



COOPERATIVE EXTENSION ... UNIVERSITY OF CALIFORNIA

# FRUIT AND NUT NOTES

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## Sacramento Valley Regional PRUNE NEWSLETTER



### IN THIS ISSUE:

- ◇ **Managing Fruit Brown Rot and Prune Rust**
- ◇ **Blue Prune Drop and Leaf Scorch**
- ◇ **Bloom Time Temperatures Compared to Fruit Set in 2011**
- ◇ **Update on Spotted Winged Drosophila in Prunes**
- ◇ **When will Harvest Start in 2011?**

### **Orchard Crop Tailgate Meetings in Tehama County**

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#### **Solar Power at Work on the Farm and Buried Drip Irrigation in Prunes**

July 28, 2011, 9-10:30 — Lindauer River Ranch — Red Bluff

#### **Irrigating Prunes on Marginal, Capability Class II and III Soils**

August 3, 2011 9-10:30— Loretta & Brad Taylor's Farm—Corning

#### **Irrigating Walnuts on Deep Alluvial, Capability Class I Soils**

August 10, 2011 9-10:30— Nick Sohrakoff Orchards—Los Molinos

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

# Managing Fruit Brown Rot and Prune Rust

*Joe Connell, UC Farm Advisor, Butte County*



Brown rot and rust are two summer diseases that we need to keep an eye out for each year. Some years are more likely to have problems with these diseases than others. This year's weather has been particularly unusual with late rain, hail, and cool weather interspersed with a few warm periods.

**Brown Rot.** Disease management is based on prevention rather than control so it's important to protect uninjured fruit before infections occur. Rotting ground fruit left from thinning can be a source of inoculum for brown rot on ripening fruit, especially if they come in contact with irrigation water. Removing or disking in thinned fruit helps reduce fruit brown rot. Injured fruit, fruit that touch each other, and trees with excessive nitrogen are the most susceptible to brown rot infections. Early harvest can help reduce brown rot damaged fruit at harvest, but may lower fruit "dry away" (see article on harvest timing in this newsletter).

If protection is needed, apply sprays within 4 weeks of harvest or just before predicted rain or high humidity as harvest approaches. Fungicides for brown rot control will not protect damaged fruit, and may not provide complete control under high disease pressure. Information on how well different fungicides work is available at <http://ipm.ucdavis.edu/PDF/PMG/fungicideefficacytiming.pdf>.

Recent research by Dr. Jim Adaskaveg, UCR Pathologist, shows that higher spray volumes (160 gpa) provided better fruit brown rot control than lower spray volumes (80 gpa). Including 1-2% 415 spray oil (1-2 gallons of oil per 100 gallons of water) in the tank with a fungicide improved fruit brown rot control. Oil removes a prune's waxy bloom, but after drying, oil-treated prunes look the same as untreated fruit. Be sure to carefully read the fungicide label before any application and check with your packer to make sure the fungicide you choose is allowable for shipping.

Good spray coverage is essential for the best possible results. Proper nozzle arrangements and tractor speeds of 2 mph or less can make the difference between the best possible disease control and a waste of time and money.

**Prune Rust.** The rust pathogen depends on moisture for infection so if rust is a potential problem it's important to have protective materials on the leaves to prevent infections. Symptoms of rust are bright yellow angular spots on leaf surfaces with corresponding red-brown spore pustules on the underside.

Normally we would suggest monitoring 40 trees randomly for rust in Sacramento Valley prune orchards every week until July 15. If no rust is seen by July 15, UC research suggests that rust should not be a problem before harvest but in this unusual year keep a close eye out for a couple of extra weeks. When searching for prune rust be sure to look at low hanging branches. Trees with vigorous growth such as non-bearing replants and known rust hot spots are good places to look.

Since premature defoliation and reduced return bloom are rust's consequences, it's important to treat at the first sign of rust. Prune rust can be controlled with sprays of Abound<sup>®</sup>, wettable sulfur or other materials listed in the publication on the web listed above (see page 43). Additional treatments may be necessary, especially if a treatment was required early in the season. After a treatment is applied, continue to monitor weekly. If the number of trees with rust increases from the last reading, a second treatment is recommended if there are more than 4 weeks remaining until harvest.

# Blue Prune Drop and Leaf Scorch

*Bill Krueger UC Farm Advisor, Glenn County*



Blue prune drop and, in some cases, an associated leaf scorch (Fig. 1) often develops following the rapid onset of high temperatures in June or July. Damaged prunes develop color prematurely and may drop from the tree. The more sun exposed fruits such as those 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.

The problem is associated with heat stress. Under certain conditions, excessive heat results in damage to the fruit that's 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.



*Figure 1. Blue prune and leaf scorch symptoms showing damaged fruit, scorched leaves and darkened leaf veins*

Anything affecting fruit temperature can have an effect. This could 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 (areas with greater sun exposure).
3. Cultural Practices - It is felt the problem is 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 (planted or volunteer) reflects less sunlight than dead vegetation or bare ground.
4. Nutrition - While the problem does not appear to be directly related to potassium deficiency, anything adversely affecting tree health and condition could contribute to higher tree and 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 prunes and the associated leaf scorch. However, you can reduce the risk by making sure trees are healthy, vigorous and well supplied with water. 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.



## Update on Spotted Winged Drosophila in Prunes

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

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In the summer of 2010, there was concern that a new pest, spotted winged drosophila (SWD), might become a significant pest in 'French' prune. This pest severely damaged unsprayed cherry fruit in the Sacramento Valley in spring 2010. An article in this regional prune newsletter advised growers and PCAs to keep an eye out for flies and damaged fruit. Flies were found in prune orchards, but no damage was seen. In addition, quick and coordinated efforts by several University of California employees provided prune growers with research results indicating SWD is not currently an economic pest of 'French' prune.

Research in summer 2010 through Dr. Frank Zalom's lab at UC Davis found virtually no infested 'French' prune fruit after healthy adult females in a lab colony were offered ripe prune fruit for egg laying. **The researchers concluded that SWD is not an ideal pest of French prune and that "normal prune handling/drying would probably not permit completion of a generation".**

The project was coordinated by Kelly Hamby, a PhD student in Dr. Zalom's lab with support from Carolyn DeBuse (UC Farm Advisor), Sarah Castro and Ted DeJong (Plant Sciences Department, UC Davis). The lab work was done by Heather Wilson, an undergraduate student working in Dr. Zalom's lab. This valuable project was pulled together quickly and effectively without direct prune industry funding.

Growers should remain aware of this pest, but protective sprays are not needed to deliver high quality prunes to market. It is possible that, over time, this pest may evolve to survive in crops not currently hosts to SWD.



## Bloom Time Temperatures Compared to Fruit Set in 2011

*Carolyn DeBuse, Farm Advisor, Solano and Yolo Counties*

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The sensitivity of French prune's bloom to high temperatures and the correlating reduced fruit set has been researched since 2005, the year after the 2004 crop was lost to a heat wave at full bloom. The Sacramento Valley UC Farm Advisors have been tracking temperature and relative humidity each spring in selected orchards. Fruit set has been correlated to the temperatures at full bloom in an effort to identify the specific hot weather conditions that reduce prune set. The threshold laboratory temperature for reducing pollen viability is 75°F. In the orchard environment, the observed threshold for lowering fruit set seems to be nearer 80°F. The question of how many hours over 80°F is detrimental to prune fruit set is still unanswered. The desired fruit set for most orchards is 12 to 20% set. To maintain fruit size and profit, fruit thinning is often needed if fruit set is above 20%.

This year we had cool temperatures leading into bloom and then high temperatures at full bloom over 3 consecutive days. Table 1 shows maximum temperature, total number of hours over 80°F, and fruit set of all the orchards monitored. Only one orchard, Tehama-South Corning, falls below the desired fruit set and the hours over 80°F at bloom does not seem to be the cause. From this data set, 2011 fruit set does not seem reduced due to high temperatures at bloom but the drawn out length of bloom and cool temperatures throughout the weeks surrounding bloom may have played a part in the successful cropping.

Table 1. Average prune fruit set, full bloom dates, and maximum temperatures in orchard at full bloom for individual orchards in Yolo, Solano, Sutter, Glenn and Tehama Counties, 2010.

Orchard	Date of Full bloom	Maximum Temperature at 80-100% full bloom	Total Number of Hours Above 80°F during full bloom	% Fruit Set (mid-May)
Tehama-Red Bluff	March 27	69	0	15%
Tehama-Los Molinos	March 30	87	9.25	44%
Tehama-S. Los Molinos	March 30	85	7.00	36%
Tehama-South Corning	March 30	86	7.75	5%
Tehama-East Corning	March 30	85	6.50	41%
Tehama-W. Red Bluff	March 30	86	8.50	42%
Tehama-Tehama	March 30	88	9.00	46%
Tehama-S. Red Bluff	March 29	87	8.75	51%
Tehama- Jelly's Ferry	March 31	85	8.00	52%
Glenn-Orland	March 29	87	4.50	20%
Glenn-Willows	March 27	70	0	24%
Glenn-Plaza District	March 30	83	6.00	30%
Glenn-Hamilton City	March 29	85	5.50	19%
Sutter #1 Tudor	March 31	81	2.00	39%
Sutter #2 Oswald	March 30	81	2.00	33%
Sutter #3 LoMo	March 30	80	1.00	46%
Yolo/Solano-Winters #1	March 30	84	6.75	24%
Yolo/Solano-Winters #2	March 30	82	8.00	41%
Yolo/Solano-Woodland	April 7	76	0	34%





## When Will Harvest Start in 2011?

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

*Bill Krueger, UC Farm Advisor, Glenn County*

Experienced growers and the UC harvest prediction model\* are forecasting a later harvest than normal in 2011. Are they right? We'll see, but don't rely exclusively on others when making your harvest decision. Track fruit maturity and target your harvest to deliver the most tonnage when fruit is in the 3-4 pounds pressure range.

Fruit maturity must be known and tracked to deliver the best quality, most profitable crop to the dryer. Sure, many factors influence harvest timing including crop size, quota concerns, custom harvester timing, brown rot pressure, and weather. But picking fruit too early leaves money on the table (see chart below). Picking too late leaves money on the orchard floor due to excessive fruit drop as fruit softens and risks delivering poor quality fruit. Business realities can influence harvest timing, but using of fruit maturity information helps make the most profitable decision. For example, do you have to harvest something? OK, start with the most mature orchard.

Prunes are fully mature and at the highest quality when fruit pressure drops to 3-4 pounds when measured with a pressure tester using a 5/16" diameter plunger tip\*\*. Well maintained prune trees without excessive cropload 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 the 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? Start 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 and use the same trees each week. Sugar or soluble solids can be measured using a refractometer and help with harvest decisions but maturity is most accurately based upon fruit flesh pressure.

Using fruit maturity information you can deliver the best quality, most profitable fruit to the dryer and maintain the excellent reputation of California prunes in an increasingly competitive world market.

Relationship between green fruit size at harvest, dry fruit size, and drying ratio with fruit sugar (% soluble solids) at harvest. Data from Claypool, ASHS Vol 68, 1956

Green count/pound	% soluble solids	Drying ratio	Dried count/pound
20	16	4.1	82
20	18	3.7	75
20	20	3.4	69
20	22	3.2	63
20	24	2.9	59
25	16	4.0	100
25	18	3.6	90
25	20	3.3	83
25	22	3.0	76
25	24	2.8	71

\*[http://fruitsandnuts.ucdavis.edu/Weather\\_Services/Harvest\\_Prediction\\_About\\_Growing\\_Degree\\_Hours/](http://fruitsandnuts.ucdavis.edu/Weather_Services/Harvest_Prediction_About_Growing_Degree_Hours/)

\*\* Price about \$250. Available on the internet (for example, <http://fruittest.com/>) or through local orchard supply stores

## **Invitation to Attend Tehama's 2011 Orchard Crops Tailgate Meeting Series:**

*You are invited to attend a series of three short field meetings in late July and early August 2011 before harvest season begins. A variety of experiences related to irrigation management in orchard crops will be shown and discussed at these meetings.*

### ***Field Meeting #1***

***Thursday, July 28, 2011, 9:00 to 10:30 a.m.***

**Topic:** Solar Power at Work on the Farm and Buried Drip Irrigation in Prunes

**Host:** Ken Lindauer and Michael Vasey, Lindauer River Ranch

**Location:** 12030 East Canal Road, Red Bluff, CA

**Meeting Content:**

In 2010, Lindauer River Ranch installed a 260 kilowatt solar power system comprised of three fixed panel arrays. The system powers electric irrigation pumps and provides some of the power for a prune dehydrator. You will have an opportunity to view and learn about the various components of this farm solar power system. You will also have the opportunity to discuss various incentives that may influence the decision to invest in solar power for a farm operation. Also, for several years, Lindauer River Ranch has been innovative with their irrigation practices. They will share their experience with using buried drip irrigation in prunes.

### ***Field Meeting #2***

***Wednesday, August 3, 2011, 9:00 to 10:30 a.m.***

**Topic:** Irrigating Prunes on Marginal, Capability Class II and III Soils

**Host:** Loretta and Brad Taylor

**Location:** 5425 Hall Road, Corning, CA

**Meeting Content:**

This approximate 28 acre French prune orchard was planted in 1996 and 1997 on marginal, capability Class II and III soils. The predominant soils are the Hillgate, Kimball, and Perkins series. They are characterized for slow infiltration, sloping topography, and other properties that make farming the orchard a challenge. This was also the first experience with farming prunes for the Taylor family. In about 2006, they sought help to improve the orchard's overall performance. Their goal was to develop a better decision making process for how they managed the orchard nutrition and irrigation that would result in more vigorous trees and improve the consistency of prune yields and size from year to year. This meeting will address experiences with a few irrigation management tools that they began using in 2008 to help them achieve these goals. This year, there is also a small fruit thinning experiment being conducted that will provide a chance to view and discuss the role of thinning in achieving a balance between prune yield and fruit size.

### ***Field Meeting #3***

***Wednesday, August 10, 2011, 9:00 to 10:30 a.m.***

**Topic:** Irrigating Walnuts on Deep Alluvial, Capability Class I Soils

**Host:** Nick Sohrakoff

**Location:** Walnut orchard is in southwest quadrant at the intersection of Highway 99 East and 5<sup>th</sup> Avenue. Park along 5<sup>th</sup> Avenue and meet midway down 5<sup>th</sup> Avenue along the north edge of the orchard.

**Meeting Content:**

This 18 acre Chandler/Paradox walnut orchard was planted in 2006 and is in its sixth growing season. This orchard is located within about 0.75 miles of the Sacramento River on a deep alluvial, Capability Class 1 Vina soil series. This meeting provides an opportunity to discuss the irrigation management strategy used on these deep alluvial soils and observe how the orchard is performing. Use of a pressure chamber to monitor orchard water status will be demonstrated.

Beginning in September 2009, an Eddy Covariance station was installed above this orchard to directly measure the crop evapotranspiration (ET<sub>c</sub>) or water use in this orchard. Data from the orchard is being used to re-evaluate crop coefficients (K<sub>c</sub>) that are commonly used to estimate crop water use for English walnut statewide. The results from this orchard will also be compared to a second station currently in operation above a mature Chandler walnut orchard located northwest of Corning on Capability Class II and III soils. The crop coefficients currently used to estimate ET<sub>c</sub> for English walnut were developed in the early 1990's for the Chico variety grown in the central San Joaquin Valley.

**Tehama Fruit & Nut Notes  
And  
Sacramento Valley Regional**

*Prune Newsletter*

JULY 2011



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