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Suggested prune orchard activities in August

- **Time harvest using fruit pressure measurements.** Picking too early leaves money on the table. Picking too late leaves money on the orchard floor.
- **Clean up your refractometer and fruit pressure gauge.** If you don't own these essential tools for effective prune harvest, buy them. A fruit pressure gauge costs about \$300. A refractometer for sugar measurement costs \$150-\$300. If these costs seem too high, share the cost and use of them with neighbors/friends in the prune business. You only need to check fruit pressure and sugars once a week in each block as harvest approaches. Sharing these essential tools can be worked out so that all get an even chance to use them.
- **Run a field sizer** on your harvester this year. Delivering certain small sized fruit to the dryer will cost you money. Check with your processor regarding prices or expected prices. What fruit will be worth what? See article in this newsletter.
- **Preharvest irrigation water shut off.** Properly timed irrigation cut off will help reduce 1) bark damage from shakers, 2) fruit dry-away ratio, and 3) premature fruit drop. Use fruit pressure information to predict start of harvest (fruit pressure drops 1-2 pounds/week; ideal harvest pressure = 3-4 pounds fruit pressure) and then use that date to decide when to cut-off irrigation water before harvest. UC research and experience in this region in 2006 shows that healthy prune trees can sustain water cut off for up to six weeks before actual harvest. Grower experience should determine when irrigation water is cut off in a specific orchard. Wet orchards show the most premature fruit drop when night-time temperatures drop to around 50°F.
- **Preharvest brown rot sprays** may reduce fruit brown rot in orchards where brown rot has been or might be a problem. Consult with your packer and PCA regarding materials and timing, if you decide to spray.
- **Watch pests and tree water status.** Monitor blocks for spider mites, rust, and water status. If spider mite pressure is building right before harvest, 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.

Sizing prunes at harvest

Franz Niederholzer, UC Farm Advisor, Colusa/Sutter/Yuba Counties
Rich Buchner, UC Farm Advisor and County Director, Tehama County

Harvest is approaching, perhaps faster than expected. As this is written on July 19, fruit have begun to show color and harvest should be about a month away. If the “one month to harvest from first color” ballpark rule holds, then we are about a week ahead schedule from where Franz thought we would be when a harvest estimate was made in May. If your processor tells you they don’t want small fruit or will pay less than the cost of production, harvest and drying for small fruit, then field sizing is a way to avoid losing money delivering small fruit.

Successful field sizing depends upon selecting and maintaining the correct chain or bar size for individual harvest conditions. Watch what’s going on the ground and adapt accordingly. In general, fresh fruit with medium and larger fresh fruit diameter (see table below) has good sugar level, but smaller fruit can be low or high in sugar depending on specific growth conditions in the tree (shade vs sun, number of nearby fruit, etc.).

The relationship between fresh fruit diameter and fresh fruit count per pound at harvest and dry fruit count per pound.

Fresh fruit Size category	Fresh fruit dia (in)	Fresh Fruit Count/lb	Dry Fruit Count/lb
Small	<1	40-50	110-180
Medium	$1 - 1^{3/16}$	25-35	70-125
Large	$1^{3/16} - 1^{6/16}$	15-25	40-70
Extra Large	$>1^{6/16}$	12-20	35-60

Information presented in this table suggests that running a sizer around $1^{1/8}$ inch may be a good starting point. Don’t take our word for it. Check your fruit before you harvest. Talk with your packer. Be ready to change chain size or remove it altogether if/when fruit sweetens and/or softens.

Here are several suggestions/cautions for separating out small and undersize prunes at harvest.

- **Sugar and pressure.** As fruit accumulates sugar and softens, a sizer is more likely to remove fruit with value.
- **Price schedule** affects the value of removed fruit. Decide which sizes to remove and select the correct opening to remove target prunes. Be prepared to change or remove sizers as fruit conditions change. Later in the season, as fruit softens and sugar levels rise, using a smaller size chain may pay off.
- **Do you need to field size?** If the amount of undersize fruit is relatively small it may not be economical to invest time and energy to remove it.
- **Harvest timing.** The later the harvest, generally speaking, the higher the sugar content of the fruit. High sugar prunes are more likely to have value.
- **Equipment logistics.** Flexibility is necessary when using sizers. They need to be kept clean to function properly. Overloaded sizers cannot be expected to work properly. Maintain the speed of the sizer so that small fruit can drop through the chain. If the sizer chain is run too fast, then small fruit will literally be carried to the bin with the flow of fruit without having the chance to fall through the chain.
- **Regularly check dropped fruit.** Is it too big to throw away? Is some of it? Growers who use harvest sizers to remove undersized prunes need to carefully monitor discarded fruit particularly if larger size openings are selected. What is your fresh count per pound? What is the sugar content of the dropped fruit? Larger openings are more typical early in the harvest. As harvest progresses, sizer openings are often decreased or sizers are completely removed.

Managing Prunes Through Harvest

Richard P. Buchner – UC Farm Advisor, Tehama County

Irrigation, nutrition, insect/disease management, tree health, harvest management and perhaps harvest sizing are all critical cultural practices to achieve the highest return for the current crop.

- Irrigation – 2011 fruit size measurements in Tehama County documented that prunes increase in circumference until about mid August. Irrigation research with prunes also showed that water stress during fruit sizing will decrease growth rate. In summary, to achieve the largest fruit size for a given fruit load; avoid water stress when prunes are sizing. If you tag 10 to 20 prunes and measure those same fruit each week with a tape measure you can determine when prunes no longer increase in circumference. Without measurements, early to mid August would be a good guess. Water stress after fruit finishes sizing is thought to improve the dry ratio.
- Potassium nutrition – Adequate potassium nutrition is crucial to growing large high quality prunes. Potassium (K) is essential for photosynthesis, translocation of sugars, opening and closing of stomata, root growth and K directly affects fruit size, sugar, dry ratio and yield. Three dry tons of prunes export about 80 pounds of K. At three dry tons per acre, that is 80 pounds of K leaving the orchard in that crop year. K is considered deficient if leaf analysis drop below 1.3%. That value is probably accurate; however, the goal is to have every tree in the orchard above that critical level. A 100 leaf sample represents an average. So a composite leaf sample at 1.3% could have a significant number of trees in the deficient range. Shooting for a leaf sample in the 2.0% range is a more realistic goal. If K levels are marginal consider an application. The new Prune Production Manual has an excellent chapter on “Nutrition and Fertilization” written by Sutter/Yuba/Colusa Farm Advisor Franz Niederholzer.
- Insect and Disease – Prune trees need leaf area to produce sugar and capture energy through photosynthesis. Rust and/or spider mites can seriously damage leaves and reduce available sugar and energy required to mature a crop. If leaves show no rust lesions by July 15th, the probability of serious leaf loss is greatly reduced. Similar to rust, if no spider mites are found by July 15th treatments are seldom necessary. Monitoring information can be found in the Integrated Prune Farming Practices (IPFP) Manual or at the UC Integrated Pest Management website <http://www.ipm.ucdavis.edu>. If brown rot is present, a pre-harvest application may be advisable.
- Tree Health – Heavy crop loads can significantly stress prune trees, break branches and scaffolds and sunburn limbs which encourages cytospora infection. Usually limb dieback begins to show in the year following a heavy crop. Propping limbs, knocking off fruit and summer pruning are typical techniques to remove fruit weight and protect the tree. Late fruit removal has little effect on fruit size, but it will favor fruit sugar accumulation and help tree health and cropping next year.
- Harvest Management – Prunes are at horticultural maturity and at their best quality when pressure required to penetrate the internal flesh with a 5/16 inch diameter tip declines to 3 to 4 pounds of force. Internal flesh pressure is measured after slicing off a thin disk of skin before testing the flesh. At this point, both maximum sugar content and best potential dry fruit size have been attained. Crop size has a large effect on fruit size and quality. Orchards with light crops may achieve good soluble solids while fruit is still greater than 4 pounds pressure and are good candidates for earlier harvest. Orchards with heavy crops will generally have better economic returns when harvest is later than normal. Delayed harvest is not without risk. Softer fruit is more likely to drop particularly if windy and, if present, brown rot damage could increase. The new Prune Production Manual has an excellent chapter on “Fruit Maturity and Harvest Management” authored by retired Farm Advisor Steve Sibbett.
- Field Sizing – Undersized prunes have marginal, if any, value and usually represent a net loss because of costs to haul, dry the fruit and market order assessments. Field sizing at harvest is a last resort and is not a substitute for in-season crop sizing cultural practices. The Niederholzer article in this newsletter covers the details of field sizing.

Distinguishing Between Branch Dieback Disorders

Carolyn DeBuse, Farm Advisor, Solano/Yolo Counties

At the first appearance of extreme hot temperatures in summer, flagging of branches, yellowing leaves, and branch and twig dieback appear. The cause of the dieback and stress may be due to different reasons and it is good to be able to distinguish between the problems so that appropriate management can be initiated. Small fruit branches and spurs can be killed by brown rot fungus (*Monilia laxa* or *M. fruitcola*) or they can be killed by 'blue prune' a physiological reaction to rapid increase of temperatures following the milder spring temperatures. Larger branches or scaffolds can begin to decline with yellowing scorched leaves and then die from either potassium deficiency or Cytospora canker (*Cytospora leacostoma*). Both are very serious problems but are managed differently. This article will help explain how to diagnosis the cause and distinguishing between the problems.

The table on the following page is a working guide to distinguish between the problems, prevention, and management of each dieback disorder.

Blue prune and brown rot twig and spur dieback are very similar in appearance but different in some key symptoms. Blue prune will show up just after the first spike in hot temperatures in the summer and is always associated with fruit that has begun to turn dark blue and shrivel, eventually falling off the tree. Leaves near the prune will turn yellow and fall off (photo 1). Branches in the sun or to the south are more affected. There may be some gummosis that is found but it is usually clear. Brown rot on the other hand begins at bloom but often the small spurs and shoots are killed later in the spring as the fungus moves through the wood. The flowers and leaves are often still attached giving the appearance of sudden death (photo 2). Gummosis is often found at the bottom of the flower or seeping from the cankers in the twig. The gum is a darker color of red or amber. All areas of the canopy can be affected by brown rot. To reduce the blue prune in your orchard irrigate properly without allowing trees to be stressed before the heat hits. Brown rot should be managed with fungicide sprays at bloom.

For more information on treatment timing and fungicide efficacy go to <http://ipm/PDF/PMG/fungicideefficacytiming.pdf>

Potassium dieback can be distinguished from the others because it starts to show leaves scorching and yellowing in the top of the canopy in the late summer. The dieback progresses down from the smaller branches at the top to the larger branches and scaffolds in severe cases. It is exasperated by a heavy crop. It is caused by potassium deficiency and can be corrected over time with application of K. (See adjoining article on Managing Prunes Through Harvest for more details)

Cytospora canker can look similar to potassium dieback but usually effects one limb or scaffold at a time. The pathogen must have a wound to enter so it often follows sunburn which can be initiated from heavy crops bending branches or potassium dieback. The symptoms to recognize are sunken cankers on the affected limbs and visible pycnidia on older cankers (photo 3). When bark is removed to expose interior, the canker will have sharp margins and zonate growth (growth rings where the pathogen has started and stopped growth during the year). Limbs compromised by cankers should be pruned out and the wood removed from the orchard.



Photo 1. Blue prune showing leaves turning yellow and falling off.







Photo 2. Brown rot twig dieback showing dead leaves and flowers



Photo 3. Cytospora canker pycnidia; raised bumps that are black then turn white releasing fungal spores.

A comparison of four branch/scaffold dieback disorders in prunes

	Blue Prune <i>No causal agent</i>	Brown Rot “Twig Blight” <i>Monilinia laxa & Monilinia fructicola</i>	Potassium Dieback <i>Potassium deficiency</i>	Cytospora Canker <i>Cytospora leucostoma</i>
photo				
Symptoms	Symptoms appear in late June or July. Small fruiting branches and spurs die back, associated leaves show scorching and yellowing. Prunes turn blue, shrivel and drop. Possible gumming.	Symptoms begin to appear after bloom. Flowers, fruiting spurs, and small shoots turn brown and die. Leaves and flowers remain attached to dead shoots. Red or amber gumming present. Small cankers form at base of spur.	Symptoms begin to show mid to late summer starting from the top of the tree and progress down. Leaves show margin scorch then turning yellow and finally dropping. Shoots dieback.	Wilting or flagging of branches. Large branches and scaffold may die. Cankers are visible as depress areas of bark that may or may not have amber gumming. Under the bark, canker has abrupt margins and zonate (growth ring) pattern
How distinguish from other dieback	Always has shriveled or dropped fruit associated with dieback. Clear gumming	Dead flowers are present, no fruit was set, dark colored gumming usually associated with strike	Symptoms start at the top of tree and not directly associated with fruit or flowers. Often large areas of the orchard are affected	Pycnidia are present in older cankers. (Pycnidia are raised bumps that are black and then turn white) Abrupt margins on cankers
Overwinter	No biological causal agent	In shoot and branch cankers, or diseased flowers and fruit mummies	No biological causal agent	In cankers; spores are released from the pycnidia.
Conditions that promote growth and spread	Rapid increase of temperatures in June and early July. Often sun exposed fruit and south side of tree show more damage.	Spread by wind and rain; growth promoted by rain during bloom and temperatures in the mid 70s °F	Inadequate potassium fertilizer application exacerbated by heavy crop	Spread by rain and wind but grows best in warm weather at temperatures above 90°F; can only enter through a wound
Management	No treatment	Fungicide sprays at full bloom and additional sprays at green bud or popcorn in wet springs	Apply potassium (K) through irrigation, foliar spray or soil.	Prune diseased limbs and scaffolds and remove from orchard
Prevention	Modifications to reduce heat stress with irrigation, cover crop, and good fertilization program.	Orchard sanitation: prune off infected branches and remove or destroy fruit mummies from orchard	Leaf analysis in July should show K >1.3%. K should be soil applied in bands in the fall or foliar during spring months	This is a weak pathogen and does not attack healthy trees. Avoid sunburn, heat stress, potassium deficiency, and ring nematode

New Prune Production Manual from UC Agriculture and Natural Resources

Written in easy-to-read non-technical language, this manual is the perfect field application guide to growing prunes. Inside you'll find the professionalism, expertise and science-based answers you've come to expect from the University of California—with contributions from more than 40 Cooperative Extension professionals, UC faculty, USDA scientists, and highly skilled prune industry experts.

Chapters include:

- An industry overview
- A detailed description of prune biology
- Information on understanding soils, varieties, irrigation and fertilization
- Pest management techniques
- A lesson on harvest and postharvest management

The breadth of expertise and knowledge contained in the 320 pages of this manual, along with the more than 300 photos and 56 color illustrations make this one of the most comprehensive prune production manuals in the world. To order or to get a video glimpse inside the book, visit www.ucanr.edu/prune.
2012 • 320pp • \$45.00 • ANR Pub 3507 • ISBN: 978-1-60107-702-8

