

*In this issue:*

- Prune Day Agenda
- Trends in World Prune Markets
- Is this a Year to Skip Thinning?
- Bloom Disease Treatments in Prune and Honey Bee Safety
- Weed Management when Replanting Trees
- Update on Heart Rot in Prunes
- Orchard Considerations
- 2019 Winter Prune Meetings

*Submitted by:*

Dani Lightle,  
UCCE Orchards Advisor  
Office: 530-865-1153  
Cell: 530-936-7728

View archived newsletter articles at:  
[sacvalleyorchards.com](http://sacvalleyorchards.com)

## Northern Sacramento Valley Prune Meeting Friday February 22<sup>nd</sup>, 2019

Red Bluff Elks Lodge, 355 Gilmore Road  
Red Bluff, CA 96080

**8:00 AM** — Registration

PCA and Private Applicator sign-ups, Coffee and Doughnuts

**8:25 AM** — Welcome and Meeting Overview

Luke Milliron, UCCE Butte County & Dani Lightle, UCCE Glenn County

**8:30 AM** — Tehama County Ag Commissioner Laws & Regulations Update

Doni Rulofson, Tehama County Assistant Ag Commissioner

**9:00 AM** — Rootstock Evaluation Update

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

**9:30 AM** — California Prune Board Activities

Donn Zea, California Prune Board

**10:00 — 10:15 AM** Break

**10:15 AM** — Getting the most value out of an acre of prunes

Ted DeJong, Professor Emeritus, UC Davis Plant Science Department

**10:45 AM** — Insect and Mite Update

Emily Symmes, UC IPM Advisor Sacramento Valley

**11:15 AM** — Prune Production Research Update, 2018

Drew Wolter, UCCE Horticulture Intern

**11:30 AM** — Nitrogen Management in Prunes

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

Buffet Lunch – Only by Prepaid Reservation (due Thursday, February 14<sup>th</sup>) – \$15.00 per person

Reserve at: [ucanr.edu/pruneday19](http://ucanr.edu/pruneday19). For more information contact: Cindy McClain (530)527-3101

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.

## **Trends in World Prune Markets (and What They Could Mean for California Grower Practices in 2019).**

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

Bigger crops often follow small to medium crops. [The 2018 prune crop looks to be 25-30% off the 2017 crop.] California should expect a larger prune crop in 2019 compared to 2018, weather allowing. While nobody can be certain what the crop will be in '19, given past history and world production trends, it's not too early to review production management practices prune growers could use to maximize their income/acre in 2019.

Bigger crops generally mean smaller fruit, unless growers manage their cropload, which means thinning with or without pruning. Smaller fruit have less value than large dried fruit and cost more to harvest and dry.

California growers who grow large crops of small fruit in 2019 should have strong competition in international markets from other, lower cost/price producers. Why is that? California produced 30% less of the world's prune crop in 2017 than in 1997, while the total volume in the world market only dropped 12% in those years. The difference in production has largely been made up by South America (Chile and Argentina). See the change in production over time between California and South American in Figure 1, with data from the International Prune Association (<http://www.ipaprunes.org/>) 2018 International Congress presentations. [Good news going forward is that plantings in South America have slowed dramatically (see recent IPA data).]

Growers in Chile and Argentina average 70-75 ct/pound dry fruit sizes and their costs are lower than those for California growers. Also, in general, prices of prunes from South American are significantly less than for prunes grown in California (see Stock Management presentation from 2018 IPA congress for an example of price differences between producing countries). Finally, major emerging markets that used to consume significant tonnage of small fruit (China, Brazil, and Russia) have dramatically reduced their use of prunes since 2014. The world supply of small fruit is up (more production, less overall consumption) and that generally means lower prices for those categories.

To deliver the best possible returns this year, growers may want to consider focusing on producing large – A & B -- screen fruit. How? Manage cropload (prune and thin) and avoid early (immature fruit) harvest. Thinning is less expensive than pruning and can be done every year (if needed). Do what you can to harvest when the fruit is mature, not before. Fruit harvested before the fruit reaches maturity (3-4 lbs internal pressure) contains less sugar and dries to a smaller fruit size compared to mature fruit. Consider all possible options to get fruit harvested on time, but not before.

Prune buds are not pushing, yet, but now is the time to think about the coming season before the days get filled with doing. Talk with your neighbors and packers to put together a plan for the coming season. Consider attending the local UCCE prune grower meetings (see dates and agendas in this newsletter). Prunes, farmed with the goal of good production of large fruit, should be an important and valuable crop to support diversified growers and the region's economy in 2019.

---

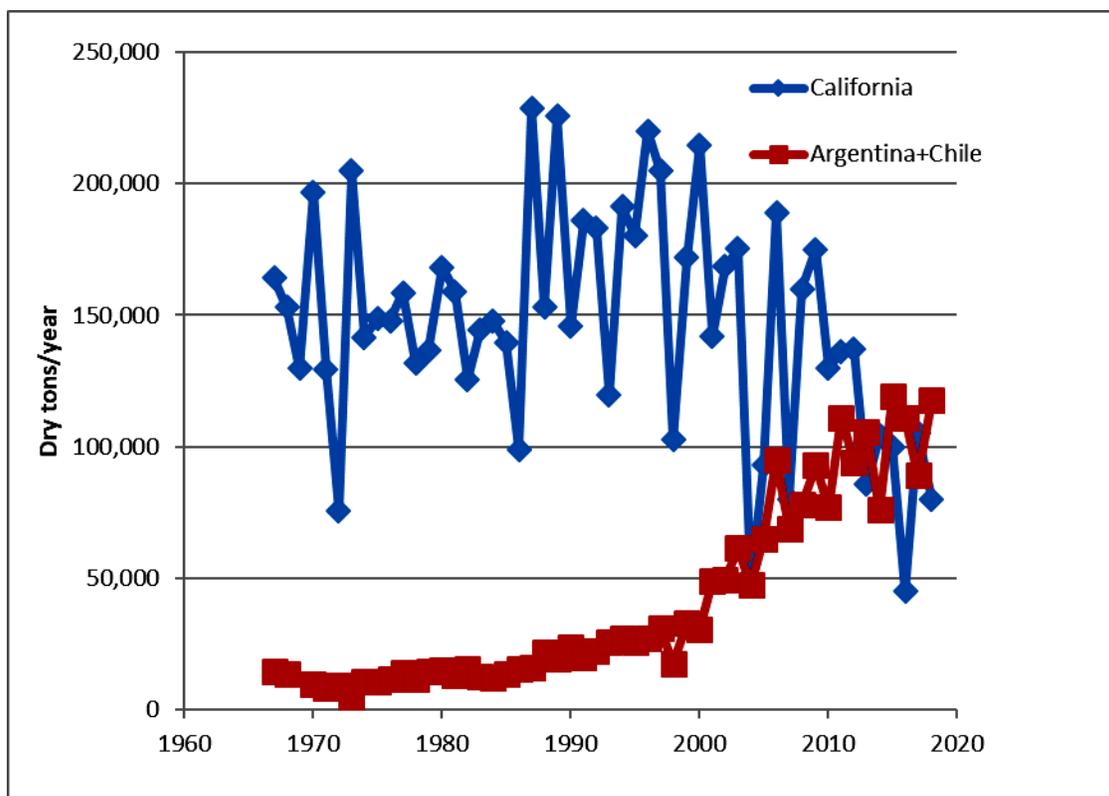


Figure 1. California and Argentina+Chile prune production (dry tons/year) from 1967 to 2018. Data are taken from charts found at <http://www.ipaprunes.org>. Note that the production in Argentina+Chile has largely stabilized around 100,000 dried tons since 2011, as new plantings have slowed dramatically.

### Is This a Year to Skip Thinning?

*Dani Lightle, UCCE Orchards Advisor, Glenn, Butte & Tehama Counties*

Between interest rate increases, labor costs, and disease concerns, many growers are looking to save on production costs wherever possible. Understandable enough – but is pinching pennies by not thinning your prune crop worth it over the long haul?

A prune tree has an upper limit to the amount/weight of fruit it can mature. This allows for two options:

- Many fruit, but small size
- Fewer fruit, but large size

The actual fresh weight of the fruit from any given tree may be quite comparable between these two options. However, as you know, your return is not calculated solely on the overall weight of your crop. It is based, in large part, on the size of the fruit you deliver. The market, as it currently stands, is not interested in purchasing small prunes.

Take 2017 pricing, for example. The grower return on A screen (61ct) fruit was roughly \$2200/ton. That return dropped to \$1400/ton for C screen (81ct) fruit – a difference of \$800/ton (or \$1,900/acre, using the NASS 2017 average yield of 2.4 tons/ac).

Ultimately, whether thinning will be needed this year will depend on the crop set. On average, production was a bit down last year. Typically, a lighter crop leaves the trees with greater reserves and potential to set a higher number of fruit. However, it's too early to predict how bloom weather may help or hurt the crop set this spring.

Let's think optimistically about the weather: super charged trees and the most perfect of spring sunshine and

temperatures! If that's how March pans out, add thinning to your to-do list. Delivering a load of tiny fruit won't bring you the returns your operation is relying upon. Keep your eyes out for the next newsletter, which will feature the step-by-step calculations for successful thinning.

---

## **Bloom Disease Treatments in Prune and Honey Bee Safety**

*Emily J. Symmes, UCCE Area IPM Advisor, Sacramento Valley*

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

Disease management during prune bloom using fungicide sprays is critical to setting a successful crop, particularly in years with wet bloom conditions that drive pathogen development and spread. Of particular concern, and often treated during bloom, are brown rot and scab.

Just as essential as disease management to producing a large and profitable prune crop is strong honey bee activity in the orchard during bloom. Unlike the majority of almond varieties, prunes are self-fertile. However, they do require bees (or other insects) to move pollen within flowers to set a crop. It is vital to understand the impacts of disease sprays on honey bees and adopt best practices for mitigating those impacts.

Prune growers should do all they can to maintain strong, healthy bee activity in their orchards by providing a safe working environment for bees. The most important single thing growers can do is **KEEP THE POLLEN CLEAN**. In addition to the obvious impacts of contact insecticidal materials on active adult honey bees, a wide range of pesticide residues (insecticides, fungicides, herbicides, etc.) found on pollen are known or suspected to have adverse impacts on the developing honey bee brood and overall hive health. Pollen is collected by foraging adult bees and taken to the hive as a source of proteins, fats, vitamins, and other nutrients for the brood (young, growing bee larvae). Pollen that comes in contact with pesticides can damage hive health when fed to the growing brood.

The release of pollen occurs gradually over the course of bloom, with more anthers "popping" each day. Pollen is released by some of the anthers in each flower in the morning as relative humidity drops and the orchard warms. Strong bee activity typically strips all available pollen from the flowers in a given day by early- to mid-afternoon. For this reason, any pesticides (i.e., fungicides) that need to be sprayed during bloom when bees are active in the orchard should be applied in the late afternoon or evening in order to minimize contamination of pollen that will become available the following morning.

### ***IPM for bloom diseases in prune, considering honey bee colony health:***

- ***Brown rot.*** The causal fungal agents survive in mummies, twig cankers, and remaining diseased flower parts and spurs, providing inoculum for spring infections. Spores are air-borne or rain-splashed. Optimal conditions for disease spread and development are rainy weather during bloom and temperatures in the mid-70s (°F), although temperatures above 58°F promote infection. All flower parts are susceptible to infection.
    - Good orchard sanitation can reduce the amount of inoculum available for spring infections. Pruning crews should remove fruit mummies and blighted shoots from the orchard. Complete removal is ideal, as mummies left on the orchard floor will contribute inoculum, although cultivating the orchard floor to bury mummies can reduce inoculum load. Dense ground cover maintained during bloom favors the production of inoculum by mummies left behind.
    - Depending on conditions, one to three bloom brown rot treatments may be needed to protect the crop. Typically, two treatments (green bud and full bloom) are applied; a third at popcorn stage may be warranted if bloom is prolonged and wet conditions favor disease development. Under dry (no rain) bloom conditions, a single fungicide spray at 30 to 50% bloom using FRAC 3, 9, and/or 11 fungicides – those showing some systemic activity – is recommended. Fungicides are most effective if applied before a rainfall event and allowed to dry.
  - ***Scab.*** Scab develops in years with excessive rain during and just after bloom, although research has shown that prunes with <75% scab do not contribute to off-grade. Although not caused by a microorganism, this
-

physiological disorder is minimized by the fungicides chlorothalonil and captan. Full bloom is the suggested treatment timing for controlling scab in years with conditions conducive to symptom development.

These applications cause particular concern for honey bee health, as both materials are known to be toxic to the bee brood. If possible, wait until the bee hives have been removed from the orchard before applying the full bloom fungicide containing captan or chlorothalonil. If bloom conditions have been good for set (60-80°F maximum daily temps with limited wind), removing bees by full bloom will not harm croplod.

- ***For any fungicide treatment during bloom:***

- Consider weather conditions and treat only when needed to avoid economic crop damage.
- Employ good sanitation for brown rot (remove and destroy mummy fruit) to reduce inoculum load and possibly limit the need to apply fungicides.
- Minimize pollen contamination by applying fungicides in the late afternoon or evening after the day's pollen has been stripped from the flowers. Avoid early morning sprays, as the spray will not have sufficient time to dry before new flowers open, anthers shed pollen, and bees begin foraging.
- Never spray the hives or foraging adults directly with any pesticide – insecticide, fungicide, and/or herbicide. Even being contacted by water sprays can adversely impact adult bee flight activity.
- Do not add adjuvants, insecticides and/or nutrients to the tank with fungicide applications during bloom or when bee activity is high in an orchard.
  - ◆ Do not add **any** insecticide to the tank except B.t. (Dipel<sup>®</sup>, etc.) during bloom or when bee activity is high in an orchard. Even “soft”, selective insecticides such as Dimilin<sup>®</sup>, Intrepid<sup>®</sup> and Altacor<sup>®</sup> applied when there is high bee activity in a block can be very harmful to hive (brood) health.
  - ◆ According to the authors of the annual Fungicides, Bactericides, And Biologicals for Deciduous Tree Fruit, Nut, Strawberry, And Vine Crops (Adaskavag, Gubler, and Michailides 2017, [ipm.ucanr.edu/PDF/PMG/fungicideefficacytiming.pdf](http://ipm.ucanr.edu/PDF/PMG/fungicideefficacytiming.pdf)), most fungicides are formulated with adjuvants including wetting agents, spreaders, and stickers. Unless a material specifically indicates on the product label that an adjuvant should be added, the fungicide product does not need additional adjuvants mixed into the sprayer tank to improve performance. With few exceptions, adjuvants do not statistically improve the efficacy of fungicides for managing diseases of fruit and nut commodities.
  - ◆ All University of California efficacy trial results (+++'s in the efficacy table) are based on this premise and materials are tested without addition of adjuvants unless expressly indicated on the product label.
  - ◆ Adjuvants may increase the potential toxicity of fungicides to honey bees. To save money and protect bees, only put what is absolutely necessary in the tank at bloom.
- Ensure that adult bees have a clean water supply by covering water sources (buckets, etc.) provided for bees when spraying or replacing water immediately after.
- Consider arranging with your beekeeper to remove hives just prior to a full bloom application of captan or chlorothalonil, if possible.
- Know the impacts of any materials being applied during bloom to honey bees and their brood. UC IPM has a searchable database with hundreds of pesticides of different classes (insecticides, fungicides, bactericides, herbicides, etc.) that provides a rating scale of impact to honey bees, adverse effects on developing broods, and indicates known interactions among materials on honey bee health. [www2.ipm.ucanr.edu/beeprecaution/](http://www2.ipm.ucanr.edu/beeprecaution/)

More information on honey bee best management practices during prune bloom is available at [sacvalleyorchards.com/prunes/honey-bee-safety-during-bloom/](http://sacvalleyorchards.com/prunes/honey-bee-safety-during-bloom/).

Although designed with almond growers in mind, the Almond Board of California's Honey Bee Best Management Practices materials are a great resource of information for all agricultural producers whose crops depend on honey bees for pollination. [almonds.com/pollination](http://almonds.com/pollination)

## PRUNE (DRIED PLUM): FUNGICIDE EFFICACY

Fungicide	Resistance risk (FRAC#) <sup>1</sup>	Brown rot		Russet scab	Rust
		Blossom	Fruit <sup>2</sup>		
Adament	medium (3/11)	++++	++++	----	+++
Bumper,Tilt <sup>2</sup>	high (3)	++++	++++	----	+++
Distinguish**	medium (9/11)	++++	++	----	++
Elite,Tebucon,Teb,Toledo <sup>2,7</sup>	high (3)	++++	++++	----	+++
Fontelis	high (3)	++++	+++	----	+++
Indar <sup>2</sup>	high (3)	++++	++++	----	+++
Inspire Super	high (3/9)	++++	++++	----	+++
Luna Experience	medium (3/7) <sup>4</sup>	++++	++++	ND	++++
Luna Sensation <sup>2</sup>	medium (7/11) <sup>4</sup>	++++	++++	ND	ND
Merivon	medium (7/11) <sup>4</sup>	++++	++++	ND	ND
Pristine <sup>2</sup>	medium (7/11) <sup>4</sup>	++++	++++	ND	ND
Quash <sup>2</sup>	high (3)	++++	++++	----	+++
Quadris Top <sup>2</sup>	medium (3/11) <sup>4</sup>	++++	++++	ND	++++
Quilt Xcel,Avaris 2XS <sup>2</sup>	medium (3/11) <sup>4</sup>	++++	++++	ND	++++
Rovral <sup>5</sup> + oil	low (2)	++++	NR	----	NR
Scala <sup>6</sup>	high (9) <sup>3,4</sup>	++++	+++ <sup>6</sup>	----	ND
Topsin-M,T-Methyl,Incognito,Cercobin + oil <sup>2,4</sup>	high (1) <sup>4</sup>	++++	++++	----	----
Vanguard <sup>6</sup>	high (9) <sup>3,4</sup>	++++	+++ <sup>6</sup>	----	ND
Elevate <sup>2,7</sup>	high (17) <sup>4</sup>	+++	+++	ND	----
Rhyme	high (3)	+++	+++	----	+++
Rovral <sup>5</sup> /Iprodione /Nevado	low (2)	+++	NR	----	NR
Topsin-M,T-Methyl,Incognito <sup>2,3</sup>	high (1) <sup>4</sup>	+++	+/-	----	----
Abound	high (11) <sup>4</sup>	++	+	----	+++
Botran	medium (14)	++	++	ND	ND
Bravo,Chlorothalonil,Echo,Equus <sup>8,9,10</sup>	low (M5)	++	++	++	---- <sup>9</sup>
Captan <sup>7,8,10</sup>	low (M4)	++	++	+++	----
Gem <sup>7</sup>	high (11) <sup>4</sup>	++	+	----	+++
Oso	high (19)	++	++	----	ND
Rally <sup>2</sup>	high (3)	++	++	----	----
Sulfur <sup>10</sup>	low (M2)	+/-	+/-	----	++

**Rating:** ++++= excellent and consistent, +++= good and reliable, ++= moderate and variable, += limited and erratic, +/- = often ineffective, ---- = ineffective, ? = insufficient data or unknown, NR=not registered after bloom, and ND=no data

\* Registration pending in California.

\*\* Not registered, label withdrawn or inactive in California.

<sup>1</sup> Group numbers are assigned by the Fungicide Resistance Action Committee (FRAC) according to different modes of actions (for more information, see <http://www.frac.info/>). Fungicides with a different group number are suitable to alternate in a resistance management program. In California, make no more than one application of fungicides with mode-of-action Group numbers 1, 4, 9, 11, or 17 before rotating to a fungicide with a different mode-of-action Group number; for fungicides with other Group numbers, make no more than two consecutive applications before rotating to fungicide with a different mode-of-action Group number.

<sup>2</sup> Fruit brown rot treatments for fungicides in FRAC Groups 1,2, 3, 17, 7/11 are improved with the addition of 2% light summer oil. The oil is "light" summer oil (1-2% vol/vol). If applied in summer, fruit will lose their waxy bloom and look red. They will dry to normal color.

<sup>3</sup> Strains of *Monilinia fructicola* and *M. laxa* resistant to Topsin-M and T-Methyl have been reported in some California prune orchards. No more than two applications of Topsin-M or T-Methyl should be made each year. Resistant strains of the jacket rot fungus, *Botrytis cinerea*, and powdery mildew fungi have been reported in California on crops other than almond and stone fruits and may have the potential to develop in prune with overuse of fungicides with similar chemistry. Subpopulations of both *Monilinia* spp. have been shown to be resistant to AP (FRAC 9) fungicides on prune in CA.

<sup>4</sup> To reduce the risk of resistance development, start treatments with a fungicide with a multi-site mode of action; rotate or mix fungicides with different mode-of-action FRAC numbers for subsequent applications, use labeled rates (preferably the upper range), and limit the total number of applications/season.

<sup>5</sup> Blossom blight only; not registered for use after petal fall.

<sup>6</sup> High summer temperatures and relative humidity reduce efficacy.

<sup>7</sup> Registered for use on fresh prunes only.

<sup>8</sup> Do not use in combination with or shortly before or after oil treatment.

<sup>9</sup> Do not use after jacket (shuck) split.

<sup>10</sup> Do not use sulfur, captan, or chlorothalonil in combination with or shortly before or after oil treatment.

## PRUNE (DRIED PLUM): TREATMENT TIMING

**Note: Timings listed are effective but not all may be required for disease control. Timings used will depend upon orchard history of disease, length of bloom, and weather conditions each year.**

Disease	Green bud	White bud	Full bloom	May	June	July
Brown rot <sup>1</sup>	+++	+++	+++	----	+	++
Russet scab <sup>2</sup>	----	----	+++	----	----	----
Rust <sup>3</sup>	----	----	----	+	++	+++

**Rating:** +++ = most effective, ++ = moderately effective, + = least effective, and ---- = ineffective

<sup>1</sup> Flowers are susceptible beginning with the emergence of the sepals (green bud) until the petals fall but are most susceptible when open.

<sup>2</sup> A physiological disorder; no pathogens involved.

<sup>3</sup> More severe when late spring rains occur.

### 2019 IPM Breakfast Meetings

Join Area IPM and Farm Advisors to discuss current pest management and production issues. We will largely focus on orchard crops (but everything is on the table for discussion!). These meetings are open to all interested growers, consultants, PCAs, CCAs, and related industry.

Meetings will be held the **second** Friday of each month (8:00-9:30am **\*note new start time\***) from March through October and will cover a wide range of timely pest and orchard management topics. Meeting locations will be rotated throughout the Sacramento Valley each month. Please contact Emily Symmes to request topics or bring your questions to the meeting!

2019 meeting dates:

March 8<sup>th</sup>, 2019 (Butte County): Red Rooster Café, Durham

April 12<sup>th</sup>, 2019 (Yuba-Sutter-Colusa Counties): Location TBA

May 10<sup>th</sup>, 2019 (Tehama County): Field Meeting, Location TBA

June 14<sup>th</sup>, 2019 (Glenn County): Field Meeting, Location TBA

July 12<sup>th</sup>, 2019 (Butte County): Field Meeting, Location TBA

August 9<sup>th</sup>, 2019 (Yuba-Sutter-Colusa Counties): Field Meeting, Location TBA

September 13<sup>th</sup>, 2019 (Tehama County): Rockin' R Restaurant, Red Bluff

October 11<sup>th</sup>, 2019 (Glenn County): Berry Patch Restaurant, Orland

Additional details will be posted on the events page at [sacvalleyorchards.com](http://sacvalleyorchards.com)

**RSVPs required** at (530) 538-7201 or [esymmes@ucanr.edu](mailto:esymmes@ucanr.edu)

**\*\*DPR and CCA Continuing Education hours requested\*\***

*Industry Partners: Sponsorships for venue and refreshment costs are welcome and appreciated. If you would like to sponsor one or more of these meetings, please contact Emily Symmes to inquire.*

## ***Weed Management Considerations When Replanting Trees in an Established Prune Orchard***

*Drew Wolter, UCCE Junior Specialist Horticulture Intern, supported by the California Dried Plum Board and the Almond Board of California for the 2019 growing season.*

Weeds impact orchard productivity and health by competing with young trees for water, light, and nutrients, and may act as hosts for a variety of pests. The primary objective of a successful weed management program is to optimize tree growth, health, and/or yield by minimizing the impact of weeds. Preemergent (PRE) herbicides can be an effective tool in orchard weed management.

Preemergent Herbicides Registered in California for Prunes <sup>1</sup>		
Active Ingredient (Trade Name)	Label Restrictions	WSSA MOA <sup>2</sup>
<b>flumioxazin (Chateau)</b>	Do not apply to trees established less than one year.	14
<b>indaziflam (Alion)</b>	Herbicide can ONLY be applied to established trees, minimum of three years after transplant, exhibiting normal growth and good vigor.	29
<b>isoxaben (Trellis)</b>	Do not apply to newly transplanted trees until soil has been settled by packing and irrigation or rainfall with no cracks present.	21
<b>mesotrion (Broadworks)</b>	Applications can ONLY be made to trees that have been established for one full growing season and are in good health and vigor.	27
<b>norflurazon (Solicam)</b>	Applications can ONLY be made 18 Months after planting OR replacement of tree.	12
<b>oryzalin (Surflan)</b>	Can be used on new transplants. Exposure of transplant roots to treated soil should be minimized to avoid any possibility of crop injury.	3
<b>oxyfluorfen (Goal, GoalTender)</b>	May be applied to transplanted trees as a single or split application once soil has settled.	14
<b>pendimethalin (Prowl H2O)</b>	Do not apply to newly transplanted trees until ground has settled and no cracks are present.	3
<b>penoxsulam/oxyfluorfen (Pindar GT)</b>	Do not apply Pindar GT to bearing and non-bearing stone fruit trees that have been established less than 4 years. Apply only to tree crops in good health and vigor. Use trunk guards to protect plants until adequate bark has developed.	2
<b>pronamide (Kerb)</b>	Do not apply to fall transplanted stock when transplanted less than 1 year or to spring transplanted stock when transplanted less than 6 months.	3
<b>rimsulfuron (Matrix)</b>	Apply only to trees that have been established for one full growing season.	2
<b>trifluralin (Treflan)</b>	May be applied to transplanted trees once soil has settled and trees are in good health and vigor.	3

<sup>1</sup>Registration status as of January 2019.

<sup>2</sup>Weed Science Society of America mechanism of action (MOA). It is critical to use herbicide MOAs in rotation or in sequence to minimize/delay development of herbicide resistance.

When a PRE is properly selected, timed and applied, weed pressure can be significantly reduced during the onset of each growing season.

If you decide to replant into a mature orchard, you must be extremely cautious with your preemergent (PRE) herbicide applications. **Carefully read the label before applying PRE applications near newly planted trees and to the surrounding orchard.** There are currently twelve preemergent herbicides registered in California for use in prunes. All of the labels list replant restrictions (see table) ranging from 30 days to 4 years from replant, along with guidelines to avoid phytotoxicity to young trees.

The residual weed control following PRE herbicide applications are affected by herbicide selection, application rate, soil texture, organic matter, and environmental conditions. If active PRE herbicides come in contact with young tree roots, significant injury can occur. Avoid backfilling planting holes with previously treated soil. Ensure the soil has completely settled before applying PRE herbicides if large cracks and holes are present in unsettled soil.

## Update on Heart Rot in Prunes

*Katrina Von Burg and Bob Johnson, Rizzo Lab, Department of Plant Pathology, UC Davis*

Prune orchard surveys throughout the Sacramento Valley in 2016 and 2017 found significant presence of the wood decay fungus *Phellinus tuberculosus*. *Phellinus* causes decay in the heartwood of trees and often goes undetected until fruiting bodies appear (Figure 1) or branches break exposing the decay within (Figure 2). Broken limbs caused by *Phellinus* were found in orchards as young as 7 years, while every orchard older than 12 years had a high incidence of broken limbs and *Phellinus* infection. *Phellinus* is spread via spores released from the undersides of fruiting bodies, with pruning wounds serving as the initial sites of infection. It is unknown exactly how long a pruning wound remains susceptible to *Phellinus* infection, but if inoculum is present and there is sufficient moisture, it may be years. Reductions in size and number of pruning wounds and pruning during dry weather may reduce incidence of *Phellinus* infection. Although *Phellinus* can be considered a major disease of prune trees, little research into its biology, epidemiology, and management strategies has been carried out. Our current project focuses on understanding the infection process and investigating possible prevention and control strategies to reduce the incidence and severity of *Phellinus* infections.

‘Improved French’ has been the dominant prune variety in California for the past century and currently represents approximately 95% of the acreage. This reliance on a single variety for such a long time has likely allowed *Phellinus* to adapt to decaying this specific variety. In collaboration with the UC Davis Prune Cultivar Development Program, we are evaluating new varieties for possible tolerance or resistance to *Phellinus* infection and decay. Preliminary results from laboratory wood decay studies show that *Phellinus* decayed significantly more ‘Improved French’ wood than most of the advanced selections from the breeding program.



Figure 2. Broken limb in young orchard caused by *P. tuberculosus*.



Figure 1. Fruiting bodies of *P. tuberculosus*

These experiments are currently being repeated and field trials are planned for 2019.

On several instances during our survey work, *Trichoderma* spp. were isolated from *Phellinus* decay. *Trichoderma* spp. are often found colonizing *Phellinus* fruiting bodies (Figure 3). *Trichoderma* spp. are free-living fungi, antagonistic to other fungi, and are also myco-parasites, meaning they can compete with and consume other fungi. *Trichoderma* spp. have been shown to be effective bio-control agents and many commercial products are available for the control of soil-borne fungal pathogens. We are testing six commercially available bio-control products in the laboratory for their efficacy at preventing *Phellinus* decay and killing the pathogen. Our preliminary results indicate that pruning wound protection with *Trichoderma*-containing products might be effective at preventing *Phellinus* infection. However, field testing is needed before specific treatment guidelines can be developed. In February

2019, we will begin field trials to evaluate *Trichoderma* products as pruning wound protectants and determine their ability to infect and kill *Phellinus* fruiting bodies.

We are confident that through a combination of new varieties, bio-control products, and conscientious pruning practices, the impact of *Phellinus* on prune orchard productivity and longevity can be mitigated.



Figure 3. *Trichoderma* sp. parasitizing *P. tuberculosus* fruiting body.

---

## Orchard Considerations for Bloom and Beyond

Emily J. Symmes, UCCE Area IPM Advisor, Sacramento Valley  
Franz Niederholzer, UCCE Farm Advisor, Colusa, Sutter and Yuba Counties  
Katherine Jarvis-Shean, UCCE Farm Advisor Sacramento, Solano & Yolo Counties  
Luke Milliron, UCCE Farm Advisor, Butte, Tehama and Glenn Counties

### February

**Bees:** Order bees, generally at a rate of 1 hive/acre. Employ best management practices for maintaining hive health and actively communicate with your beekeeper about the fungicides you may use at bloom. Refer to the article in this issue for more information on bloom pest management activities and honey bee protection.

**San Jose Scale (SJS):** Dormant to delayed-dormant is the preferred management timing for applying pesticides to treat damaging levels of San Jose Scale. Use spur monitoring to determine if treatment is needed. For detailed directions for taking a dormant spur sample, see: [ipm.ucanr.edu/PMG/r606900511.html](http://ipm.ucanr.edu/PMG/r606900511.html). Place pheromone traps by mid- to late-February to establish a biofix and begin accumulating degree days for crawler treatment timing (if dormant treatments were not applied) and to monitor parasitic wasp levels *More on SJS:* [ipm.ucanr.edu/PMG/r606302111.html](http://ipm.ucanr.edu/PMG/r606302111.html)

**Irrigation Maintenance:** Maintaining and checking the distribution uniformity of your irrigation system is key to preparing for possible heat at bloom, as well as the coming irrigation season.

**Calibration:** Calibrating your spray equipment and replacing nozzles, checking spray filters and other worn parts is part of preparing for bloom disease sprays.

**Protect new trees:** For both replants and new orchard plantings, protect trees from sunburn and herbicides 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”.

**Chill:** Steady accumulation (as of January 15) has resulted in accumulation levels above the past two winters. *To check chill at the nearest CIMIS station, visit:* [fruitsandnuts.ucdavis.edu/Weather\\_Services/chilling\\_accumulation\\_models/Chill\\_Calculators/](http://fruitsandnuts.ucdavis.edu/Weather_Services/chilling_accumulation_models/Chill_Calculators/).

### March

**Cold at bloom:** a closely mowed orchard floor is warmer than one with tall weeds/cover crop, while freshly disked soil is the coldest.

**Heat at bloom:** Consider irrigating to wet the orchard floor, refilling soil moisture in the first foot of soil. Run sprinklers when temperatures reach 75°F and shut off when they drop below those temperatures. Evaporation of this water provides some small temperature reduction (usually just one or two °F).

**Brown rot:** Depending on conditions, one to three bloom brown rot treatments may be needed to protect the crop. *See article in this issue on Bloom Disease Treatments and Honey Bee Safety.*

---

**Russet scab:** This disorder develops when there is significant rainfall during and/or immediately after bloom. The suggested full bloom timing of captan or chlorothanil (Bravo/Echo) can be risky for bee health. *Learn more in the article on Bloom Disease Treatments and Honey Bee Safety.*

**Peach twig borer (PTB):** Monitor during and after bloom. Chewing damage on buds during bloom indicates PTB activity and may warrant treatment. To protect bees, avoid any insecticide in the spray tank at bloom, except Bt (*Bacillus thuringiensis* formulations). *More on PTB at: [ipm.ucanr.edu/PMG/r606300211.html](http://ipm.ucanr.edu/PMG/r606300211.html) and more details on bee safety in the article in this issue.*

**Aphid:** If control measures were not taken during fall or winter, two oil sprays (4 gal/acre/spray) at bloom can be effective against mealy plum and leaf-curl plum aphids if applied 7-10 days apart at 1.5 mph. Oil has a level II precaution for bee safety, meaning it should only be sprayed between sunset and midnight, ideally when temperatures have dropped below 55°F to avoid foraging bees. The safest option for bees is to consider utilizing an alternative management timing (spring, fall, or winter). Finally, oil should *not* be applied with or shortly before/after captan, chlorothalonil, or sulfur because the combination can be phytotoxic.

*More leaf curl plum aphid info: [ipm.ucanr.edu/PMG/r606301811.html](http://ipm.ucanr.edu/PMG/r606301811.html)*

*More mealy plum aphid info: [ipm.ucanr.edu/PMG/r606301711.html](http://ipm.ucanr.edu/PMG/r606301711.html)*

## April

**San Jose Scale (SJS):** If dormant treatments were not applied, efficacy not achieved, and/or spring SJS pressure appears high, consider treating at 600 to 700 degree days after pheromone trap biofix to target emerging crawlers. Alternatively, SJS crawler activity can be monitored using double-sided sticky tape around limbs beginning in April to detect crawler emergence and time spring treatments if necessary.

**Peach twig borer (PTB):** Begin post-bloom monitoring with pheromone traps (minimum 2 per block) no later than mid-March to determine biofix (moths caught on two consecutive trap checks) and begin accumulating degree days to inform when to begin fruit inspections.

**Obliquebanded leafroller (OBLR):** Place pheromone traps (minimum 2 per block) at the beginning of April to establish a biofix (moths caught on two consecutive trap checks) and begin accumulating degree days to inform when to begin fruit inspections. *More on OBLR at [ipm.ucanr.edu/PMG/r606300511.html](http://ipm.ucanr.edu/PMG/r606300511.html)*

**Aphid:** Monitor for leaf curl plum aphid and mealy plum aphid as colonies can grow soon after bloom. Monitoring details at: [ipm.ucanr.edu/PMG/r606900211.html](http://ipm.ucanr.edu/PMG/r606900211.html)

**Fertilization program starts:** With crop load being the major driver of nitrogen (N) and potassium (K) use, measure the crop in mid-April and use this information to plan your fertilizer applications. To optimize uptake and avoid leaching, apply multiple N applications, avoiding a single heavy spring application. Consider an N application before the end of April if there is a good crop set. If considering foliar potassium nitrate applications due to cold soil/wet spring conditions reducing root uptake, begin spraying in late April and make additional applications every 2-3 weeks.

**Irrigation:** Monitor soil moisture sensors or pressure bomb readings to track orchard moisture status and determine when to apply first irrigation. Don't apply irrigation before the crop has used more water than the first irrigation will apply. Irrigating too early can saturate soils, which can lead to iron chlorosis and leaf yellowing.

## May

**Rust:** Monitoring commences with the start of the month, surveying 40 trees every 1-2 weeks, paying close attention to non-bearing replants, exceptionally vigorous trees, and previous hot spots. Consider treating when the first leaf with rust is found. *For more on rust see: [ipm.ucanr.edu/PMG/r606100611.html](http://ipm.ucanr.edu/PMG/r606100611.html)*

**PTB and OBLR:** For PTB, begin fruit inspections at 400 degree days after the first biofix. In the orchard, look for larvae entry points on the fruit (ideally 15 fruit from 80 trees), especially where fruit contact each other or touch leaves. Treat if 2% or more (24+ of 1,200) of the fruit have damage. For OBLR, begin fruit inspections at 930 degree days after biofix, following the same sampling protocol and treatment threshold.

## 2019 UCCE Winter Prune Meetings

Thursday, February 21 <sup>st</sup> 8:00 am - 12:00 pm	<p style="text-align: center;"><b>South Sacramento Valley Prune Day</b></p> Veterans Memorial Hall, 1425 Veterans Memorial Circle, Yuba City
Friday, February 22 <sup>nd</sup> 8:30 am - 12:00 pm	<p style="text-align: center;"><b>North Sacramento Valley Prune Day</b></p> Elks Lodge, 355 Gilmore Road Red Bluff Buffet Lunch – Only by Prepaid Reservation—\$15.00 per person. Register by Thursday, February 14, 2019 at: <a href="http://ucanr.edu/pruneday19">ucanr.edu/pruneday19</a>
You can find agendas and more event details at: <a href="http://sacvalleyorchards.com/events/">sacvalleyorchards.com/events/</a>	

**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.



Prune Newsletter

University of California  
 Cooperative Extension  
 Glenn County  
 P. O. Box 697  
 Orland, CA 95963

Nonprofit Organization  
 U. S. Postage Paid  
 Orland, CA 95963  
 Permit No. 63