University of California
Agriculture and Natural Resources
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# Prune Notes

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*In this issue:*



*Submitted by:*

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## Predicting an Early 'French' Harvest

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It seems like just about every pest and crop development stage has been coming in early this year. What does that mean for prune harvest? The UC prune harvest model based on spring weather is predicting Sacramento Valley 'French' harvest around August 7 – 13 this year, depending on location (see Table). For prunes, spring temperatures (growing degree hours) during the first 30 days after full bloom govern fruit developmental rate, and are the biggest factor determining harvest date (see Figure 1). This relationship can be used as a tool to approximate harvest date for Improved French.

| Location | Est. Regional Full Bloom | GDH 30 | Days b/t Bloom & Harvest | Projected Harvest |
|---|---|---|---|---|
| **Red Bluff** | March 8 | 7937 | 143 | August 8 |
| **Yuba City** | March 11 | 7642 | 155 | August 13 |
| **Winters** | March 12 | 8831 | 148 | August 7 |

To use this tool to predict harvest for your orchard, find the accumulation of Growing Degree Hours (GDH) 30 days after bloom at the UC Fruit & Nut Research and Information Center website (http://fruitsandnuts.ucdavis.edu). Select 'Weather Services,' then 'Harvest Prediction Model.' Select the location of the nearest California Irrigation Management Information System (CIMIS) weather station (click on the weather station, not the county) and enter the date of full bloom. The table shows the accumulated GDH during the first 30 days after bloom. With this number, use the figure to determine how many days there will be from full bloom to harvest.

For example, say full bloom was March 18th and the Harvest Prediction Model website said 6000 GDH accumulated in the first 30 days after full bloom.

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Find 6000 GDH on the bottom axis of the graph (Figure 1, below) and follow that up to the trend line. Then find the number of days on the left axis that meets that part of the trend line. For these GDH you'll see just over 160 days (on the left axis). That would estimate there would be about 160-170 days from full bloom to harvest.

This GDH 30 approach is only an estimate. As the estimated date approaches, it is important to track fruit maturity and target your harvest to deliver the most tonnage when fruit is in the 3-4 pounds pressure range. Tracking fruit maturity ensures delivery of the best quality, most profitable crop to the dryer.

Prunes are fully mature and at the highest quality when fruit pressure drops to 3-4 pounds as measured with a pressure tester using a 5/16" diameter plunger tip, available on the internet (e.g. fruittest.com) or orchard supply stores. Well maintained prune trees without excessive crop load should reach 24% sugar (soluble solids) at 3-4 pounds pressure. Trees no longer move sugar to the fruit at pressures below 3-4 pounds. Soluble solid content of the fruit may increase due to natural dehydration if fruit remains on the tree. Soluble solids increase about 2% per week and fruit firmness will drop 1.5 to 2 lbs. per week prior to harvest (more rapidly with cool weather and more slowly with hot weather).

How do you track fruit maturity as harvest approaches? At first fruit color, fruit should be about 10 pounds pressure. Flag 5 sample trees across a block and take 5 pieces of fruit per tree. Sample fruit from inside and outside the canopy as you walk around the tree. Check fruit once a week, using the same trees each week. Sugar or soluble solids can be measured using a refractometer, and readings help with harvest decisions, but maturity is most accurately based upon fruit flesh pressure.

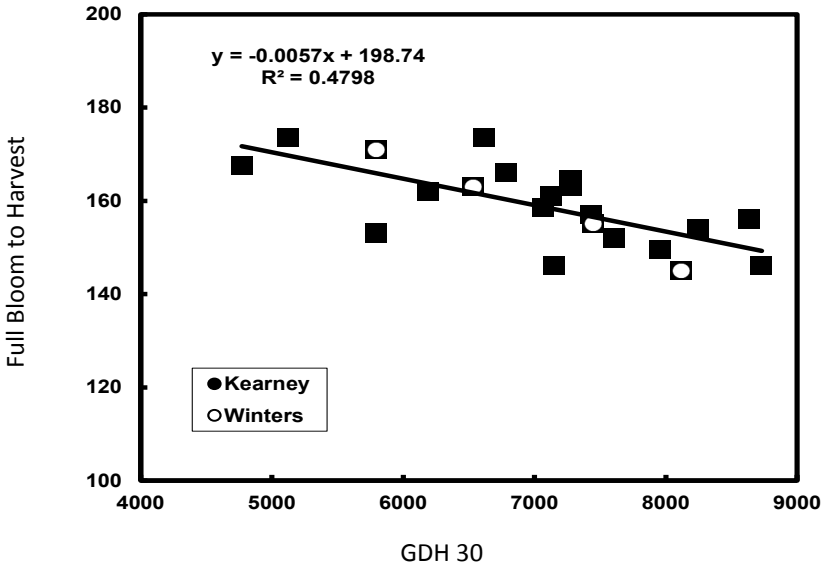


**Figure 1.** Relationship between growing degree hours (GDH) 30 days after full bloom and the number of days from full bloom to harvest for the cultivar 'Improved French' at Kearney and Winters.

# Blue Prune

*Bill Krueger UCCE Advisor-Emeritus, Glenn County*
*Richard Buchner UCCE Advisor, Tehama County*

Blue prune and, in some cases, an associated leaf scorch often develops following the rapid onset of high temperatures as occurred this year. Damaged prunes color prematurely (turn blue) and usually drop from the tree. The more sun exposed fruits on the top or south side of the tree are more affected. Often the sun exposed side of the fruit will be sunken or flattened. Leaf scorch and die back may develop in leaves and twigs near the damaged fruit. When damaged leaves dry the veins may be a darker brown than the rest of the leaf.

Blue prune is associated with heat stress. Excessive heat results in damage to the fruit that is thought to produce a toxin which is transported to spurs, leaves and shoots resulting in the leaf scorch symptoms. Leaf scorch symptoms are always associated with damaged prunes. They do not occur in areas of the tree with no fruit or on young trees without a crop. Anything affecting fruit temperature can have an effect. This would include:

1. **Irrigation** – Drop and particularly scorch are generally more severe on shallow soils with limited water holding capacity or in orchards toward the end of their irrigation cycle at the onset of heat. Adequate soil moisture insures maximum evapotranspiration and cooling of the plant.

2. **Tree Position or Fruit Location** - Leaf scorch is usually worse on border trees, or on the south side of individual trees with greater sun exposure.

3. **Cultural Practices** – Blue prune appears to be less severe in orchards with cover crops than in clean tilled or drip irrigated orchards. Transpiration from an adequately irrigated cover crop should contribute to orchard cooling. In addition, a vegetated orchard floor reflects less sunlight than dead vegetation or bare ground.

4. **Nutrition** - While blue prune and leaf scorch does not appear to be directly related to potassium deficiency, anything adversely affecting tree health and condition could contribute to higher fruit temperatures. Adequate tree nitrogen levels promote vegetative growth that shades fruit from direct sunlight.

We don’t have any sure ways of preventing blue prune and the associated leaf scorch. However, you can reduce the risk by making sure trees are healthy, vigorous and well supplied with water. Crop load management (fruit thinning) can maintain tree health and more vigorous shoot growth in a heavy crop year compared to over cropped unthinned trees. Because the damage is caused by heat and not a disease, it should not continue to expand in the tree. Damaged wood should be pruned out during the dormant season.

# Prune Cracking

*Richard P. Buchner, UCCE Advisor, Tehama County*

Prune fruit cracking is a fairly common defect in prune production and may or may not result in economic damage depending what percent of the fruit is affected. Research has provided a working understanding of how to manage fruit cracking, although its exact mechanism is not well understood. Two different types of fruit cracking are described for prune and each occurs when prunes are rapidly growing under various conditions. End cracking occurs on the bottom end of the prune while side cracking is usually larger and more visible on the sides of the fruit.

**End cracking** often occurs following irrigation of water stressed trees during the period of rapid fruit volume growth, usually in late June through mid-July. This year, that "window" probably fell almost entirely in June. The sudden increase in tree water status at least doubles pressure inside the fruit, especially at the tip, which encourages end cracking. The strategy is to avoid water stress during spring and mid-summer.

**Side cracking** usually occurs when water is present on large prunes exposed to sunlight as they being the final growth stage. Historically the susceptible period is usually around July 4, but can differ by several weeks depending upon the year. There is about a three week period when side crack potential is high. This period begins a week after cheek to cheek diameter measurement exceeds the suture diameter. Fluctuation in day and night temperature can lead to dew formation, an increase in internal flesh pressure and skin rupture often on the sunny side of exposed fruit when the skin is “sun-toughened” and less elastic. Managing side cracking is challenging because weather conditions are so variable. During the three week period of rapid fruit growth, management practices that keep orchard humidity low and avoid large fluctuation in soil moisture conditions are suggested.

Uriu et.al. (Prune Research Reports, 1970) conducted experiments to determine the mechanism, cause and factors involved in side cracking. They reported:

- Shading fruits the entire growing season nearly prevented cracking. Shading for short periods reduced cracking in all cases but the best reduction was obtained when the fruits were shaded during the cracking period. More cracked fruit on sun exposed, compared to shaded branches would suggest favoring leaf canopies that shade fruit.
- Cracking takes places during the early morning hours. Low temperature and high humidity are positively correlated with the amount of cracking that occurs during this time. Early in the morning, water content of the fruit is at its highest and fruit expansion is greatest.
- The force necessary to break the skin decreases rapidly at the beginning of the cracking period. Midway into the cracking period, skin stretchability rapidly increases which may explain why cracking decreases.

Additional research by Uriu et.al. (Prune Research Report, 1972) found:

- The pressure chamber to be an excellent tool in evaluating the relationship between soil moisture status of the tree and side cracking. Stem water potential (SWP) of -8 to -10 bars would represent low water stress levels enabling shoot growth and fruit sizing. A complete discussion of using the pressure chamber for irrigation management in Prune can be found at http://anrcatalog.ucdavis.edu/pdf/8503.pdf.
- When soil moisture at the beginning of the cracking period is about 40% or less of the available water (top five feet of soil) side cracking can be expected to be minimal.
- Drip irrigation can significantly reduce side cracking. Possibly because it reduces orchard humidity and might provide a “steady soil moisture environment,” less prone to large swings in wet to dry.

## Pre-Harvest Practices to Consider

*Franz Niederholzer, UCCE Advisor, Colusa and Sutter/Yuba Cos.*

- **Time harvest using fruit pressure measurements.** Harvest should be early this year. See "Predicting an Early 'French' Harvest" in this newsletter for more details. To be ready, track fruit maturity using a fruit pressure gauge. Early fruit pressure testing also helps time irrigation cut-off (see information below).
- **Pre-harvest irrigation water shut off**. Properly timed irrigation cut off helps reduce 1) bark damage from shakers, 2) fruit dry-away ratio, and 3) premature fruit drop. UC research and experience shows that healthy prune trees can sustain water cut off for up to six weeks before actual harvest, but every orchard is different. *Cytospora* disease cankers grow faster in water stressed trees, so be careful with blocks with high *Cytospora* infection. If the crop is large and early irrigation cut off is planned, consider a potassium (K) foliar spray during irrigation cut off because K moves more slowly in dry soil.
- **Check with your packer before deciding whether to use a field sizer**. Prices for smaller fruit vary by packer. Even if small fruit returns a profit, consider running just a small (15/16") sizer to remove garbage and damaged fruit.
- **Preharvest brown rot sprays**. Brown rot risk increases as fruit sugar levels rise and harvest approaches, especially with high humidity and/or rain. Important points influencing brown rot control and fungicide resistance include:
- High spray volumes (150+ gallons per acre) plus 1-2% 415 spray oil (summer oil) improves brown rot control, especially where fruit is bunched.
- Rotate fungicide chemistries or tank mix combinations of fungicides as part of a resistance management program. If you can see brown rot infections in your orchard, DO NOT use one, single-site fungicide in subsequent sprays.
- See the latest information from UC on fruit brown rot control in prunes at: http://ipm.ucdavis.edu/PDF/PMG/fungicideefficacytiming.pdf (pages 49-50). Check with your packer that fungicides are not on their "Don't use" list.

- **Watch pests and tree water status.** Monitor blocks for spider mites, rust, and water status. If spider mite pressure is building right before harvest when no miticide can legally be applied, consider a potassium nitrate spray to "top off" the potassium levels in the trees and suppress adult spider mites for 2-3 weeks.

- **Clean up orchard before harvest**. Cut out dead and dying limbs, suckers, etc. prior to harvest. This will reduce harvester and/or tree damage and make for a faster, cleaner harvest.

- **Take leaf samples in July**. The key nutrients to test are nitrogen, potassium, and zinc. Add chloride to the analysis request if you use muriate of potash (MOP, potassium chloride). If you have switched from surface to ground water, consider including chloride, sodium and boron. Check with your PCA/CCA and/or UCCE Farm Advisor for help interpreting prune leaf analysis results.

**Are you removing an orchard this year?**

Bob Johnson, a Ph.D. student at U.C. Davis, is beginning a research project on heart rots and wood rots in almonds and prunes. **We are looking for growers who are planning on removing an older prune orchard** who would be willing to let us take samples for identification shortly after trees are removed. You're done with the trees - so give them one more chance to help out the industry!! For more information, contact Dani at 865-1107.

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