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Franz Niederholzer
UCCE Farm Advisor
Sutter, Yuba, and Colusa Counties

2024 Sacramento Valley Orchard Meetings - Save the Dates!

Jan 18, 12 PM - 2 PM	Third Thursday Things in the Field Lunch	Orland, CA
Jan 30, AM	Colusa Winter Almond Meeting	Arbuckle Golf Club, Arbuckle
Jan 31, 7 AM - Noon	North Valley Nut Conference	Silver Dollar Fairgrounds, Chico
Feb 1, 7:30 AM to Noon	N. Sacramento Valley Prune Day	Elk's Lodge, Red Bluff
Feb 20, 7:30 AM to Noon	N. Sacramento Valley Olive Day	Orland, CA
Feb 22, 7:30 AM to Noon	N. Sacramento Valley Walnut Day	Elk's Lodge, Red Bluff
Feb 27, AM	S. Sacramento Valley Prune Day	Sutter County Ag, Yuba City

Fall Prune Orchard Management Considerations

Franz Niederholzer, UCCE Farm Advisor, Colusa, Sutter, and Yuba Counties

Key points:

- Keep orchards irrigated after harvest
- Apply Potassium (or decide to wait for new crop year)
- Protect pruning (hand or mechanical) wounds with effective fungicide
- Plan for fall or dormant insect management

Irrigate after harvest through the start of leaf drop to **maintain good orchard health**. Forgetting irrigation after harvest will harm orchard health and next year's production. From now through leaf drop, stem water potential measured with the pressure chamber should be between -12 and -16 bars, which should be roughly -4 to -8 bars drier than baseline. Avoid extended, high water stress levels as *Cytospora* canker spreads faster in stressed trees compared to adequately watered trees.

Prune to manage next year's crop and tree size plus remove dead/diseased wood:

- Remove existing [cytospora](#) cankers and spore sources (see photos in this newsletter) by cutting branches several inches to a foot below the symptoms and burn prunings if permitted.
- Consider your management goals: topping young vigorous trees before a big wind can reduce risk of blow-over, while [long pruning](#) can increase early yields in young prune plantings.
- Prune early in the fall to allow cuts to harden off before seasonal rains. Protect fresh wounds from water-borne spores with a fungicide spray (Topsin-M® or Topsin-M® + Rally®).

Sanitize your orchard by removing fruit mummies and blighted shoots to remove disease inoculum. Remove bark damaged during harvest (cutting back to "tight bark"), and backhoe out diseased or dead trees to prepare for replants.

Band potassium (K) in the soil, based on July leaf sample results, visual symptoms, and the amount of fruit harvested this year. Some growers wait to check cropload in the spring before applying any potassium. In-season potassium options include foliar sprays and/or fertigated material.

Apply foliar zinc (Zn) to correct zinc deficiency (July leaf sample <18ppm). Spraying 20 lbs/acre of 36% zinc sulfate in late October can deliver needed zinc into the tree and, in addition, can facilitate leaf drop, reducing risk of blow over and/or disrupting aphid reproduction. Be sure to time with natural leaf drop because early defoliation may interfere with plant carbohydrate storage.

Plant new trees. Protect trees from sunburn with white interior latex paint diluted 2:1 water to paint, plus tree wraps. If tree wraps are used without painting trees, the boxes should be flattened (◇ from the top, not □) to avoid “wrapper burn.” Research in almonds shows that white paint, alone doesn’t protect young tree trunks from herbicide damage.

Maintain micro-irrigation systems to ensure good, uniform delivery of water and nutrient to your orchard next season. Fall is a great time for this activity.

Survey for weeds after the first rain to identify perennials, germinating winter annuals, and summer species that escaped the past season’s control tactics to inform next year’s control strategies. UC IPM provides a [printable weed survey form \(PDF\)](#).

Manage gophers when populations are at their lowest before the breeding season (March-May). Trapping, fumigation, and baiting can all be effectively utilized when soil is moist. Gophers kill prune trees. Regular management will help reduce the chance of tree loss to gophers.

Fall/Winter insect pest management:

- [Sample dormant spurs](#) to determine the need to treat for [San Jose](#) and/or [soft scale](#) along with aphids and some mites.
- Aphid: If you have a history of aphid infestations, assume you have an annual problem and [treat aphids between fall and leaf out](#).
- [San Jose Scale](#): Where spur sampling shows a need, treat low to moderate populations with oil, or for moderate to high infestations, oil with insect growth regulator (Centaur®, Seize™). Check with your PCA about using oil if the trees and/or soil are dry to avoid oil burn damage, especially to young shoots.
- [Peach Twig Borer \(PTB\)](#): PTB can infest prunes and allow easy brown rot infection that can spread to nearby fruit. PTB management is part of a brown rot management program. Dormant sprays of oil plus spinetoram (Delegate®), spinosad (Entrust™, Success™) or diflubenzuron (Dimilin®) will control overwintering PTB larvae—oil alone does not control peach twig borer. Pyrethroid insecticides also control PTB (and aphids). Including B.t. (Javelin, Dipel, etc.) with bloom fungicide sprays will also give good PTB control if a dormant spray is not needed for scale.
- Pyrethroid insecticides (Asana®, Warrior®, etc.) are effective and relatively inexpensive pesticides but [highly toxic to aquatic life](#) and [beneficial insects](#). Follow [regulations regarding use of insecticides](#), especially pyrethroids around weather events. Excellent control of prune aphid or PTB is delivered by lower pyrethroid rates. For example, in UC trials, Asana XL delivered excellent aphid control at 4.8 oz/acre, the minimum labeled rate, and excellent PTB control at 6-8 oz/acre. The max label rate for Asana is 14.5 oz/acre. If pyrethroids are the pesticide selected for fall/dormant use, consider these research results when selecting the use rate.
- Use Gear Up, Throttle Down spray practices to control pests this fall and winter while saving time and money and reducing spray drift. [This is a proven practice in prune production](#). See article in this newsletter.

Please note: Any mention of a chemical is not a chemical recommendation, merely the sharing of research results. Always read the pesticide label, the label is law.



Canker Management After Pruning/Hedging: Spray Now or Pay Later

Franz Niederholzer, UCCE Orchards Systems Advisor, Colusa, Sutter, and Yuba Counties

Luke Milliron, UCCE Orchards Systems Advisor, Butte, Glenn, and Tehama Counties

Good orchard (or life) health rule number 1 is start early. That’s because developing an orchard is a lot like developing a successful community of individual people. Maintaining good health means starting early and keeping regular practices to prevent chronic diseases and deliver healthy and productive trees or people. There is a catch, early pay-in is needed to deliver longer lasting health (and payout). We do this all the time – retirement investment, Social Security pay in, unemployment insurance, preventative doctor and dentist visits, etc. This same long-term thinking is needed to control chronic diseases in prune orchards.

Chronic diseases are the leading killers of Americans and prune orchards. Practices that promote these diseases start early in life – with often unnoticed impacts until later in life. Chronic diseases of humans (heart disease, cancer, diabetes, etc.) are the leading cause of death and disability in the United States. Chronic diseases of prune orchards (*Cytospora* canker, Bot canker, *Phellinus* wood rot, etc.) often infect trees early in the life of the orchard, slowly killing scaffolds, then whole trees. Eventually the orchard is no longer profitable, years sooner than it would be without chronic disease. *Cytospora* is the pathogen most often isolated from cankers in prune orchards. A great deal is known about this pathogen and its disease cycle.

Cytospora spores develop in existing cankers, are released with rain, and moved by wind. The longer the time between rainstorms and the more rain that falls in a storm, the higher the risk of infection as more spores are found in the orchard under these conditions.

Cytospora spores infect prune trees through existing openings, including damaged bark (sunburn, shaker damage, etc.) or pruning wounds. Once a tree is infected, *Cytospora* (and other bark cankers) can only be removed by cutting out the damaged wood. Cankers left in the wood stay active in the tree -- a chronic disease. The more stressed an infected tree, the faster the disease will spread. Water stress, nutrient stress, heat stress – all these will increase the activity of chronic cankers, especially *Cytospora*, in prune trees.

Certain fungicides sprayed on fresh pruning wounds ahead of rain significantly reduce *Cytospora* infection in prune trees. Thiophanate-methyl (Topsin®-M, etc.) was the most consistently effective fungicide tested against *Cytospora* infections of pruning wounds in 'French' prune during years of testing by UC researchers funded by the CA Prune Board.

For long-term orchard health and productivity, manage chronic diseases by working a protective fungicide spray into your pruning (hand or mechanical) program after cutting and ahead of forecasted rain*. This practice is critical for all orchard ages but is especially important for young orchards with large pruning cuts lower in the canopy or any age orchards where mechanical hedging makes large cuts. Yes, these practices add cost and management steps during pruning. However, with regular use starting the first dormant pruning, this program should maintain orchard health and yield longer than a short-sighted approach that can cut short the productive life of an orchard.

Rain + disease spore + unprotected cut = infection

Rain + disease spore + protected cut ≠ infection

Rain + disease spore + no cut ≠ infection

No rain + disease spore + unprotected cut ≠ infection

Please note: Not pruning and/or topping is the safest practice (no wounds = no infection risk) but be ready to thin fruit in the spring if needed to avoid orchard damage from over cropping. Another option for canker management is spring pruning and/or topping when rain is not in the forecast.

* Talk with your PCA about pesticide rates, REIs, and timings. Always read the label. Any mention of a chemical is not a pesticide recommendation, merely the sharing of research results.



Contrasts of tree age and health. Young healthy tree on the left and canker damaged tree on the right. To reduce chances of the left tree looking like the tree on the right in the future, protect pruning wounds with fungicide as soon as possible after cutting and before rain.

Replanting Prunes Back into Prunes

Becky Wheeler-Dykes, UCCE Farm Advisor Glenn, Tehama and Colusa Counties

Luke Milliron, UCCE Farm Advisor Butte, Glenn, and Tehama Counties

With the recent good prices, many growers with prune orchards at the end of their productive lifespan are opting to replant back into prunes. With ever increasing input costs, yield maximization is one of the key objectives you will likely have. Here are some things to keep in mind while designing and preparing for a new orchard.

Nematode testing: Nematodes can not only damage trees and reduce vigor, but they can also vector or increase susceptibility to diseases like bacterial canker and prune brownline. Knowing the nematode population levels in your soil will inform whether pre-plant fumigation, a fallow year, or an alternative rootstock may be necessary. For more information on nematode sampling, listen to this [podcast](#) from UCANR's Growing the Valley.

Soil preparation: Thorough root removal by chiseling and deep ripping of any underlying compaction will be necessary between plantings. Even with very deep soils, years of production without soil disturbance can lead to compaction that may limit root growth for young trees. Roots can carry pathogens and pests over to the next generation of trees. After chiseling and ripping, discing, and if necessary, fumigating, the field should finally be leveled before berms are made.

Pre-emergent herbicides: Pre-emergent herbicides allow young trees to get a head start on growth without competition from weeds. However, pre-emergent herbicides used in orchards can have plant-back restriction periods of up to 20 months. It's important to check the dates and products used and plan ahead to ensure no damage to young trees.

Variety choice: The prune breeding program at UC Davis has developed several [promising new varieties](#) with the potential to improve grower profitability with early bearing and reduced drying costs. If you would like to help with the field testing of these varieties by planting part of your orchard with one of these new selections, please contact Sarah Castro at scastro@ucdavis.edu.

Rootstock choice: Perhaps the most important decision when planting a new orchard is which [rootstock](#) to use. Factors to consider when tailoring a rootstock for your site include vigor, anchorage, reduced suckering, bacterial canker history and risk of waterlogging and *Phytophthora*. The Brownline Alert article in this newsletter also details very recent findings of brownline in prunes on the popular K86 rootstock. Viking™ rootstock was second to only K86 in UC testing of anchorage, although its brownline susceptibility remains unknown.

Tree spacing: Total yield and the bottom line of the orchard can be greatly affected by tree spacing. Maximizing the trees per acre and light interception can be a delicate balancing act. Equipment, soil quality, rootstock vigor, and worker safety at harvest, all play into the decision of tree spacing. For more information, check out [this article](#).

Early pruning choices: [Long pruning](#) has been gaining in popularity for management of young prune trees. Without a follow-up plan, leaving scaffolds un-headed and only making thinning cuts during training can risk limb breakage. Roping, tipping, and selective fruit removal are all ways [growers avoid limb breakage](#) while also maximizing yield. Whichever pruning strategy is used, it's important to [protect pruning wounds](#) to avoid fungal canker infections that can cut an orchard's lifespan and profitability short.

Gear Up, Throttle Down to control pests, spray drift, and costs

Franz Niederholzer, UCCE Farm Advisor, Colusa, Sutter, and Yuba Counties

Want to save money and control pests from fall through bloom? Gear up and throttle down (GUTD) when you spray. Many successful growers are already doing this. Why spend the time and money spraying your orchard between harvest and petal fall as if the tree had a full, dense canopy with a heavy crop pulling down the branches? Here's what's involved:

The GUTD power settings differ between PTO and engine-drive sprayers. For PTO sprayers, ease up on tractor rpms roughly 20% and shift up to increase tractor/sprayer speed to 3-4 MPH. These steps reduce diesel use and work time per acre. For engine drive sprayers, reduce sprayer engine rpms and shift up on the tractor gears to drive faster (3-4 MPH).

Sprayer system pressure will drop with reduced power to the pump (RPM; PTO or engine drive). Adjust the system pressure up to correct for this decrease. This is easy to do with diaphragm pumps. Some sprayers with centrifugal pumps (for example, Rears sprayers) have adjustable pump power using different pulley settings to maintain pump speed when power is decreased. Sprayer system pressure of 80-120 psi is sufficient.

Since sprayer speed (MPH) is increased, spray output (gallons per minute; GPM) must also increase to maintain gallons per minute output. This can be done by increasing nozzle size(s), adding more nozzles, or some combination of both.

In [two years of research in Sutter County](#) prune orchards, GUTD cut diesel use per acre in half and spray time by a third without ANY change in pest control compared to full power and slow ground speed. In addition, spray drift was significantly reduced. These results are savings for the grower and the environment without any loss in crop protection. Please note: After petal fall, sprayer speed should be reduced to maintain good coverage of the thicker canopy (expanded leaves, crop, etc.). This will mean recalibrating from GUTD to reduce gallons per minute to match desired spray volume.

If you have questions about Gear up, Throttle Down spray practices, please contact me at fjnieiderholzer@ucanr.edu or (530) 218-2359.

Prune Brownline Alert

Jaime Ott, UCCE Tehama, Shasta, Glenn, and Butte Counties

Since this spring, we have found prune brownline disease (brownline) in three Sac Valley orchards on Krymsk 86 rootstock. Symptoms include tree decline and rapid collapse of the entire canopy. If you peel the bark away, a distinct line of brown, dead tissue will be visible at the graft union. **If you notice these symptoms in your orchard, please reach out to your local farm advisor** so we can sample for confirmation. Over the last several decades brownline has been considered a very rare disease in prunes, and we want to understand the extent of current infections.



Prune brownline affected trees this spring (upper left photo, arrow) and after harvest (upper right photo, arrows) with healthy trees for comparison. Brownline causes decline and collapse of the entire canopy: trees appear “off-color”, with yellowing or scorched leaves. Brownline affected trees also tend to have a bulge at the graft union, with the scion overgrowing the rootstock (bottom photo). In some cases, but not all, there is gumming on the trunk above the graft union. Note that these symptoms are NOT exclusive to brownline disease.



Trees affected by prune brownline have a distinct line of brown, dead tissue at the graft union (arrows). This line can be exposed by cutting away the bark. Once a tree is collapsing, the line will usually extend entirely around the trunk, girdling the tree. Earlier in infection, the line might only be visible around a section of the trunk. This symptom is fairly specific to prune brownline, though confirmation with lab testing is prudent. Healthy trees will have a smooth connection between the rootstock and scion, with no visible line.



The Details

Prune brownline was first described in the late '70s affecting prune trees on peach (lovell, nemaguard) or Myrobalan plum (myro seedling, 29C) rootstocks. At that time, there were many orchards affected, especially in the south Sacramento Valley. Since then, it has only been reported very rarely.

The disease is caused by Tomato Ringspot Virus (ToRSV), which is transmitted to the tree by dagger nematodes (*Xiphinema* species). The virus infects the rootstock, moving up the trunk toward the graft union. When it reaches the graft union, the scion reacts with a hypersensitive response, killing the cells in contact with the infected rootstock tissue. This results in the line of dead tissue at the graft union, which disrupts the transport of water and eventually kills the tree.

From previous research, we know that trees on Marianna 2624 are resistant to prune brownline disease: our best recommendation currently is to use that as a rootstock for replants if you have confirmed brownline in your orchard. Trees on lovell, nemaguard, myro seedling, and 29C are all susceptible to brownline, and our in-orchard observations add Krymsk 86 to that list. We plan to conduct testing to determine the susceptibility of other modern rootstock options, such as Atlas, Viking, and M40.

If you have questions about prune brownline disease or think you might have the disease in your orchard, please reach out to njott@ucanr.edu.



New Orchard Advisor Introduction

Ryan Hill; UCCE Weed Science and Agronomy Advisor; Tehama, Shasta, and Glenn Counties



My name is Ryan Hill and I am the new UC Cooperative Extension Weed Science and Agronomy Advisor for Tehama, Shasta, and Glenn counties.

My education and professional background is in weed science and plant genetics. I received a B.S. in Biology from George Fox University in 2014 and an M.S. in Plant Breeding and Genetics from the Department of Horticulture at Oregon State University in 2020. Following graduation with my masters, I took on a faculty research assistant role in Dr. Marcelo Moretti's perennial weed science lab at OSU. In this role I conducted weed research in horticultural crops including several projects on herbicide-induced crop injury. Additional projects included sucker control in hops and hazelnuts, pollinator habitat establishment with pre-emergent herbicides, and electrical weed control of Italian ryegrass.

My family and I have already been blessed by the welcome we have received since we arrived in Tehama County. Currently my main objective is to identify priorities for my research and extension programs so I can start supporting growers in the counties I serve. I encourage you to reach out with ideas, requests, or questions relevant to weed science or agronomic crops. You can contact me at rjahill@ucanr.edu or (530) 527-3101.

