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# Fruit and Nut Notes

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PRACTICAL • CONNECTED • TRUSTED

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# SACRAMENTO VALLEY REGIONAL PRUNE NEWSLETTER

## IN THIS ISSUE:



## UPCOMING MEETINGS

MANAGING SOIL AND WATER QUALITY IN SACRAMENTO VALLEY AGRICULTURE

*Tuesday, March 6, 2018, - 8:00 a.m. to 12:00 Noon*
*Glenn County Farm Bureau Office 831 5th Street, Orland, CA 95963*

NICKELS FIELD DAY

*Tuesday, May 8, 2018*



*Full color articles and photos are available on our Website: cetehama@ucanr.edu*

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# Dry, Warm Winter Raises Questions about Irrigation

*Ian Fulton, UC Irrigation and Water Resources Farm Advisor, Tehama, Glenn, Colusa, and Shasta Counties*

On the upside, the dry, warm fall and winter seasons of 2017/18 have been pleasant and provided opportunity to complete many orchard activities. On the other hand, it is raising questions about how it might affect irrigation in the early season of 2018.

Rainfall from October 1, 2017 through February 12, 2018 is approximately 27, 36, and 19 percent of average rainfall (Table 1). The low rainfall prompts questions about the level of soil moisture reserves in the root zone of prune orchards and what, if anything, should be done about it?

Table 1. Rainfall received between October 1, 2017 and February 12, 2018 and comparison to average rainfall for same timeframe.

| Location | | 2017/18 Rainfall (inches) | Average Rainfall (inches) |
|---|---|---|---|
| Gerber Station #222 | | 5.5 | 20.5 |
| Durham Station #12 | | 8.1 | 22.8 |
| Williams Station #250 | 2.6 | 13.8 | |

Soil moisture reserves in the root zone of prune orchards may be sub-par this year. How low will depend upon last season's irrigation practices, particularly post-harvest irrigation and whether any winter irrigations have been applied. When the rainfall levels shown in Table 1 are compared to general water holding capacity for soils of different texture (Table 2), it appears that it is possible for soil moisture levels to be refilled between about two to four feet deep by rainfall alone. Refill will not be as deep for loam, silt loam, and clay soils or in areas receiving lower rainfall. Whereas, refill will be deeper in sandy and sandy loam soils especially if rainfall has been higher.

On February 9, 2018, we measured soil moisture levels in six different orchards in eastern and western Tehama County. The soil series represented included Arbuckle gravelly loam, Hillgate silt loam, Kimball loam, Los Robles clay, Tehama silt loam, and Vina loam. All of the orchards were located in Tehama County where rainfall was most similar to the Gerber CIMIS station #222 (Table 1). On average, soil moisture levels increased 4.1 inches from mid October 2017 to February 9, 2108. All orchards showed at least 3.0 inches of refill and the highest was 5.5 inches. Most of the refill occurred in the top four feet of soil in these orchards. An exception was a newly planted orchard in 2017. This young orchard with smaller trees used less water in 2017 and had more carry over moisture at greater depths.

| Soil Texture | Inch/foot soil |
|---|---|
| Fine sand | 1.1 |
| Sandy loam | 1.4 |
| Fine sandy loam | 1.8 |
| Loam | 2.0 |
| Silt loam | 2.1 |
| Clay loam | 2.0 |
| Clay | 2.2 |

Table 2. General estimates of water holding capacity for soils of different texture.

At this point, the most appropriate step is to evaluate the specific conditions in your orchard by auguring and judging soil moisture by feel or with soil moisture sensors that have already been installed. If there is a four-foot profile of good soil moisture, the orchard probably has sufficient reserves as the 2018 prune season approaches. If indications are that the soil at three and four feet deep is noticeably drier than the top two feet, there is still time to consider winter irrigation during the next two weeks or so. One or, at most, two irrigations depending on the irrigation system water application rate and duration should help replenish deeper moisture at a depth of three and four feet.

A benefit of winter irrigating is to assure deeper moisture and lessen the need for irrigation during bloom when orchard access may be important for fungicide sprays and improve the chances that emerging roots will be growing in warm, aerated soils that are at less risk to diseases. The down side might be that the weather changes abruptly during bloom and irrigation may be needed anyway to manage frost or excess heat or that a rainy spell arrives. Then, the winter irrigation is all for not. These are difficult decisions but ones worth some thought.

Last, when gearing up for the irrigation season consider:

Maintenance of irrigation system(s) to improve irrigation distribution uniformity (see sacvalleyorchards.com/almonds/irrigation/irrigation-system-maintenance/)

If not already doing so, look into using weekly regional, real-time crop ET , soil moisture monitoring, or methods of monitoring tree water status as tools to help make irrigation decisions in 2018. Additional information can be found at: sacvalleyorchards.com/prunes/irrigation-prunes/techniques-to-time-first-irrigation-dates-for-prune/

# Thinning Prunes

*Dani Lightle, UCCE Orchards Advisor, Glenn, Butte & Tehama Counties*

Will you need to thin prunes this year? In order to keep fruit from falling through the sizer, you need to do some legwork and estimate your fruit set. If needed, thinning should occur roughly around the same time as 'reference date', or the point at which 80-90% of the fruit have a visible endosperm. The endosperm, a clear gel-like glob, will be found in the seed on the blossom end of the prune (Figure 1) and is solid enough to be removed with a knife point. Typically, the reference date occurs in late April or early May, approximately one week after the pit tip begins to harden. The earlier the thinning is done, the greater effect it will have on final fruit size at harvest, though if you thin too early, you may damage the trees without removing the desired number of fruit.

Figure 1. Extraction of the endosperm on a developing prune.

To decide whether to thin, **estimate** the number of fruit per tree to produce your desired crop, **determine** the number of fruit on a few (3) representative trees, at or just before reference date, and, using those numbers, **decide** if you need to thin. **Calculate** how much fruit needs to come off if thinning is needed. Finally, **shake** if thinning is needed. Below I walk through the math, step by step.

1. **Estimate** the targeted tonnage from a given block by considering orchard history, age, etc. Let's assume a target of 4 tons/ac, and shoot for 60 dry count/lb. From there, we calculate a targeted number of fruit per tree:

(Dry pounds per ac x Dry count per lb) ÷ Trees per ac = Target number fruit per tree

$$8{,}000\,\frac{lbs}{ac} \times 60\,\frac{count}{lb} \div 150\,\frac{trees}{ac} = 3{,}200\ fruit/tree \text{ (target)}$$

2. **Determine** the actual number of fruit in a sample tree and compare that number to the target of 3,200 fruit. Ideally, you would repeat this procedure on 3 trees, representative of most trees in the orchard, to ensure accuracy. Place a tarp under the tree and mechanically shake off as much fruit as possible, then hand strip any remaining fruit. Collect all the sound fruit from the tarp and weigh them (for easy math, let's assume right now it weighs 100 lbs). Take a 1-lb subsample of the fruit and count how many sound fruit are in a pound (here, we'll assume 90 fruit/lb). Don't count fruit that looks like it wouldn't have stayed on the tree (if you hadn't have stripped it off). These fruit are light green or otherwise look slightly "off" compared to the strong fruit that will make it to harvest. Then use those numbers to determine the total number of fruit per tree:

Total tree fruit weight x Number of prunes per lb = Total number of fruit per tree

$$100lbs \times 90\,\frac{fruit}{lb} = 9{,}000\ fruit/tree \text{ (actual)}$$

3. **Decide** if you need to thin. Subtract the number of fruit needed at harvest from the number of fruit on the tree now (at reference date). In this example, you have approximately 2.8 times the number of fruit on the tree as desired to hit the target of 60 dry count/lb, and you may consider thinning the orchard. You don't want to simply remove all those fruit though, because you need to account for natural fruit drop and variability in fruit per tree across the orchard. Estimates of natural fruit drop range from 10%-40%. This is an area where you need to account for orchard history, as well as your own risk threshold. Many growers prefer to leave approximately 50% more fruit on the tree than the target amount. This means that we need 50% more fruit on the tree after mechanical thinning than we want remaining on the tree at harvest:

Target number prunes per tree x (1.5% fruit drop buffer) = Adjusted number fruit per tree

$$3{,}200\ x\ 1.5 = 4{,}800\ fruit/tree \text{ (adjusted target)}$$

4. **Calculate** how many fruit to remove by subtracting the adjusted target number from the actual number of prunes on the tree:

Actual fruit per tree – Adjusted target fruit per tree = Number fruit to remove

$$9{,}000\,\frac{fruit}{tree} - 4{,}800\,\frac{fruit}{tree} = 4{,}200\ fruit/tree\ to\ remove$$

5. **Shake** (if needed). Use harvest machinery (shaker) to remove the approximately 4,200 excess fruit. Shake a tree for one second, and following the steps above, calculate how many fruit were removed. If needed, increase the shaking time until the desired numbers are removed. Typical shaking time is 2-4 seconds; avoid shaking for longer than 6-7 seconds to prevent unnecessary damage. Once you've calibrated your shaking time, go through and thin the block. If you are thinning for more than a week, check fruit per tree and green fruit per pound every few days to make sure that your shake time doesn't need to be adjusted down as fruit grow.

# Prune Bloom Orchard Management Considerations

*Katherine Jarvis-Shean, UC Farm Advisor Sacramento, Solano & Yolo Counties*
*Franz Niederholzer, UC Farm Advisor, Colusa, Sutter and Yuba Counties*
*Emily J. Symmes, UCCE Area IPM Advisor, Sacramento Valley*

## FEBRUARY

- ✓ Order *bees* in February. Generally, you want to install one hive per acre.
- ✓ If you're going to *winter irrigate* to backfill what Mother Nature didn't deliver this year, get it done before the end of February. To evaluate whether winter irrigation makes sense for a particular orchard, see sacvalleyorchards.com/blog/thinking-about-irrigating-this-winter.
- ✓ Check *irrigation system* uniformity and perform maintenance before the system is needed for frost protection, orchard cooling at bloom, or the irrigation season starts. How-to details at sacvalleyorchards.com/almonds/irrigation/irrigation-system-maintenance.
- ✓ Get *air-blast sprayer* ready to apply bloom fungicides. Check calibration and do general maintenance (check sprayer filters, replace nozzles as needed, etc.)
- ✓ If *San Jose scale (SJS)* dormant treatments were not applied, not effective, and/or SJS pressure is high, treatments targeting the late spring crawler stage can be effective. Place pheromone traps by mid- to late February. Apply crawler treatments 600-700 degree days after biofix (males caught on consecutive trap checks). More on SJS: ipm.ucanr.edu/PMG/r606302111.html
- ✓ Consider bee safety when planning your sprays. More on bee safety: sacvalleyorchards.com/prunes/honey-bee-safety-during-bloom and searchable database for pesticide impacts on honey bees at: ipm.ucanr.edu/beeprecaution.
- ✓ Winter chill accumulation (as counted in chill portions, as of February 7th) is stacking up to be similar to the winter of 2014-2015, though not nearly as low as 2013-2014. To check out chill at the nearest CIMIS station, visit http://fruitsandnuts.ucdavis.edu/Weather_Services/chilling_accumulation_models/Chill_Calculators/.

## MARCH

- ✓ *If it's cold at bloom,* a closely mowed orchard floor is warmer than one with tall weeds/cover crop. Freshly disked soil is the coldest.
- ✓ *If it's hot at bloom,* consider irrigating to wet the orchard floor, and as much as the first foot of soil. This may provide some cooling if hot temperatures occur at bloom. Run sprinklers when temperatures reach 70-75°F and shut off when they drop below those temperatures. Evaporation of this water provides some small temperature reduction (usually just one or two °F). Experience has shown the extended cool weather (<60°F) or a few hours of hot temperatures (>81°F) at bloom pose the greatest risk to a prune crop.
- ✓ Plan for *brown rot* fungicide sprays if bloom weather is wet. In a wet bloom, two sprays (green bud and full bloom) are recommended (see fungicide efficacy table in this newsletter). One spray at 40-50% bloom effectively controls brown rot in years with no rainfall since there's still a risk of brown rot infection from dew. Alternate fungicide classes (use fungicides with different FRAC numbers) if spraying more than once. More on Brown rot: ipm.ucanr.edu/PMG/r606100411.html
- ✓ *Russet scab* develops when there is significant rainfall during and/or immediately after bloom (before the fruit fills the floral "jacket"). Consider spraying captan or chlorothanil (Bravo/Echo) at full bloom to reduce scab at harvest, but pay attention to honey bee safety (both those fungicides are tough on bees). More on Russet scab: ipm.ucanr.edu/PMG/r606100511.html

- ✓ If *aphid* control measures were not taken during fall or winter, two oil sprays (4 gal/acre/spray) at bloom can be effective against mealy plum and leaf-curl plum aphids if applied 7-10 days apart at 1.5 mph. 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
- ✓ Monitor for *Peach twig borer (PTB)* 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 B.t. (Dipel®, Javelin®, etc.)

## APRIL

- ✓ If *San Jose scale (SJS)* dormant treatments were not applied, not effective, or SJS pressure is high, *and* you didn't put out pheromone traps to monitor SJS activity, put double-sided sticky tape around limbs beginning in April to detect crawler emergence and time spring treatments if necessary.
- ✓ Begin post-bloom *Peach twig borer (PTB)* monitoring with pheromone traps (minimum 2 per block) no later than April 1 to determine biofix (moths caught on two consecutive trap checks).
- ✓ Place *Obliquebanded leafroller (OBLR)* pheromone traps (minimum 2 per block) no later than mid-April to identify biofix (moths caught on two consecutive trap checks).
- ✓ Measure crop load in mid-April, and use this information to plan your nitrogen (N) and potassium (K) fertilizer applications. Crop load is the major driver in mature prune orchard N and K use. For optimal N uptake, apply multiple applications avoiding a single heavy spring application, since rains and subsequent irrigation may leach nitrate from the root zone. Consider an N application before the end of April if there is a good crop set.

## MAY

- ✓ Monitor for PTB fruit feeding 400 degree days after the first biofix. In the orchard, look for larvae entry points on the fruit (ideally 15 fruit from 80 trees), especially where fruit contact each other or touch leaves. Treat if 2% or more (24+ of 1,200) of the fruit have damage. More PTB info: ipm.ucanr.edu/PMG/r606300211.html
- ✓ Begin sampling fruit for OBLR damage 930 degree days after biofix. As with PTB, look for damage on fruit in the orchard (ideally 1,200) and treat if 2% or more have damage. More OBLR info: ipm.ucanr.edu/PMG/r606300511.html

## 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.

# Evaluating New Rootstocks: What's the Latest?

*Luke Milliron, UCCE Farm Advisor, Butte, Tehama and Glenn Counties*
*Franz Niederholzer UCCE Farm Advisor, Sutter/Yuba and Colusa Counties*
*Dani Lightle UCCE Farm Advisor, Glenn, Butte and Tehama Counties*

Only a few rootstocks are traditional options for the California prune industry, and there has been renewed interest in increasing the available rootstock choices. UC Cooperative Extension farm advisors have been evaluating alternative rootstocks in California Dried Plum Board (CDPB) supported field trials. An evaluation of 29 rootstocks began with the planting of replicated field trials in two commercial 'Improved French' orchards in 2011 (Yuba County and Butte County), and a smaller un-replicated plot of more experimental rootstocks at the UC Davis Wolfskill research station in Winters.

UC Cooperative Extension farm advisors have used the Butte County and Yuba County replicated rootstock trials in growers' orchards to evaluate a total of 15 rootstocks (see table 1) under very different soil, irrigation, and yield potential. The Butte plot is planted on Farwell clay adobe and the lighter textured Nord Loam soil types; this ground was previously planted to almonds on Lovell (peach) rootstock. In contrast, the Yuba site is planted on more typical prune ground (Kilga clay loam) and is prune following prune. The Butte plot is drip irrigated, while the Yuba plot has micro sprinklers. The differences in soil, crop history, irrigation and vigor at the two replicated trial sites allows for a rigorous evaluation of these rootstocks. We now have updates on bloom timing, tree loss due in-part to bacterial canker/*Cytospora* canker at the Yuba County site, and yield results from the first commercial harvest in 2017 at the Butte and Yuba County plots.

## Rootstock Bloom Timing in Butte County:

2016 and 2017 each had very different bloom conditions which were evaluated at the Butte County location. In 2016, bloom was early (March 10 full bloom for traditional rootstocks like Myrobalan 29C), with cold temperatures and rain for much of the early bloom period. In 2017, the traditional rootstocks reached full bloom on March 19 and bloom conditions were more favorable for bees. Consistent across both years was that trees on some rootstocks reached full bloom well after the traditional rootstocks. Citation, Krymsk 86, and Marianna 58 all reached full bloom at least two days after the traditional rootstocks in both years. Bloom will continue to be evaluated to fully assess bloom timing differences over time. A potential application of different bloom timing by rootstock might be to plant blocks on different rootstocks to spread out bloom timing and reduce the risk of a crop failure due to a bad weather event. More details on the bloom timing of the rootstocks can found at: ucanr.edu/sites/driedplum/show_categories/Rootstocks/

## Cankers and Tree Loss at Yuba County Plot

Bacterial canker (*Pseudomonas syringae*) as well as *Cytospora* canker have plagued the Yuba County plot, with notable gumming and tree loss in 2013 and 2017. Rootstocks with a high percentage of tree loss are Marianna 30 (40%), Myrobalan 29C (23%), and Myrobalan seedling (17%). Other rootstocks suffered minor losses such as Rootpac-R (two trees or 7%), and Marianna 2624, Marianna 40, and Marianna 58 all with one tree lost (3%). Half of the rootstocks have suffered no losses at this site (Lovell, Atlas, Viking, Citation, Krymsk 86, Krymsk 1, and HBOK50). To date, extensive gumming has not been documented in the Butte County or Wolfskill plots.

## Trunk Size and 2017 Yield

The 2017 season was the first commercial harvest for the trials. Fruit were not thinned at either site to demonstrate the fruiting capacity of the different rootstocks. In general, we have observed that a larger trunk, referred to as trunk cross sectional area (TCSA, in $cm^2$), is correlated with more fruit per tree, and higher dry yield (pounds per tree), higher dry away ratio (dry weight: fresh weight), and smaller fruit size. The relationship between increasing TCSA and these yield results has been very direct at the Butte County site (see table 2), and although there is a relationship at the Yuba County site it has not been as strong (see table 3). Across

rootstocks, TCSA and yield were much higher in 2017 at the Butte plot compared to the Yuba plot, while dry away ratios were lower and fruit were larger at the Yuba site (data not shown). This tree size and yield disparity may be due in part to soil/water differences between the sites, particularly the saturated soil conditions at the Yuba site during the 2017 bloom. Despite these differences between sites, the relative performance of many of the rootstocks was the same. Among the smaller (TCSA and tree canopy) and lower yielding trees at both sites were Krymsk 1 and Marianna 58. Among the largest and highest yielding trees at both sites were Viking, Atlas and Myrobalan 29C. In the prune orchard of the future, a critical question in choosing the right rootstock will be whether your objective is to plant larger, more vigorous trees or to plant smaller trees at a much higher density.

## Cautionary Note

When evaluating rootstock trial results, it is important to consider the collective information from all sites to inform your new orchard planning. A singular focus on yield from a particular rootstock trial can miss important tree health information. For example, Marianna 30 and Myrobalan 29C were top tier producers in the Butte County trial in 2017, but sensitive to canker at the Yuba County site, with 40 and 30% tree death, respectively. Previous reporting in 2016 described the lack of documented rootstock incompatibility to-date, as well as the relative vigor, suckering and anchorage of the rootstocks (for those observations please go to: sacvalleyorchards.com/blog/prunes-blog/preliminary-observations-for-new-prune-rootstocks/).

**TABLE 1**

**Table 1. Rootstocks being evaluated in Butte and Yuba Counties**

| Rootstock | Heritage |
|---|---|
| Myrobalan seedling | Seed selection of *P. cerasifera* |
| Myrobalan 29C | Clonal selection of a vigorous Myrobalan seedling |
| Marianna 2624 | Clonal selection of a *P. cerasifera x P. munsoniana* cross. Origin: Texas |
| Marianna 30, Marianna 40 and Marianna 58 | Clonal selections from original Texas Marianna or another Marianna seedling |
| Empyrean 2 (Butte only) | Open pollinated seedling of 'Imperial Epineuse', a European prune (*P. domestica*) |
| Lovell | Peach seedling rootstocks (*P. persica*) |
| HBOK 50 | Peach clonal selection of 'Harrow Blood' x 'Okinawa' |
| Krymsk 1 | Plum x plum (*P. tomentosa x P. cerasifera*) Origin: southern Russia |
| Krymsk 86 | Plum x peach (*P. cerasifera* x *P. persica*). Origin: southern Russia |
| Atlas | Intraspecific hybrids of peach, almond, apricot and plum developed by Zaiger Genetics |
| Viking | |
| Rootpac-R (Yuba only) | Plum x almond (*P. cerasifera* x *P. dulcis*) developed by Agromillora |
| Citation | Peach x plum (*P. salicina* x *P. persica*). Used widely as rootstock for fresh market Japanese plum orchards in the San Joaquin Valley. |

## TABLE 2

| 2017 Butte Rootstock Experiment Harvest Comparisons | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Rootstock | 2016 TCSA ($cm^2$) | | Fruit Per Tree | | Dry Away Ratio | | Dry Yield (lbs./tree) | | % A Screen | |
| **Krymsk 1** | 46.01 | a | 875 | a | 3.17 | ab | 17.5 | a | 75.8 | g |
| **HBOK50** | 56.07 | ab | 1998 | bcd | 3.35 | bcd | 27.5 | ab | 41.1 | cd |
| **Marianna 58** | 56.34 | ab | 1387 | ab | 3.22 | abcd | 23.7 | ab | 68.5 | fg |
| **Empyrean 2** | 58.92 | abc | 1219 | ab | 3.31 | bcd | 20.6 | a | 66.9 | fg |
| **Citation** | 66.52 | bcd | 1793 | abc | 3.4 | de | 27.9 | ab | 56.0 | ef |
| **Krymsk 86** | 73.19 | cde | 2445 | cb | 3.31 | bcd | 36.1 | bc | 48.0 | de |
| **Myrobalan seedling** | 73.37 | cde | 2186 | bcd | 3.19 | abc | 35.9 | bc | 59.8 | ef |
| **Marianna 2624** | 75.22 | def | 2870 | def | 3.33 | bcd | 41.4 | cd | 41.2 | cd |
| **Marianna 40** | 84.69 | efg | 2644 | cde | 3.10 | a | 40.5 | cd | 39.9 | bdc |
| **Lovell** | 89.17 | fgh | 3440 | efg | 3.56 | ef | 41.4 | cd | 20.3 | a |
| **Marianna 30** | 92.45 | gh | 2925 | def | 3.38 | cde | 40.7 | cd | 33.7 | abcd |
| **Viking** | 97.39 | ghi | 3652 | fg | 3.40 | de | 49.4 | de | 29.2 | abc |
| **Atlas** | 101.38 | hi | 3963 | g | 3.61 | f | 48.9 | d | 26.2 | ab |
| **Myrobalan 29C** | 111.55 | i | 4418 | g | 3.27 | abcd | 61.6 | e | 31.4 | abc |

**Table 2.** 2017 trunk size (trunk cross sectional area in $cm^2$) and 'Improved French' prune yield characteristics for the Butte County rootstock experiment harvested 8/29/17. Values are treatment means for the five replicates. Values followed by different letters are significantly different.

## TABLE 3

| 2017 Yuba Rootstock Experiment Harvest Comparisons | | | | | | |
|---|---|---|---|---|---|---|
| Rootstock | Dec. 2016 TCSA ($cm^2$) | | Dry Yield (lbs./tree) | | Dry Away Ratio (dry wt:fresh wt) | |
| **Krymsk 1** | 39.03 | a | 5.13 | ab | 2.26 | a |
| **Marianna 58** | 39.91 | a | 4.74 | a | 2.61 | d |
| **Citation** | 46.94 | ab | 8.22 | ab | 2.43 | abcd |
| **Myrobalan seedling** | 48.37 | abc | 3.78 | a | 2.35 | ab |
| **Marianna 2624** | 47.97 | abc | 4.93 | ab | 2.37 | abc |
| **Marianna 40** | 53.77 | bcd | 6.17 | ab | 2.39 | abc |
| **Myrobalan 29C** | 58.44 | bcd | 9.16 | b | 2.30 | a |
| **Krymsk 86** | 60.23 | bcd | 9.95 | b | 2.58 | cd |
| **Lovell** | 60.62 | bcd | 8.52 | ab | 2.55 | bcd |
| **Rootpac-R** | 61.84 | cd | 8.26 | ab | 2.33 | a |
| **HBOK50** | 63.09 | cd | 10.46 | b | 2.60 | bcd |
| **Marianna 30** | 63.53 | d | 5.90 | ab | 2.43 | abcd |
| **Atlas** | 65.87 | d | 9.03 | ab | 2.43 | abcd |
| **Viking** | 66.85 | d | 9.51 | ab | 2.45 | abcd |

**Table 3.** 2017 trunk size (trunk cross sectional area in $cm^2$) and 'Improved French' prune yield characteristics for the Yuba Rootstock experiment harvested 9/1/17. Values are treatment means for the five replicates. Values followed by different letters are significantly different.

# New Hazard for Interplanted Orchards

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

Interplanting existing prune orchards where established trees don't fill their space is a long accepted practice to increase grower income while limiting costs compared to complete orchard removal and replanting. This is often done in older orchards either by interplanting down the existing tree row or changing the direction of the tree rows 45° and interplanting on the diagonal between two existing trees.

Research by Dr. Themis Michailides since 2016 has shown pruning wounds on young trees are especially vulnerable to infection by *Cytospora*, *Botryosphaeria*, and/or *Lasiodiplodia* fungi (see photo). These infections damage developing scaffolds, potentially limiting orchard productivity over time.

Growers should reconsider interplanting prunes – or at least how they treat interplanted trees -- due to the risk of pruning wound infections. The primary source of the infections in interplanted trees are the mature trees in the orchard -- often in decline themselves due to those same canker and wood rot diseases.

Pruning wound infections can be minimized by 1) pruning in late summer or spring with no rain in the forecast or 2) pruning during winter and spraying Topsin-M® or Topsin-M® + Rally® after pruning and before the next rain to protect the cuts from infection. Dr. Michailides reports that Topsin-M® is especially effective against *Botryosphaeria*. Adding Rally® could be helpful for resistance management.

With yield and net income limited by tree spacing that is too wide and/or tree health in some older blocks, growers must choose between interplanting and removal/replanting. While interplanting costs less up front, pruning wound infections can speed the rate of tree decline in interplanted orchards reducing grower returns.

## Pruning wound infections on 5th leaf interplanted prune tree.

*Full color articles and photos are available on our Website: cetehama@ucanr.edu*
*Under the Orchard crops newsletter tab.*

# PRUNE (DRIED PLUM): FUNGICIDE EFFICACY

| Fungicide | Resistance risk (FRAC#)[1] | Brown rot | | Russet scab | Rust |
|---|---|---|---|---|---|
| | | Blossom | Fruit[2] | | |
| Adament | medium (3/11) | ++++ | ++++ | ---- | +++ |
| Bumper,Tilt[2] | high (3) | ++++ | ++++ | ---- | +++ |
| Distinguish** | medium (9/11) | ++++ | ++ | ---- | ++ |
| Elite,Tebucon,Teb,Toledo[2,7] | high (3) | ++++ | ++++ | ---- | +++ |
| 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 | 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 | high (3) | +++ | +++ | ---- | +++ |
| Rovral[5]/Iprodione /Nevado | low (2) | +++ | NR | ---- | NR |
| Topsin-M,T-Methyl,Incognito [2,3] | high (1)[4] | +++ | +/- | ---- | ---- |
| Abound | high (11)[4] | ++ | + | ---- | +++ |
| Botran | medium (14) | ++ | ++ | ND | ND |
| 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.**

**** Not registered, label withdrawn or inactive 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 2% light summer oil. The oil is "light" summer oil (1-2% vol/vol). If applied in summer, fruit will loose their waxy bloom and look red. They will dry to normal color.

[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.

# MANAGING SOIL AND WATER QUALITY IN SACRAMENTO VALLEY AGRICULTURE

*Tuesday, March 6, 2018*
*Glenn County Farm Bureau Office*
*831 5th Street,*
*Orland, CA 95963*
*8:00 a.m. to 12:00 Noon*

**Description:**

Changes and expansion of irrigated agriculture in the Sacramento Valley has posed new and different challenges related to managing soil and water quality to sustain production agriculture. This workshop will explore various soil and water quality issues that may confront growers and agricultural consultants and discuss some of the management tools and strategies that are available to diagnose and manage them.

**Course content is concentrated in classroom style teaching so seating capacity is limited to 35 participants.**

**RSVP by March 2, to UCCE Tehama County office (530) 527-3101**

## Agenda:

| | |
|---|---|
| **8:00 - 8:20 a.m.** | **Meeting sign-in, coffee and refreshments.** |
| **8:20 - 8:30 a.m.** | ***WELCOME* and introduction.** *Allan Fulton, UC Farm Advisor, Tehama Co.* |
| **8:30 - 9:10 a.m.** | **Becoming more familiar with soil and water testing and the laboratory results.** *Dirk Holstege, Director UC Davis Analytical Lab, Davis CA* |
| **9:10 - 9:50 a.m.** | **Working with water quality test results to manage plugging problems in wells, filters, and irrigation systems?** *Larry Schwankl, UC Emeritus* |
| **9:50 -10:10 a.m.** | ***BREAK AND REFRESHMENTS*** |
| **10:10 - 10:50 a.m.** | **Case studies using water and soil test results to develop management strategies**. *Allan Fulton, UC Farm Advisor, Tehama County.* |
| **10:50 - 11:20 a.m.** | **Field experiences with gypsum and sulfuric acid to manage soil and water quality.** *Jim Gregory. Verdegaal Bros., Inc., Hanford, CA* |
| **11:20 -11:40 a.m.** | **Field experiences with sulfur burners as an alternative method of amending soil and water.** *Jim Pingrey, Colusa County Farm Supply.* |
| **11:40 -12:00 Noon** | **Open discussion** |
| **12:00 Noon** | ***ADJOURN*** |

*Approved 3.0 Hours Continuing Education Credits for Certified Crop Consultants*

# SACRAMENTO VALLEY REGIONAL PRUNE NEWSLETTER



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