Advisor Retirement and New Position Proposals

Bill Krueger UCCE Farm Advisor Glenn County

On June 28th I retired after 32 years as a University of California Farm Advisor. I started as a Tree Crop Advisor in Glenn County in August of 1980. Over the years I added olives in Tehama County and County Director in Glenn County to my responsibilities. I have seen tree crop acreage in Glenn County grow from 22,000 acres to more than 68,000 as many acres of row crops and, more recently, rangeland were converted to tree crop production. It has been great to be involved with this and I appreciate all of the support and cooperation I have received from growers, allied industry and my colleagues over the years.

During the same time we have also seen UCCE ranks decline from around 500 to less than 200 now. Within the current advisor ranks, two thirds are 55 or older so there are many more retirements eminent. While the consolidation of UCCE resources is likely to continue, UC ANR administrators put the hiring of new advisors and specialists as a highest priority.

There are currently 107 proposed positions being considered for administrative approval. From this group of 56 specialists and 51 advisors a small number will be selected for recruitment. Four of the proposed positions could be of real benefit to the Northern Sacramento Valley. They are, a Sustainable Orchard Systems Advisor for Almonds and Olives #235 to be housed in Glenn County and covering Glenn and Tehama Counties now and potentially adding Butte County when the current advisor retires; an Orchard Systems Advisor #079 focused primarily on walnuts and prunes housed in Butte County covering Butte and Glenn Counties now and, potentially, adding Tehama County when the current advisor retires; an Area IPM Advisor Sacramento Valley #211; and a Small Farms Local Food Systems Advisor #104 to be housed in Butte County covering Butte, Glenn, and Tehama Counties.

To learn more about these or the other positions being requested, and, to comment or make suggestions, go to the following link: www.ucanr.edu/callforpositions (hold down the control key and click on the link to make the link work). The site will be open to comments until August 7th.
Alternaria Leaf Spot and Leaf Rust of Almond

Joe Connell, UCCE Farm Advisor, Butte County, and Jim Adaskaveg, Professor, Department of Plant Pathology and Microbiology, University of California Riverside

Alternaria leaf spot and almond rust are fungal diseases of almond that are becoming more prevalent in the Sacramento Valley. Both diseases are favored by high humidity and leaf wetness. Often, additional fungicide treatments are necessary to minimize early defoliation. Recent extended wet springs and changes in cultural practices (higher density plantings and microsprinkler irrigation with longer, more frequent irrigations) are contributing to higher humidity, more accumulated leaf wetness hours (e.g., dew, rainfall, irrigation, etc.) resulting in higher disease incidence.

**Alternaria leaf spot** is a fungal disease caused by a complex of Alternaria species including *A. alternata*, *A. arborescens* and *A. tenuissima*. Alternaria leaf spot appears as up to half inch diameter brown spots (Fig. 1) on leaves. Leaf spots turn black as the fungus produces spores. Alternaria leaf spot develops most rapidly in the hot summer months, and can almost completely defoliate trees by mid-summer.

**Disease management.** Relying entirely on fungicides to control this disease can be costly and increases the risk of resistance development. Consider an integrated approach including:

a. Planting less susceptible cultivars. Varieties most susceptible include Carmel, Sonora, Monterey, Winters, and Butte.

b. Select a planting design which allows for air circulation. Orchards planted with rows in an east/west direction typically have more severe disease than orchards with rows in a north/south orientation.

c. Prune and train trees to allow air circulation and reduce dew formation.

d. Practice good foliar disease and mite control to minimize stressed and injured leaf tissue.

e. Irrigate less frequently with larger volumes of water to minimize relative humidity and subsequent leaf wetness.

f. Manage the orchard floor to reduce relative humidity and the amount of senescing tissue colonized by *Alternaria* species.

Disease resistance against QoIs (strobilurins – FRAC group 11) and SDHIs (FRAC group 7) occurs in the Sacramento Valley. Late-spring/early-summer applications should alternate materials to manage resistance. New materials (Quash, Inspire Super - both containing FRAC group 3) and Ph-D (FRAC group 19) must be used in rotations and mixtures for resistance management. Newer SDHI fungicides (different sub-groups) are proving to be highly effective but the potential for resistance is also extremely high. Combination tank mixtures, pre-mixtures, and rotations will be required for preventing disease resistance to the newer SDHI compounds.

**Rust** is caused by the fungus *Tranzschelia discolor* and occurs sporadically throughout almond-growing areas in California. It appears as small, yellow, angular spots on the upper surface of leaves and rusty red pustules of spores on the lower surface (Fig. 2). The disease is favored by spring and early summer rains and is more likely to become serious in orchards near rivers or streams or other locations where spring and summer humidity is relatively high. Excessive levels of nitrogen are also known to increase a tree's susceptibility. The disease causes premature defoliation and will weaken trees, reducing the following year's bloom. The rust fungus overwinters in infected leaves that remain on the tree, spores contaminating buds and tree bark, and possibly infected twigs. Rust is frequently more severe in young vigorous trees, especially in second to fourth leaf orchards where fungicides have not been applied.
In orchards with a history of rust, treatments should be applied before symptoms appear: 5 weeks after petal fall and and a second application 4 to 5 weeks later to control leaf infections. Two or three applications may be needed in orchards that have had severe rust problems.

A zinc nutritional spray (zinc sulfate 20-40 lb/acre) applied in late October to early November resulting in defoliation may reduce overwintering rust inoculum.

**Resistance management** will be critical to maintain efficacy of currently available fungicides. Resistance development in *Alternaria* species to QoI fungicides was first detected in 2003/04. Field Disease resistance was found in Kern County in 2005 and in northern California in 2007. Field disease resistance to SDHI fungicides (group 7) was found in the northern and southern Central Valley in 2007. Consequently, Pristine® (groups 7/11 or QoI + SDHI) is not effective in some locations. For rust, resistance has not been detected and the potential for resistance against QoI (group 7 or QoI) and DMI (group 3) fungicides is considered low.

The following are general suggestions for fungicide resistance management.

- Rotate and mix fungicides that belong to different FRAC group numbers.
- Apply per acre label rates, no every-other-row spraying (upper label rates for QoIs).
- Limit a single mode of action fungicide class (e.g. FRAC Group) application to 1 or 2 per orchard per season.
- Start your fungicide program with a multi-site mode of action material (Captan, Bravo/Echo, Ziram, Rovral, sulfur). Sulfur can be used in combination with single-site mode of action fungicides such as QoI and DMI fungicides.

Fungicides effective for Alternaria leaf spot and rust can be found at [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu) Click on Agricultural Pests, then Almond, and then the individual diseases. Another resource is the 2012 Efficacy and Timing of Fungicides Publication at [http://ipm.ucdavis.edu/PDF/PMG/fungicideefficacytiming.pdf](http://ipm.ucdavis.edu/PDF/PMG/fungicideefficacytiming.pdf)
A new almond cost study has been published by UC Davis. The cost study shows sample costs to establish an almond orchard and produce almonds in the Sacramento Valley, for the year 2012, under micro-sprinkler irrigation. This is a great resource and guide if you are thinking about growing almonds for the first time, expanding your current orchards, or just need to determine potential returns. This cost study assumes a hypothetical farm of 105 acres with 100 acres planted in almonds. In the first pages, the study goes over the farm’s layout, orchard establishment and cultural practices assumed for the study trying to capture the current practices used to grow almonds. The second part of the study is made up of tables which look at the average current cost of all these practices for the years of orchard establishment and for a mature orchard. Each table finishes with estimated total cash cost and returns per acre grown. A sample table of costs per acre at varying yields is shown below.

Table showing the cost per acre at varying yields to produce almonds taken from the new Almond Cost Study for Sacramento Valley (micro-sprinklers) 2012.

This cost study is a great tool and should only be used as an estimate of current costs and returns. One way to use the cost study is to use it as an outline and create similar tables using your actual costs. Or another way is for new growers to use them to summarize what practices, machinery, custom hired work, and materials they should be planning to have when they establish their first orchard.

This cost study can be found at http://coststudies.ucdavis.edu/files/AlmondSprinkleSV2012.pdf

All current and past UC cost studies can be found at http://coststudies.ucdavis.edu
2012 Navel Orangeworm

Richard P. Buchner – UCCE Farm Advisor, Tehama County

Navel orangeworm (NOW) monitoring begins in early April by hanging black egg traps baited with almond press cake mixed with 3-10% almond oil. Traps mimic old, moldy mummy nuts attractive to female NOW for egg laying and larval feeding. Because NOW populations are usually low in the Sacramento Valley, we typically do not observe egg laying on every trap, every year. Winter weather and good mummy nut removal (orchard sanitation), practiced in the Sacramento Valley, reduce overwintering larvae and decrease worm pressure. Multiple traps are a good strategy to improve the probability of observing egg laying particularly when NOW populations are low. Four traps per location is a reasonable compromise between time and accuracy and reading NOW egg traps twice per week (Monday and Thursday) has worked well. Eggs will be white when first laid and turn orange as they mature. Remember, egg traps alone will not tell you if a spray is necessary, but if used in combination with Degree Days (DD) it is possible to predict NOW activity and egg hatch. Figure 1 shows 2012 NOW egg laying in a Tehama County almond orchard.

NOW biofix is the beginning date of a consistent increase in egg laying. Notice that 5/3/12 is the biofix for the Tehama county orchard (figure 1). New crop nuts are a more nutritious food source which speeds up generation time. Generation time is 1056 DD on less nutritious mummy nuts and 723 DD on new crop nuts. Using that information we can predict second and third generation egg hatch. The accuracy of that prediction will improve as more information is collected. If egg hatch coincides with hull split on susceptible varieties, the chance of damage is increased. Figure 2 shows actual and predicted generation events for one almond orchard in Tehama County. Since hullsplit is beginning in some orchards, a portion of the second generation may be able to feed on new crop nuts and will develop more quickly. With our current information, the earliest third generation laying could be expected to begin is 8/14/12 with egg hatch expected on 8/19/12. Additional data will adjust that prediction. You can follow the Tehama information by going to cetehama.ucdavis.edu then click on orchard crops and click on insect update. Spring or hull split applications are two options for spray control. Spray timing and material choices are described in detail at the UC IPM website http://www.ipm.ucdavis.edu. Click on Ag Pests, Almond, then navel orangeworm.

Tehama County 2012 Navel Orangeworm Monitoring

Figure 1. Egg laying activity for Navel Orangeworm in a single almond orchard in Tehama County. 5/3/12 was selected as the first biofix and the beginning of the first generation.
2012 NOW Generation Activity

<table>
<thead>
<tr>
<th>Biofix, start of 1st generation</th>
<th>1st Gen insect activity</th>
<th>Biofix, start of 2nd gen.</th>
<th>2nd Gen insect activity</th>
<th>Biofix for 3rd gen.</th>
<th>3rd gen. insect activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st eggs, Tehama Co.</td>
<td>Egg laying on mummies OR on new crop after hull split</td>
<td>Second egg hatch</td>
<td>Egg laying if moth developed on new crop</td>
<td>Egg hatch, nut feeding</td>
<td></td>
</tr>
<tr>
<td>Actual 5/3/12</td>
<td>Predicted 7/9/12</td>
<td>Predicted 7/14/12</td>
<td>Predicted 8/14/12</td>
<td>Predicted 8/19/12</td>
<td></td>
</tr>
<tr>
<td>0 DD</td>
<td>100 DD</td>
<td>1056 DD</td>
<td>100 DD</td>
<td>723 DD</td>
<td>823 DD</td>
</tr>
</tbody>
</table>

Figure 2. Actual and predicted NOW activity for Tehama county almonds. Generation length is 1056 Degree Days on mummy nuts, 723 Degree Days new crop nuts and 100 Degree Days for egg hatch. Notice that Degree Day accumulations reset to zero at each actual biofix.

**Why are Some Individual Trees Turning Yellow, are Weak, or are Not Growing?**

*Joe Connell, UCCE Farm Advisor, Butte County*

When an individual tree turns yellow compared to all of its neighbors it often indicates there is something going wrong in the root system. The yellowing often shows up at the time the weather turns hot and the compromised roots are unable to keep up with the water needs of the tree. There are a variety of potential causes for these symptoms and they can’t all be fully explored here but I’ll comment on some of the main things I see on farm calls.

**Soil borne diseases.** The two most common diseases affecting the crown and root system are *Phytophthora* and *Armillaria*. Both diseases cause similar above ground symptoms: poor terminal growth, small chlorotic leaves, premature defoliation, and decreased productivity, branch dieback and ultimately, tree death.

For *Phytophthora*, disease severity depends upon *Phytophthora* species, soil type, climatic conditions and tree age. *Phytophthora* affects the inner bark and cambium and typical root or crown cankers will be brownish with a fairly distinct margin as the fungus advances. Removal of the outer bark often reveals brown tissue with a water soaked zonate appearance near the margin between healthy white and infected tissues if the fungus is active. Excessive soil moisture favors infection.

*Armillaria mellea* or oak root fungus is identified by cutting into crown or root tissue and looking for whitish fungal plaques growing between the bark and wood. Whitish fungal strands and gumming are also commonly found in infected bark. Finding rhizomorps, fungus signs that resemble brown to black shoestrings adhering to the outer bark of infected roots is a positive confirmation of *Armillaria*. They develop best in moist soil. *Armillaria* often produces clusters of mushrooms around the base of infected trees following rainfall from November to February. When newly planted in an infected site it usually takes about four years for a susceptible tree to show symptoms of *Armillaria*. Infected trees may die suddenly when the heat of summer arrives.

Another soil borne disease that can weaken trees, crown gall, is caused by the bacterium *Agrobacterium tumefaciens* and is relatively easy to identify. Galls are made up of undifferentiated, disorganized tissue growths on roots and/or the tree crown. Galls most often develop on root or crown tissue underground and may not be noticed. As galls enlarge, the center of the gall dies creating a dead wood area that can be infected by wood.
rotting fungi. These galls and wood rots were shown to be related to 85% of the trees lost in windstorms in surveys previously conducted in the Chico area. Trees with severe crown gall infection and girdling may be stunted and may display poor growth and yellow foliage. Before almond trees succumb to crown gall itself they often topple over from structural weakening related to the wood rots.

**Water logging.** One of the more common problems has been water logging injury due to periods of excessive rainfall at times during the past two years. Zinc and manganese micronutrient deficiencies are more prevalent in soil related areas where soils are wet, cold, and saturated. Reduced root activity and nutrient uptake can produce pale leaf color or interveinal chlorosis. When tree roots are excessively wet they can die from lack of oxygen even without any major pathogens present. This may be a transient problem in some cases, affecting only small feeder roots followed by tree recovery as new feeder roots grow out of the problem. In more severe cases, larger roots can die and trees may begin a gradual decline. Such trees may make little new growth, have a canopy that begins to thin out, may be off color, can stress easily between normal irrigations, and may display lower limb dieback. Once tree root systems are injured by excessive rainfall it’s easy for the weak orchard areas to be overwatered when irrigating. This compounds the problem making it difficult to overcome. Reducing nozzle sizes in weak areas in an orchard may help mitigate over-irrigation.

**Moisture stress.** Good irrigation management is required for growth and vigor. Young trees are sensitive to moisture stress and will stop growing at moderate stress levels. Root systems need to be kept moist but not wet enough to favor root rot fungi and/or low oxygen conditions. Pressure chambers are the most effective technique for measuring tree water status. Research suggests young almonds will slow shoot growth at –12 to –13 bars Midday Stem Water Potential. Soil augers are useful for visual soil moisture evaluation and various soil moisture sensors are available.

**Vertebrates.** Pocket gophers are serious pests especially in young orchards. Root damage results in a yellow, stressed canopy, and poor tree growth. Gopher girdling on the crown mimics *Phytophthora* root rot, oak root fungus, or mild etch when on Marianna 2624 rootstock. Trees die when completely girdled. Gophers can easily kill two to four year old trees but I’ve seen 10 year old trees girdled and killed by gophers as well. Look for missing bark and parallel tooth marks on the wood at feeding sites about 6 inches below ground where the bark has been chewed away in a girdle about 4 to 6 inches wide. Voles, also called meadow voles or meadow mice, may move into orchards and feed on the bark of young trees at the ground surface particularly when vegetation around tree trunks offers cover and protection. Mainly a problem on first year trees, their girdling produces symptoms similar to gopher damage. Rodents are potential pests in all orchards, but they are more likely to invade orchards that provide good cover with a cover crop or where they can migrate in from rangeland or unmanaged areas.

**Rootstock compatibility.** Union mild etch (UME) occurs on Marianna 2624 plum rootstock when soils are too wet during the growing season. This problem is more prevalent on the varieties in an orchard that are the least compatible with the rootstock (such as Butte or Monterey) but other varieties may be affected as well. On Marianna 2624, once growth is affected by UME, leaves turn pale yellow and growth may stop. When severely affected, leaves roll and scorch on the margins, and trees may defoliate. Some trees die or remain weak enough to be removed although most affected trees will recover the following year.
Coping with Rain at Harvest
Franz Niederholzer, UCCE Farm Advisor, Colusa/Sutter/Yuba Counties

Rain at harvest can increase risk of mold and concealed damage to nuts. Both of these conditions can reduce grower income. The increase in acreage of late harvested varieties in the Sacramento Valley, especially Fritz and Monterey, increases the risk of rain at harvest. Several key points to remember if rain is forecast or occurs at harvest are:

1) If rain is forecast, don’t shake. After a rain, wet nuts dry faster on the tree than on the wet orchard floor.

2) If rain is forecast and nuts are harvested but too wet to pickup, blow them away from the tree trunks but don’t windrow. Rain wetted nuts on the orchard floor often are very difficult to blow as they tend to stick to muddy soil.

3) Condition ("Drop chute") windrowed nuts after a rain. Removing leaves and other trash helps the nuts dry faster.

Grower options across a range of harvest conditions appear in the following table.

<table>
<thead>
<tr>
<th>Orchard conditions</th>
<th>Dry, windy, or normal weather</th>
<th>High humidity</th>
<th>Showers</th>
<th>Rain</th>
</tr>
</thead>
<tbody>
<tr>
<td>No rain has occurred, almonds are:</td>
<td>Knock</td>
<td>Knock</td>
<td>Knock</td>
<td>Wait</td>
</tr>
<tr>
<td>Knocked</td>
<td>Harvest normally</td>
<td>Harvest normally</td>
<td>Open*</td>
<td>Open</td>
</tr>
<tr>
<td>Opened and raked</td>
<td>Harvest normally</td>
<td>Harvest normally</td>
<td>When dry, windrow</td>
<td>When dry, windrow</td>
</tr>
<tr>
<td>Windrowed</td>
<td>Stockpile or pick up</td>
<td>Stockpile or pick up</td>
<td>Stockpile or pick up</td>
<td>Stockpile or pick up</td>
</tr>
</tbody>
</table>

| After 0% in rain, almonds are: | Knock | Knock | Wait | Wait |
| On tree | Harvest normally | Harvest normally | Wait | Wait |
| Knocked | When dry, open | When dry, windrow | 1. Wait | 2. Pick up and machine-dry |
| Opened and raked | When dry, windrow | 1. When dry, pick up | 2. Pick up and machine-dry |
| Windrowed | When dry, pick up | When dry, pick up | 1. When dry, pick up | 2. Pick up and machine-dry |

| After 1/4 to 1/2 in rain, almonds are: | Knock | Harvest normally, windrow | Harvest normally | Wait |
| On tree | Harvest normally | Harvest normally | Open |
| Knocked | 1. Drop-chute or | 1. Drop-chute or | 1. Wait | 2. Pick up and machine-dry |
| Opened and raked | 2. Pick up and machine-dry | 2. Pick up and machine-dry | 2. Pick up and machine-dry |
| Windrowed | 1. Drop-chute or | 2. Pick up and machine-dry | 2. Pick up and machine-dry |

| After more than 1/2 in rain, almonds are: | Knock | Harvest normally | 1. Pick up and move nuts to dry area or | Machine-dry |
| On tree | Harvest normally | 2. Machine-dry | 1. Pick up and move nuts to dry area or | Machine-dry |
| Knocked | 1. Pick up and move nuts to dry area or | 2. Machine-dry | 2. Pick up and move nuts to dry area or |
| Windrowed | Drop-chute | 2. Machine-dry |

Source: This table was originally developed by Larry Reinhart, former manager, North State Hulling Cooperative.

* To open, in this context, is to sweep almonds off berms but not gather them into windrows.

' To drop-chute is to run nuts through the pickup machine and drop them from an open cart. This process removes leaves and promotes quick drying by laying out a wide swath of almonds. This process is also known as "Conditioning" nuts.
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.

<table>
<thead>
<tr>
<th>Fresh fruit Size category</th>
<th>Fresh fruit dia (in)</th>
<th>Fresh Fruit Count/lb</th>
<th>Dry Fruit Count/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>&lt;1</td>
<td>40-50</td>
<td>110-180</td>
</tr>
<tr>
<td>Medium</td>
<td>1 - 1 3/16</td>
<td>25-35</td>
<td>70-125</td>
</tr>
<tr>
<td>Large</td>
<td>1 3/16 - 1 6/16</td>
<td>15-25</td>
<td>40-70</td>
</tr>
<tr>
<td>Extra Large</td>
<td>&gt;1 6/16</td>
<td>12-20</td>
<td>35-60</td>
</tr>
</tbody>
</table>

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 can not 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.
<table>
<thead>
<tr>
<th></th>
<th>Blue Prune</th>
<th>Brown Rot “Twig Blight”</th>
<th>Potassium Dieback</th>
<th>Cytospora Canker</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td>Symptoms appear in late June or July. Small fruiting branches and spurs die back, associated leaves show scorching and yellowing. Prunes turn blue, shivel and drop. Possible gumming.</td>
<td>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.</td>
<td>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.</td>
<td>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.</td>
</tr>
<tr>
<td><strong>How distinguish from other dieback</strong></td>
<td>Always has shriveled or dropped fruit associated with dieback. Clear gumming.</td>
<td>Dead flowers are present; no fruit was set, dark colored gumming usually associated with strike.</td>
<td>Symptoms start at the top of tree and not directly associated with fruit or flowers. Often large areas of the orchard are affected.</td>
<td>Pycnidia are present in older cankers. (Pycnidia are raised bumps that are black and then turn white). Abrupt margins on cankers.</td>
</tr>
<tr>
<td><strong>Overwinter</strong></td>
<td>No biological causal agent</td>
<td>In shoot and branch cankers, or diseased flowers and fruit mummies</td>
<td>No biological causal agent</td>
<td>In cankers; spores are released from the pycnidia.</td>
</tr>
<tr>
<td><strong>Conditions that promote growth and spread</strong></td>
<td>Rapid increase of temperatures in June and early July. Often sun exposed fruit and south side of tree show more damage.</td>
<td>Spread by wind and rain; growth promoted by rain during bloom and temperatures in the mid 70s°F</td>
<td>Inadequate potassium fertilizer application exacerbated by heavy crop.</td>
<td>Spread by rain and wind but grows best in warm weather at temperatures above 90°F; can only enter through a wound.</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>No treatment</td>
<td>Fungicide sprays at full bloom and additional sprays at green bud or popcorn in wet springs</td>
<td>Apply potassium (K) through irrigation, foliar spray or soil.</td>
<td>Prune diseased limbs and scaffolds and remove from orchard.</td>
</tr>
<tr>
<td><strong>Prevention</strong></td>
<td>Modifications to reduce heat stress with irrigation, cover crop, and good fertilization program.</td>
<td>Orchard sanitation: prune off infected branches and remove or destroy fruit mummies from orchard</td>
<td>Leaf analysis in July should show K &gt;1.3%. K should be soil applied in bands in the fall or foliar during spring months.</td>
<td>This is a weak pathogen and does not attack healthy trees. Avoid sunburn, heat stress, potassium deficiency, and ring nematode.</td>
</tr>
</tbody>
</table>
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:

1) An industry overview
2) A detailed description of prune biology
3) Information on understanding soils, varieties, irrigation and fertilization
4) Pest management techniques
5) 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.

Call the Glenn County Cooperative Extension Office at 865-1107 to order your copy today.

2012 • 320pp • $45.00 • ANR Pub 3507

ISBN: 978-1-60107-702-8
You are invited!

Not Your Ordinary Retirement Celebration for

Bill Krueger
County Director and Farm Advisor
University of California ● Cooperative Extension
Glenn County
1980 - 2012

Friday, August 17, 2012
6:00 p.m. Social
7:00 p.m. Dinner
Live Music and Dancing following Dinner
7782 County Road 16 — Hamilton City
(Between Road VV and Hwy 45) at Mills Orchards

$25 per person includes dinner, beverages, dancing and gift contribution.
Please make checks payable to Jody Samons and mail to
UCCE, P. O. Box 697, Orland, CA 95963 by August 10.