levels in your July leaf sample were below the critical value, consider a fall foliar nitrogen spray, especially in young orchards where low nitrogen can predispose the trees to bacterial canker infection over a cold/wet winter. Soil applied nitrogen, especially after September, is vulnerable to leaching because of limited root activity – a particularly costly loss this year. Soil applied potassium (K) banded in the fall is a cost-effective delivery method. Alternatively, fertigation or foliar potassium applications during the next growing season may include more expensive liquid materials (KTS, liquid MOP, potassium carbonate, etc.).
- **Orchard clean up and pruning.** Plan for pruning to remove *Cytospora* cankers, cut out branches damaged during harvest, tame tree size, and manage next year's crop load. Avoid pruning within two weeks prior to a rain event. Current UC research shows that the best way to protect pruning wounds is with a fungicide spray of Topsin-M®.
- **Weed Management.** Conduct a post-harvest weed survey to evaluate your 2022 weed control program. Pre-emergent herbicide should be applied shortly before a moderate rain event (0.25") or irrigation to move material into the soil. Avoid application prior to a large rain event (> 1"), which can move the product too deep into the soil for good weed control.

Late-season Irrigation Management in Prune

Curt Pierce, UCCE Irrigation and Water Resources Advisor, Glenn, Tehama, Colusa, and Shasta Counties

While area production has been impacted by spring freezes and reduced water supplies, when considering late-season irrigation strategies for prune trees, both the current and following season's crops must be considered. From June to mid-August, fruits are sizing and adding dry weight until they reach maturity at around 4lbs. pressure. This is also when prune trees are initiating both the floral and vegetative buds that will form the basis for next year's crops. Even in years with heavy crop loss, producers should strive to maintain sufficient tree water status to maintain any current crop-load as well as overall tree and orchard health to help support crops in the coming years.

While ET and relative soil moisture are helpful for informing irrigation decisions, use of the pressure chamber is the best way to both directly measure the stress levels of trees, and account for local variations impacting different areas in an orchard . From late June to early or mid-August, mild to moderate tree water stress levels of -12 to -15 bars allows for both sufficient support for the current crop (Table 1) and subsequent crop development while reducing overall water applied.

Range in SWP (bars)	Crop stress level	No. of fruit at harvest/ac (× 1,000)	No. of fruit dropped/ac (× 1,000)	Dry fruit yield (T/ac)	Dry fruit count (count/lb)	Fruit drying ratio	Growth in trunk cross-sectional area (cm^2)
−10 to −12	mild	5020	700	6.07	61	2.99	10.53
−12 to −15	mild to moderate	5090	560	6.03	62	2.90	9.68
−14 to −20	moderate to high	4940	490	5.73	68	2.83	8.86
LSD (5%)		680	100	0.54	3	0.07	1.30

Table 1. Yield and production factors at different tree water stress levels in prune (Shackel et al., 2000) Shackel, K. A., B. Lampinen, S. Southwick, W. Olson, S. Sibbett, W. Krueger,and J. Yeager. 2000. Deficit irrigation in prunes: Maintaining productivity with less water. HortScience 35(6): 1063-1066.

Once fruit sizing has finished, typically around late August , further irrigation reduction down to approximately -20 bars may improve dry-away ratios with increased sugar and reduced moisture content (Table 2.) This can be achieved by stopping all irrigations in the week or two before harvest. Reduced water applications at this stage also helps to reduce premature fruit drop as well as bark injury due to shaker contact during harvest. Producers with trees on K86 rootstocks, in particular, should be aware that extra dry down time may be needed for those trees to be adequately protected from possible bark damage. However, extended periods of increased tree water stress levels may negatively impact fruit bud development for the following year, as well as reducing potassium uptake. Increased levels of sunburn and *Cytospora* cankers can also occur with sustained water stress in prune. Follow-up checks with the pressure chamber can help ensure that trees remain near -20 bars and help avoid more harmful crop stress levels.

In cases where total crop loss has occurred, and/or water supplies are severely restricted, available water can be allocated evenly through the pre-harvest period, with a goal of more frequent, shallower irrigations to limit applied water to the bulk of the effective root-zone. Application of foliar zinc in the early fall can help initiate defoliation and further conserve available soil moisture.

Post-harvest irrigation targets should seek to return to tree-water stress levels of approximately -12 to -16 bars when sufficient water supplies exist to do so. This will help protect against sunburn and other negative effects heading into dormancy (Table 2.) Refer to our "Irrigating During a Drought – Scenarios" article for more information.

SWP range (bars)	General Stress Level	Water stress symptoms in prune
-8 to -12	Low to mild	Favors rapid shoot growth and fruit sizing in orchards when minimal crop stress is sustained from April through mid-June. Continuing to maintain low-mild stress into the summer may not be cost effective.
-12 to -16	Mild to Moderate	Suggested mild levels of stress during late June, July, and early August. Shoot growth slowed but fruit sizing (fresh and dry weights) is unaffected. May help manage energy and irrigation costs.
-16 to -20	Moderate to High	Should be avoided until fruit sizing is completed. Appropriate for late August (preharvest shut down). Imposing moderate to high levels of crop stress by reducing irrigation about two weeks before harvest may increase sugar content in fruit and reduce moisture content or "dry-away" (fruit drying costs).
-20 to -30	High to Severe	More likely to occur in late August and early September during and after harvest. Extended periods of high crop stress before harvest will result in defoliation and exposure of limbs and fruit to sunburn. Extended periods of high stress after harvest may also negatively affect the condition of trees going into dormancy.

Table 2. Tree water stress levels in Prune, as determined by pressure chamber, and potential effects on both current and following season crops.

Five Practices to Help Prevent Bacterial Canker

Luke Milliron, UCCE Orchard Advisor, Butte, Glenn, and Tehama Counties
Franz Niederholzer, UCCE Orchard Advisor Colusa, and Sutter-Yuba Counties

Left image: Prune orchard with extensive limb dieback from suspected bacterial canker during the spring of 2019. An adjacent orchard that had been treated for nematodes showed no signs of bacterial canker. Right image: Classic mottled damage often associated with bacterial canker infections (photos: Franz Niederholzer).

Every year is a Cytospora canker year, and unfortunately, some years are also bacterial canker years. In the springs of 2019 and 2022 farm advisors observed bacterial canker infections caused by *Pseudomonas syringae* pv. *syringae* and closely related species (the same bacteria that causes bacterial blast in almond, prune, and other stone fruits). While *Pseudomonas* species are ubiquitous across all plant surfaces in all orchards, these bacteria only cause infections and damage under certain environmental conditions depending on the year and the orchard condition. Wet and cold springs are conducive to bacterial canker infections, which can be severe and are often lethal. Bacterial cankers do not continue to spread the following year, but if dead wood is not removed, Cytospora or Botryosphaeria cankers may develop that can contribute to ongoing dieback.

What steps can you take to help prevent bacterial canker?

Pre-Plant

Rootstock Selection	Both Krymsk 86 and Viking had 100% survival at a site with high bacterial canker pressure and with only 53% survival of Myroblan 29C.
Soil Prep	Ensure that soil is prepared to allow for adequate drainage. Consider deep ripping in both directions or excavating planting holes if there are clay or other hard pans present in the top six feet.
Fumigation	Take a nematode sample and consider Telone™ II soil fumigant if you have elevated ring nematode. The benefits against bacterial canker only last a few years, and in some sites no benefit is seen.

Post-Plant

Minimize Stress	Bacterial canker "preys" or occurs mostly on the weak. Anything you can do to maintain a strong orchard with adequate fertility and water will help prevent bacterial canker.
Nitrogen	Applications of $Ca(NO_3)_2$ to prune trees did not decrease lesion sizes of bacterial canker. However, urea (UN-32), CAN-17, or fertilization with 16-16-16 (N-P-K) macronutrients decreased bacterial canker in prune and peach. Ammonia-generating fertilizers were reported to have an effect in reducing ring nematode populations in soil and subsequently reducing bacterial canker. In young (2nd to 8th leaf) orchards, consider fertilization with ammonium products particularly if July leaf N is low.

Pre-harvest Management of Brown Rot

Becky Wheeler-Dykes, Orchard Researcher, CSU Chico

High humidity, high temperatures and tightly clustered fruit create the perfect environment for brown rot. In recent years, heavy smoke cover after wildfires has increased orchard humidity, making it especially important to monitor for disease presence. Rain in the forecast prior to harvest also indicates a need for brown rot treatment.

Brown rot treatment sprays, where deemed necessary based on current season observations and block history, should begin 4-6 weeks before harvest and are only useful on uninjured fruit. Recent UC research on timing and material efficacy found that fungicides containing FRAC 3 chemistry (brand name examples include[1] Tilt, Teb, Tebucon, Indar, etc.) provided the best possible fruit brown rot control. For a complete list, consult the UCIPM 2022 Fungicide Efficacy Tables.

Including 2% (v/v) summer (415) oil in the tank and 140 gallons per acre spray volume improved disease control over using non-ionic surfactants and spraying 80 gallons per acre. Make sure there is no residual sulfur in the tank before adding the oil to the tank. Oso® fungicide[1] is the best rated organic fungicide for fruit brown rot management. Check with your processor regarding fungicides approved for use and your PCA for rates and materials.

Pre-harvest spray efficacy can be particularly challenging due to dense canopy and branches weighed down by the crop. Slow tractor speeds will deliver the best spray coverage under these conditions. Slow down and do the best job possible. Aerial application will provide less control than careful ground application. Control of brown rot in fruit is difficult, and complete control may not be possible.

[1] *Mention of a pesticide is not a pesticide recommendation, merely the sharing of research results. Always read the pesticide label, the label is law.*

UC DAVIS PRUNE BREEDING PROGRAM

2022 Summer Field Meeting

Location: Wolfskill Experimental Station
Winters, CA

Date: August 4, 2022

Time: 9:30-11 am

COME CHECK OUT THE NEW PROMSING CULTIVARS!

We will be meeting by the rootstock block on Wintu Way in Winters, CA
From Putah Creek Rd (heading west), left on Wintu Way,
then your first left through the gate.
Enter coordinates into your navigation: 38.506855, -121.973882

Please RSVP via email to Sarah at scastro@ucdavis.edu

SACRAMENTO VALLEY REGIONAL PRUNE NEWSLETTER

The University of California, Division of Agriculture and Natural Resources (UC ANR) prohibits discrimination against or harassment of any person in any of its programs or activities on the basis of race, color, national origin, religion, sex, gender, gender expression, gender identity, pregnancy (which includes pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition (cancer-related or genetic characteristics), genetic information (including family medical history), ancestry, marital status, age, sexual orientation, citizenship, status as a U.S. veteran.

UC ANR policy prohibits retaliation against any employee or person in any of its programs or activities for bringing a complaint of discrimination or harassment. UC ANR policy also prohibits retaliation against a person who assists someone with a complaint of discrimination or harassment, or participates in any manner in an investigation or resolution of a complaint of discrimination or harassment. Retaliation includes threats, intimidation, reprisals, and/or adverse actions related to any of its programs or activities.

UC ANR is an Equal Opportunity/Affirmative Action Employer. All qualified applicants will receive consideration for employment and/or participation in any of its programs or activities without regard to race, color, religion, sex, national origin, disability, age or protected veteran status.

University policy is intended to be consistent with the provisions of applicable State and Federal laws.

Inquiries regarding the University's equal employment opportunity policies may be directed to: John I. Sims, Affirmative Action Compliance Officer and Title IX Officer, University of California, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618, (530) 750-1397. Email: jsims@ucanr.edu.
Website: http://ucanr.edu/sites/anrstaff/Diversity/Affirmative_Action/.

This policy statement supersedes the UC ANR Nondiscrimination and Affirmative Action Policy Statement for University of California Publications Regarding Program Practices dated July 2013.

To simplify information, trade names of products may have been used but no endorsement of named product is intended, nor is criticism implied of similar products, which are not mentioned.

Cooperative Extension Work in Agriculture and Home Economics, U.S. Department of Agriculture, University of California, and County of Tehama, Cooperating.

University of California
Cooperative Extension
1754Walnut Street
Red Bluff, CA 96080
"52"