Sacramento Valley Prune News
Bloom 2021
University of California
Agriculture and Natural Resources | Cooperative Extension

Orchard Considerations for Bloom and Beyond, 2021

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In This Issue

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Late February

- ✓ **Bees:** Order bees, using a 1 hive/acre stocking rate. Employ best management practices for maintaining hive health and actively communicate with your beekeeper about the fungicides you may use at bloom. *More information at*: sacvalleyorchards.com/prunes/diseases-prunes/bloom-disease-treatments-honey-bee-safety.
- ✓ **San Jose Scale (SJS):** If dormant treatments were not applied or were unsuccessful, place pheromone traps by late-February to establish a biofix and begin accumulating degree days for crawler treatment timing. *See:* 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. More information available at: sacvalleyorchards.com/almonds/irrigation/irrigation-system-maintenance. If you farm in Tehama, Butte, Colusa, Glenn, Shasta or Yolo counties you can apply for a free system evaluation from the Tehama Resource Conservation District Mobile Irrigation Lab. *For more information, or to schedule a free evaluation, please contact:* Kevin Greer (530) 727 – 1297, kevin@tehamacountyrcd.org.
- ✓ **Calibration:** Calibrating your spray equipment and replacing nozzles, checking spray filters and other worn parts is part of preparing for bloom disease sprays. *Learn more at:* sacvalleyorchards.com/almonds/foliar-diseases/pre-season-airblast-sprayer-calibration
- ✓ **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". Research in almond has found that trunk cartons can provide protection from herbicide injury for young trees. However, **paint alone does NOT provide protection from herbicide(s)**. Learn more at: ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=38701
- ✓ **Chill:** Steady accumulation (as of February 20) has resulted in chill accumulation that is in the middle of the pack compared to recent winters. *To check chill at the nearest CIMIS station, visit:* fruitsandnuts.ucdavis.edu/Weather_Services/Chill_Calculators.

March

- ✓ **Forecast = cold at bloom:** a closely mowed orchard floor is warmer than one with tall weeds/cover crop, while freshly disked soil is the coldest.
- ✓ **Forecast = hot at bloom:** If temperatures climb above 81-82°F during or soon after full bloom, fruit set may be reduced and crop loss can occur. To cool the orchard as much

as possible when hot weather (80ºF plus) at bloom is predicted, run sprinklers during bloom (especially full bloom and the next 2-3 days after full bloom) when temperatures reach 75ºF and keep them on until they drop below 75ºF. Evaporation of sprinkler water as it moves through the air provides some small temperature reduction (usually just one or two ºF). If the weather is hot at bloom, taller orchard floor vegetation may keep the orchard cooler during the day. (See article on 2020 heat during bloom in this newsletter.)

- ✓ **Brown rot:** A single bloom spray for brown rot, applied at 25-40% bloom, is recommended to protect flowers from brown rot even when skies are clear during bloom. Use locally systemic fungicide(s) (FRAC Group 3, 9, and/or 11) in a single-spray brown rot program. A scab material can be included with this single brown rot spray. Dew can wet the flowers long enough to allow infection, even if there is no rain, so treating at least once for brown rot is recommended. If the weather outlook changes and rain is forecast during bloom, spraying twice is recommended; once at white bud (5% bloom) and again at full bloom. The full bloom spray is the most critical. *See fungicide timing and efficacy data in this newsletter.*
- ✓ **Russet scab:** This disorder develops when significant rainfall occurs during or immediately after bloom. If a single bloom spray is applied for brown rot, before 50% bloom, scab material can be included in that spray. Once the fruit is through the jackets, the risk of scab is mostly gone. The suggested full bloom timing of captan or chlorothanil (Bravo®/Echo®) can harm bees so spray in the late evening or night (bees are back in the hive) or arrange with your beekeeper to remove the hives before spraying. The recommended timing for bee removal is when 90% of flower are open.
- ✓ **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 such as Dipel®, Javelin®, etc.). 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. *More on PTB at:* ipm.ucanr.edu/PMG/r606300211.html
- ✓ **Aphid**: If control measures were not taken during fall or winter, two 440 oil sprays (4 gal/acre/spray) at bloom can be effective against mealy plum and leaf-curl plum aphids if applied at slow ground speeds (for example 1.5 mph) 7-10 days apart. 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 55ºF to avoid foraging bees. **The safest option for bees is to consider utilizing an alternative management timing (spring, fall, or winter) for aphid control.** 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
More mealy plum aphid info: ipm.ucanr.edu/PMG/r606301711.html

April

- ✓ **Got a crop?** With a light crop in 2020 in many orchards in the state, if bloom-time maximum temperatures stay between 60º-80ºF, there is a strong chance the crop will be good to heavy and thinning needed once reference date arrives. Get ready to line up shakers if bloom weather is good. Check for tip hardening starting in mid-April. If a sharp knife catches, even briefly, when cutting across the blossom end of the flower, the fruit has reached tip hardening. Reference date is usually 7-10 days after tip hardening. **Thin early (once reference date is reached) for best size results**.
- ✓ **Irrigation:** *In dry springs, pay special attention to orchard water status and if irrigation is needed*.
  - If we continue to have a dry spring, irrigation may be needed much earlier than "normal". If the orchard is allowed to really dry out in the spring, rewetting can cause end cracking on fruit, especially in May and/or June. Don't let your orchards go into those months with water stress. Keep an eye on 1) crop needs and soil water levels and 2) the forecast weather for the coming week and beyond. *The*

most direct measure of water status is the pressure bomb, read more at: sacvalleyorchards.com/manuals/stem-water-potential/

- Monitor orchard moisture (soil moisture sensors or pressure chamber readings) to track orchard moisture status and determine when to apply first irrigation. *For more information on the approaches to timing the first irrigation, see:* sacvalleyorchards.com/blog/almonds-blog/early-season-irrigation-do-we-know-when-to-start.
- Don't apply irrigation before the crop has used more water than the first irrigation will apply. Irrigating too early can saturate soils, leading to leaf yellowing from iron chlorosis. Yellow trees due to wet soils in the spring should "green up", but may not feed the growing crop as well as if they never became yellow at all. *For more on diagnosing yellow prune trees see:* sacvalleyorchards.com/blog/prunes-blog/why-are-some-prune-trees-yellow-in-the-spring-the-bicarbonate-blues/
- **Fertilization program starts:** Crop load is the major driver of nitrogen (N) and potassium (K) use in prune trees. The bigger the crop, the more of these nutrients that're needed. Check crop load 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 as your K program or to supplement soil applied K, begin spraying in late April and make additional applications every 2-3 weeks.
  - More than 50% of annual N budget should be applied before June 1st. A large prune crop (3-4 dry tons/acre) contains 40-50 lbs of N and that N will leave the orchard in the fruit bins at harvest. Assuming an additional 30 lbs N for the tree (shoot growth, spur growth, etc.) and 70% efficiency (0.7 lb N into the tree for every pound of fertilizer N applied to the soil) the annual N budget/acre for a mature prune orchard with a good to heavy crop should be 100-115 lbs N/acre. For best efficiency, make several smaller (for example, 25-40 lbs N/acre) N applications through the season and inject liquid fertilizer late in the irrigation set and then flush with 1-2 hours of clean water. More details on prune nutrition/fertility are found at: apps1.cdfa.ca.gov/FertilizerResearch/docs/Prune_Plum.html

✓ **Aphid:** Monitor for leaf curl plum aphid and mealy plum aphid since colonies can grow soon after bloom. Monitoring details at: ipm.ucanr.edu/PMG/r606900211.html. Oil sprays anytime from petal fall to May 15 can reduce mealy plum aphid to acceptable levels with good to excellent coverage. Oil is not effective against leaf curl aphid during this period as the spray can't reach inside the curled leaves. Other pesticides are effective in controlling aphids during the spring, but be careful to avoid flaring mites with pyrethroids (Asana®, Warrior®, etc) or neonics (Actara®, Provado®, etc.). Movento® and BeLeaf® can provide excellent aphid control when monitoring shows a need.

✓ **San Jose Scale (SJS):** If dormant treatments were not applied, the dormant spray didn't do a good job, or spring SJS pressure appears high, consider treating at 600 to 700 degree days after pheromone trap biofix to target emerging crawlers. (Traps should be up in February.) 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. *Caution:* If you use neonic pesticides for aphid control (Actara®, Assail®, Leverage 360®, etc.) scale populations may increase.

✓ **Peach twig borer (PTB):** Continue monitoring for PTB biofix. (Traps should be up in March.) PTB biofix in prune orchards is often later than in almond orchards. PTB damage can give brown rot disease entry into fruit. If you set a heavy crop, beware of PTB populations.

✓ **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

Mechanical Pruning of Prune Trees Update

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

The California prune industry relies on hand pruning to thin fruitwood, improve fruit size, reduce alternate bearing, and control tree size and shape. A number of prune growers, however, mechanically prune their orchards instead of the standard hand pruning of **mature, bearing trees. Mechanical pruning typically entails hedging all 4 sides of the tree and topping every year, resulting in a box-shaped tree. Other growers have experimented with less severe mechanical pruning, hedging one or both sides of the tree. Even for growers who have gone mechanical, some hand cuts are still needed to remove suckers, as well as diseased and dead wood.** Hand pruning involves selective annual removal of branches using loppers and ladders as needed. In this article we will provide the latest information on the "why" of mechanical pruning, yields of hand vs. mechanically pruned trees, as well as the when, and how to mechanically prune.

Why Mechanical prune?

The two main incentives for mechanically pruning your orchard are:

a. Cost of labor
b. Availability of labor

Hand pruning is one of the most expensive field operations, accounting for over 25% of the total cultural costs to produce prunes (UC Cost Studies, 2018). The UC Cost Study estimates about $3 per tree to prune, however, growers have mentioned that this figure can be $5/tree or more. Hand pruning costs and mechanical pruning costs are shown in **Table 1**. Savings ranged from $330 to $400 per acre using mechanical hedging vs. hand pruning. Mechanical hedging can be an important tool in decreasing pruning costs, reducing alternate bearing, and helping to maintain trees in their allotted space. A range of practices including mechanical topping and/or side hedging (one or two directions) are beginning to be practiced by prune growers. Growers are currently experimenting with mechanical pruning to limit tree size and encourage renewal growth at the canopy perimeter.

Table 1. Hand pruning, hedging both sides of the tree, and boxing costs and projected savings using mechanical pruning.

Cultural Operation	150 trees/acre	Savings using Mechanical Pruning/acre
Hand Pruning*	**$450**	
Hedging both sides**	**$50**	**$400**
Boxing***	**$120**	**$330**

* Hand pruning costs are based on $3/tree. Similar costs are reported in the 2018 Prune Cost Study.
**Hedging/topping cost are based on current estimates from commercial hedging companies.
***Boxing consists of hedging 4 sides of the tree plus topping.

Mechanical pruning is a labor-saving technology, important because farm labor is in short supply in California. Farmers are finding it difficult to obtain employees, despite raising wages and benefits. A recent survey conducted by the California Farm Bureau Federation in collaboration with the University of California, Davis found that 56 percent of farmers had experienced employee shortages (cfbf.com/wp-content/uploads/2019/06/LaborScarcity.pd). The survey indicates that farm labor shortages are getting worse thereby forcing some growers to adopt labor-saving technologies such a mechanical pruning.

Yields of hand vs mechanically pruned trees

Current findings comparing treatment yields in hand, boxed, and hedged both sides of the tree, indicated no significant prune yield differences (**Figure 1**). Preliminary finding in 2019 and 2020 also indicated no differences in fruit size between mechanical vs. hand pruned trees. This trial, however, will continue for another two years, so stay tuned for more results.

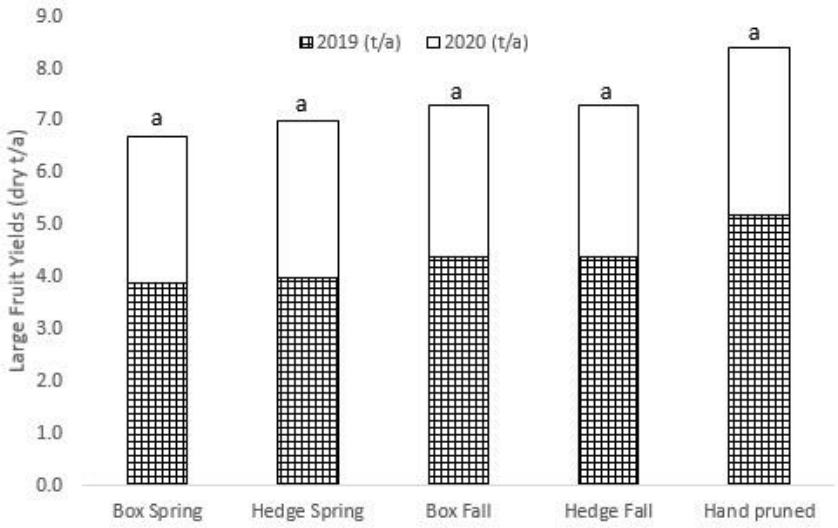

Figure 1. Dry fruit yields (A and B screens) in 2019 and 2020 in Tehama county (n =5). No significant differences were found.

Pruning weights and canopy volume

Hand pruned trees had larger canopy volumes than mechanically hedged trees (Figure 2). Hand pruning typically consists of thinning cuts which removed large branches to allow light penetration into the center of the canopy, but had minimal effects on total canopy volume. In contrast, hedging makes heading cuts where many small branches, leaves, and fruit were removed, significantly reducing the size of the canopy. Hedging can produce a fruiting wall where most of the fruit are located on the tree periphery.

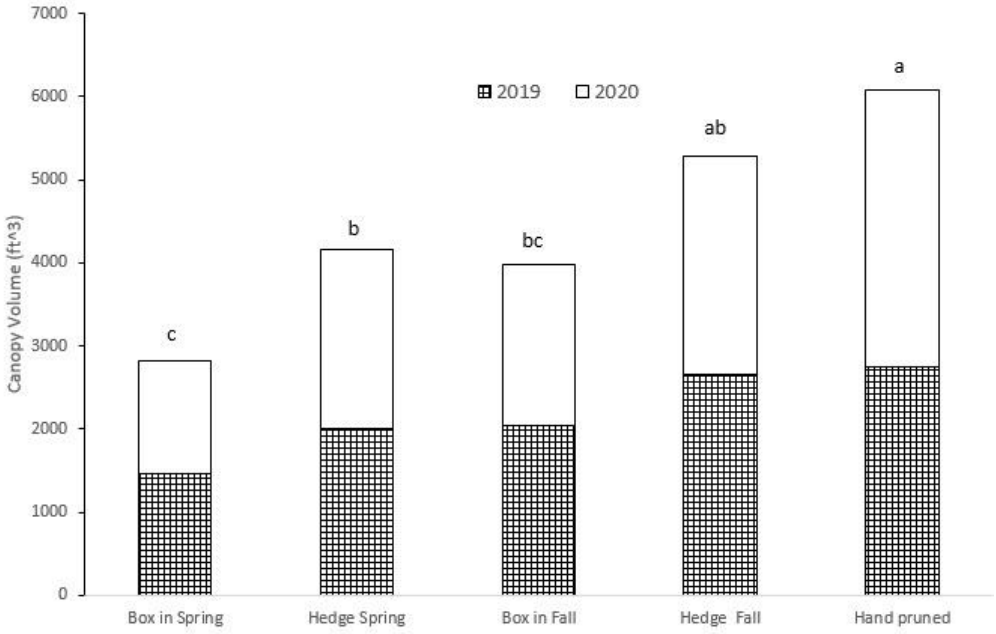

Figure2. Differences in canopy volume from hand and mechanical pruning treatments in 2019 and 2020. Columns with the same letter above them are not significantly different ($p < 0.05$).

When to mechanically prune?

Mechanical pruning operations should be timed to minimize strong vegetative regrowth. Strong regrowth following hedging can decrease fruit size in the current year and return bloom during the following year. Late spring following the growth flush and early fall following harvest have been identified as good times to mechanically prune. Previous studies have shown that return shoot growth is minimized during these time periods. Results to date do not favor one timing over the other. However, if trees require fruit thinning, the spring treatment may be favored because substantial amounts of fruit are removed during spring mechanical hedging.

Concerns with mechanical pruning

Disease risk: Hedging results in thousands of indiscriminate cuts that are potential entry points for rain-splashed fungal spore infection from diseases such as *Cytospora* and *Botryosphaeria* (figure 3). Spraying with a fungicide protectant like Topsin-M® soon after any pruning can reduce the risk of infection. *Learn more at:* sacvalleyorchards.com/prunes/diseases-prunes/cytospora-signs-management.

Figure 3. A prune orchard mechanically 'boxed' for several years showing severe branch dieback in September 2019. *Botryosphaeria* canker was identified by the lab of Dr. Florent Trouillas (UC Davis Pathology Specialist at Kearney Ag Center). The orchard block was subsequently removed because of the severe dieback. Topsin-M® had not been regularly applied after mechanical pruning.

Reduced fruitwood thinning: Mechanical hedging doesn't selectively thin fruitwood to improve fruit size. Instead, shaker thinning, as needed, is relied on to achieve good fruit size. Reduced fruitwood thinning may also result in fruit on positions that are more difficult to shake, such as long "hanger" spurs. If a grower is going to stop detail pruning in an orchard, estimating fruit per tree and shaker thinning – when needed – will be essential to avoid growing a big crop of small, low value fruit.

Unknown long-term results: Although previous studies and the first two years of the ongoing study point to mechanical pruning saving costs without compromising productivity, long-term results remain unknown. The

rise in labor costs and reduced availability come at a time when Cytospora and Botryosphaeria cankers have dramatically increased. With adoption of best practices like not pruning when rain is forecast and using a protectant like Topsin-M® these cankers might be minimized. Long term results of mechanical pruning on yield, dieback and overall orchard longevity are unknown.

Bloom review, 2020

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

The 2020 prune crop in California was light: averaging 1.45 dry tons/acre. [Total production was 58,000 dry tons from 40,000 acres.] The crop was particularly light in many orchards in the Sutter/Yuba area. What happened? While it's hard to be certain what caused the light crop, the warm temperatures in early March, peaking on March 12 at 80-82°F (hourly average) just after full bloom, match past weather patterns associated with crop failures (see Figure 1). The warm temperature right after bloom may have contributed to the light crop in the Sutter/Yuba area and other prune growing regions of the state. The crop set was much better where bloom was earlier or later or temperatures a little cooler (just a degree or two!). (Table 1).

New research will focus on prebloom conditions and the impact of higher February and March temperatures on flower development. We will be trying to determine if the problem is just due to extreme heat right around full bloom or if delayed dormant into bloom temperatures have some role in the problem. It is worth noting that all the years with reduced crop per acre were those with early to average bloom timings (Table 2) plus full extreme heat(82°F or more) just following full bloom (Figure 1).

Until more is known about the cause of crop failure associated with heat at bloom, it is recommended that growers run sprinklers, where possible and water available, during bloom while temperatures exceed 75°F. The evaporative cooling delivered by this practice can decrease daytime peak temperatures by one, perhaps two degrees F.

Table 1. Bloom temperatures and final set values for 10 orchards from Red Bluff to Madera in 2020. Data from Mark Gilles (Sunsweet Growers), Luke Milliron, Franz Niederholzer, Kat Jarvis-Shean and Phoebe Gordon (UCCE). Full bloom dates are in bold numbers and darker shading. Lighter shading shows timing of open flowers. *Dormant season oil was applied in this block.

	----------March----------																
Location	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	% set
Red Bluff–East					63	56	58	66	77	74	81	**72**	60	52	54	45	25
Red Bluff – West					64	56	58	67	76	**73**	80	72	58	54	56	45	15
Vina/Corning					66	57	59	67	76	74	81	**74**	61	54	55	46	17
N. Chico					66	56	60	68	77	74	82	73	60	56	**57**	47	17
West Chico	73	81	76	75	66	60	61	67	77	75	**81**	73	59	54	55	49	32
W Yuba City*	73	81	77	76	**65**	58	59	69	79	75	82	71	55	54	49	52	23
SW Yuba City	73	81	77	76	66	58	60	69	**79**	76	82	72	56	53	49	53	***5***
Dingville	73	81	76	75	65	57	59	68	**77**	73	82	70	54	52	48	54	***4***
Wolfskill	72	81	77	74	63	60	58	**66**	76	73	81	68	55	55	49	55	19
S Madera					69	66	65	65	68	73	70	57	54	**47**	53	58	12

Figure 1. Timing of flower development during bloom and maximum average hourly temperatures in individual orchards in years with very low fruit set. All data are from Sutter County.

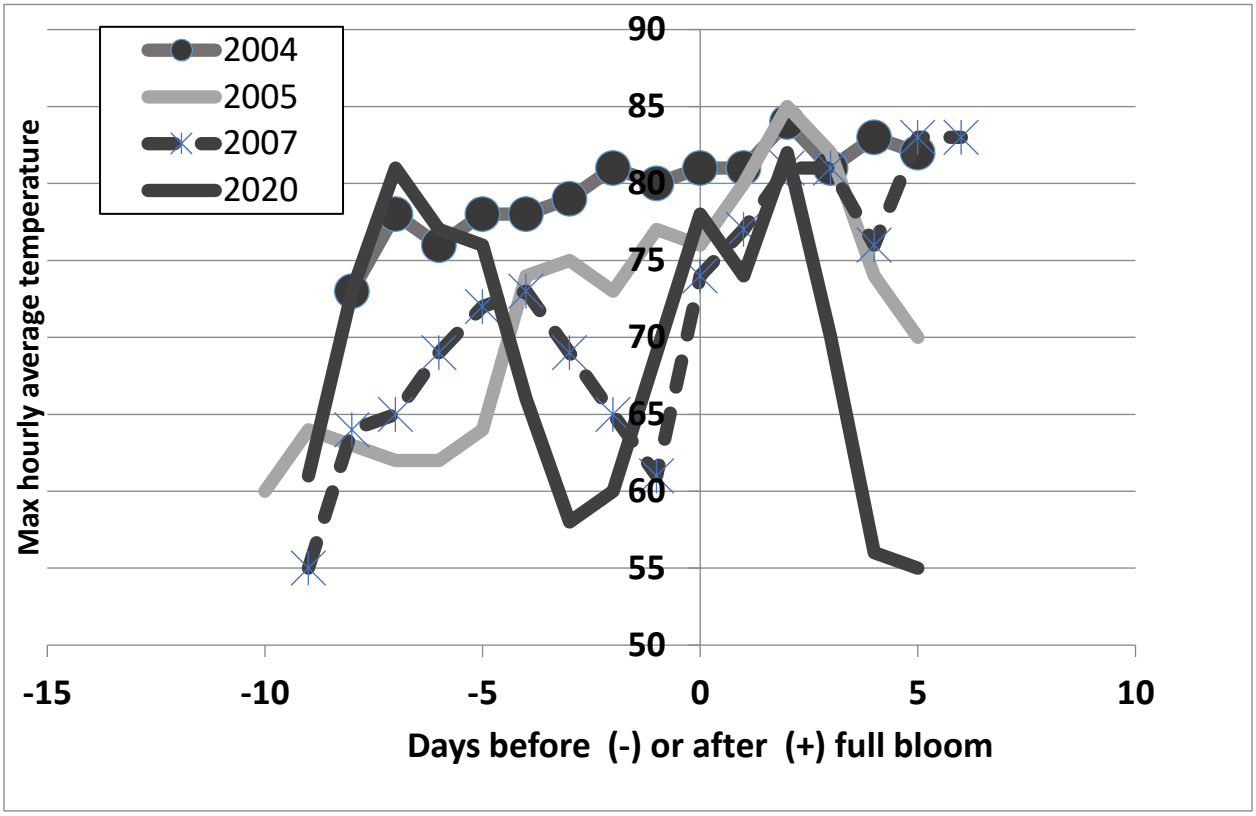

Table 2. General full bloom timing and average prune production per acre for California (2004-2020) based on UC observations and CDFA/USDA crop statistics. Red, bold font is used for all crop years with average production below 1.5 dry tons/acre.

Year	Full bloom date	Crop (dry ton/acre)
2015	8-Mar	2.08
2016	**9-Mar**	**0.94**
2005	**10-Mar**	**1.39**
2020	**10-Mar**	**1.45**
2014	14-Mar	2.17
2013	15-Mar	1.72
2004	**15-Mar**	**0.69**
2007	**16-Mar**	**1.30**
2017	16-Mar	2.44
2010	19-Mar	2.13
2008	20-Mar	2.03
2012	23-Mar	2.49
2009	23-Mar	2.59
2018	26-Mar	1.93
2019	30-Mar	1.98

PRUNE (DRIED PLUM): CONVENTIONAL FUNGICIDE EFFICACY

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

[1] 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.

[2] Fruit brown rot treatments for fungicides in FRAC Groups 1,2, 3, 17, 7/11 are improved with the addition of 1-2% 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. Use of a sticker such as NuFilm-P (8 to 16 fl oz/A) and high gallonage (120-150 gal/A) applications will provide effective control and fruit will retain their waxy bloom.

[3] 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.

[4] 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.

[5] Blossom blight only; not registered for use after petal fall.

[6] High summer temperatures and relative humidity reduce efficacy.

[7] Registered for use on fresh prunes only.

[8] Do not use in combination with or shortly before or after oil treatment.

[9] Do not use after jacket (shuck) split.

[10] Do not use sulfur, captan, or chlorothalonil in combination with or shortly before or after oil treatment.

PRUNE (DRIED PLUM): ORGANIC FUNGICIDE EFFICACY

Fungicide	Resistance risk (FRAC#)[1]	Brown rot		Russet scab	Rust
		Blossom	Fruit[2]		
Dart	low	+++	++	----	+
EcoSwing	low	+++	++	----	+
Problad[1]	low	+++	----	----	----
Oso[1]	low	++	++	----	ND
Double Nickel 55[2], Serenade ASO/Opti, Serifel, Taegro, etc.	low	++	----	----	+
Aviv[3]	low	++	----	----	+
Sulfur[4]	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

[1] Pending registration in CA.
[2] Strains of *Bacillus amyloliquefaciens*.
[3] Strains of *Bacillus subtilis.*
[4] 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[1]	+++	+++	+++	----	+	++
Russet scab[2]	----	----	+++	----	----	----
Rust[3]	----	----	----	+	++	+++

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

[1] Flowers are susceptible beginning with the emergence of the sepals (green bud) until the petals fall but are most susceptible when open.
[2] A physiological disorder; no pathogens involved.
[3] More severe when late spring rains occur.