

In this issue:

- Prune Breeding Program Update
- Preharvest/ Harvest prune orchard practices in a tough year
- New Prune Rootstock Performance

Prune Breeding Program Update

Sarah Castro, UC Davis Plant Sciences Department

The UC Davis Prune breeding program has been actively breeding new cultivars for the dried plum industry for over 30 years. The goal of this program is to breed cultivars with enhanced characteristics that will in turn save the average prune grower money. The traits that the breeding program is actively breeding for are: a dense, low dry away ratio prune ranging from 1.7-2.5; a less vigorous tree requiring less pruning; and a self-pollinating tree with more consistent fruit set. These mentioned traits are in addition to the other traits we have already accomplished such as better flavor, spread of harvest dates, spread of bloom dates and early bearing.

Prune genetics are interesting because of the great diversity within the prune genome. The program has many different shapes, sizes and colors of prunes. Recently, the lowest dry away ratio item is 'F11S-38'. Its dry away ratio has been as low as 1.5, but is typically closer to 1.7-2.0, and a brix sugar reading of 35-40. The dried fruit is relatively small (50 to 60 ct/pound) and is round and yellow when fresh. It partially dries on the tree which is the trait that contributes to the low dry away and high sugar. When ready for harvest, the fruit has usually already lost 1/3 of its water. It harvests in mid to late July, which could pose a problem for processor and drier timing.

The program's current top item is 'G16N-19.' It is a large, sweet, purple fruit that typically has a dry away ratio of 2.8-3. It has had good in-house fruit testing scores for the past 4 years, and typically harvests 4 days to a week after Improved French. In 2015, it was hand-picked and evaluated by DFA and had 89% A screen sized fruit. In 2014, it was preliminarily evaluated by Sunsweet for its viability for commercial processing. While no official decision has been made, it had a positive evaluation, showing a good ability for pitting and a stronger, less breakable pit than Improved French. If the 2016 harvest is positive, we will encourage the



G16N-19 : Picture of a 3rd leaf, top grafted tree on 29c rootstock

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This will give California growers the ability to capitalize on their new cultivar before any international growers can have access to it. This will also give California the ability to continue its reputation for producing the finest quality prunes in the world.

We encourage any interested parties to attend our grower meeting where we visit the breeding orchard at the Wolfskill Experimental Orchards in Winters, CA on July 29th at 9:30 – 12:00 a.m. If you would like to be more involved with the breeding program, or if you would like to plant experimental trees in your orchard, please email the manager Sarah Castro at scaastro@ucdavis.edu and you will be placed on the UCD breeding program's email list.

Calendar of area Cooperative Extension meetings & events

We've built this site for you, the growers, PCAs, managers and allied industries. Please let us know what you think so we can continue to improve it.

Visit us at <http://www.sacvalleyorchards.com/> to check it out!

Preharvest/Harvest prune orchard practices in a tough year

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

The 2016 prune crop in California is forecast to be 45,000 dried tons, or about 1000 lbs dried fruit/acre based on current acreage data provided by growers. See the whole forecast at: https://www.nass.usda.gov/Statistics_by_State/California/Publications/Fruits_and_Nuts/201606prunf.pdf.

A light crop challenges growers and the industry as a whole. Growers lose income and the industry struggles to maintain market share in an already competitive world market. Growers must manage for a successful future using the limited income of today. The crop for next year is beginning to develop this year, so deficiencies this year can limit the crop next year. Cutting back instead of eliminating inputs/investment is the best approach in a year like this, keeping in mind that next year might be tough, too, if there is a big crop that has to be farmed with the light returns from this year. The following are some practices to consider in every year, modified in light of the challenges of a light crop.

- ◆ **Harvest prep:** If you have a light crop, consult with your insurance company about whether to harvest. Some companies deduct the value of the fruit in the orchard from your payout.

Prunes should be ready about 30 days after first color. Look for color change on good, sound fruit (not “blue prunes”) and clean up your refractometer and pressure gauge once color shows in those fruit. As it looks now, harvest should begin about the same time as last year – early to mid-August for shaker startup – with most of the acres finished by the end of August. In a light crop year with costs high, why pick early and leave fruit on the tree? Schedule harvest by tracking fruit maturity with fruit pressure gauge. Fruit pressure, not sugar or fruit color, is the most accurate measure of maturity. Fruit is ready to harvest when pressure drops to between 3-4 lbs. In a light crop year when dryer space shouldn't be too tight, waiting until closer to 3 lbs to start harvest might help reduce costs. Harvesting fruit at proper maturity helps maintain California's reputation as the world leader in high quality prune production.

- ◆ **Run a field sizer on a short crop?** In a normal year, running a small sizer (for example, 15/16-inch) to remove garbage and damaged fruit can help keep the delivered fruit clean. In a short crop year, check with your packer to see about their payment plan and if leaving off the sizer and delivering all fruit makes economic sense.

- ◆ **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 = 3-3.5 pounds fruit pressure this year) and then use predicted harvest date to decide irrigation water preharvest timing. Grower experience should determine when irrigation water is cut off in a specific orchard. Orchard health, soil

type, and cropload all influence the cutoff date for irrigation. In a 3 year study by UC showed that healthy, mature prunes were not harmed – tree health or crop yield – when irrigation shut off was 5 weeks before harvest. In the same study, water shut off 22 or 30 days ahead of harvest significantly reduced dry away, from 3.1 to 2.9 compared to water shut off at 12 days before harvest. (See report at: <http://ucanr.edu/repositoryfiles/ca4804p13-70125.pdf>) Wet (irrigated) orchards show the most premature fruit drop when night-time temperatures drop to around 50°F.

- ◆ **Preharvest brown rot sprays** can reduce [fruit brown rot](#) in orchards where brown rot has been or might be a problem. However, brown rot is more of an issue in clustered fruit and there isn't much clustered fruit in many of the orchards I've seen. Talk with your PCA about the pros and cons of a preharvest fruit brown rot spray. Weigh the added cost of a fruit brown rot spray against the risk of fruit damage in a light crop year. For UC info on fungicide efficacy and timing see: <http://ipm.ucanr.edu/PDF/PMG/fungicideefficacytiming.pdf>. In a light crop year, the cost of a brown rot spray might be better used on something else, such as preharvest clean up or nutrient sampling.
- ◆ **Watch pests and tree water status.** Monitor blocks for [spider mites](#), [rust](#), and water status approaching harvest. 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. Leaf loss from mites, rust, and/or water stress slows harvest as blowers work to keep extra leaves out of the bins and also exposes scaffold branches to sunburn in the postharvest heat of August and early September.
- ◆ **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. If woody suckers at the trunk base are not removed ahead of harvest, the suckers can damage the tree bark when the shaker clamp grabs the tree. Cutting out damaged branches will protect employees and shaker tarps from flying wood at harvest and also help renew the orchard.

Cutting out dead and diseased wood is really important for older blocks with a lot of dieback due to [Cytospora canker](#). There is no fungicide to get rid of *Cytospora*. Dead and/or diseased wood must be cut out and removed from the orchard to improve orchard health. The cankered wood is much easier to see before rather than after harvest. UCCE Yuba City office has laminated shirt-pocket cards with pictures of “good” and “bad” saw cuts to help avoid the problem of not cutting far enough down the branch to remove all the canker.

If cutting and hauling dead branches is too much to consider before harvest, think about sending a trusted employee (or the owner) through a block and mark cutting points with paint. When the pruning crew comes through in the fall, they can make the right cut quickly.

- ◆ **Take leaf samples in July.** Even if your bank account/cash flow is suffering, you still need to know what the “nutrient account” looks like in the orchard. The cost of leaf analysis is a few dollars an acre and the results can help you go into the new year with adequate nutrition. Key nutrients to check are nitrogen (N), potassium (K), and zinc (Zn). Add chloride to the analysis request if you use muriate of potash (MOP, potassium chloride) as a potassium fertilizer. If you have switched from surface to ground water irrigation source, definitely consider chloride, sodium and boron in the lab analysis request.

Make sure the sampler is trained on what leaves to sample. Expensive decisions are made based on leaf analysis results, even if the practice itself is not costly. Sampled leaves (1-2/tree) should come from healthy, non-bearing spurs from representative trees across the block for a total of 50-75 leaves/sample. Avoid weak trees. Call your farm advisor for UCCE recommendations for interpreting prune leaf analysis results.

Given the expected cutbacks in a fertilizer program in a light crop year, July leaf sample analysis results are especially important to allow time to make fall applications of N, K, or Zn to be ready for new crop in 2017.

New Prune Rootstock Performance

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Roots are the unsung heroes of orchard plantings. They operate out of sight and are relatively difficult to examine and characterize. So what do roots do?

Roots:

- Anchor trees to the soil
- Take up water and essential mineral elements for use by the entire tree
- Store carbohydrates and synthesize materials

Rootstocks:

- Influence scion vigor, growth and performance
- Have varying tolerance to different soil types and conditions
- Have varying resistance to soil borne diseases/nematodes

Must be graft compatible with the scion variety

The root system is a branching system of main roots, lateral roots, feeder roots, and root hairs. The root hairs are the primary up-take structures. Healthy roots require aeration which is why over irrigation is detrimental to root performance. Low oxygen and high carbon dioxide reduce or stop root growth. Low soil moisture and temperature will also stop root growth.

The California prune industry has primarily utilized five rootstocks: Myrobalan Seedling, Myrobalan 29C, Marianna 2624, Lovell Peach and Marianna 40. The characteristics of these rootstocks are listed in the rootstock chapter of the Prune Production Manual (ANR #3507). Many more potential rootstocks for prune are being investigated. Three prune rootstock experiments evaluating 29 rootstocks are planted in Northern California. One experiment was planted at the UC Davis Wolfskill Experimental Orchards on 1/19/2011 (Yolo loam), a second experiment was planted in Yuba County on 6/3/2011 (Kilaga clay loam over hardpan) and a third experiment in Butte County was planted on 4/28/2011 (Farwell clay adobe alternated with Nord loam). All trees were nursery grafted to the 'Improved French' variety. Fowler Nursery donated most of the trees, with Viking and Atlas rootstock donations from Dave Wilson Nursery and HBOK 50 from Duarte Nursery. The first commercial harvest took place in 2015.

Figures 1-2 summarize the anchorage and suckering for the Butte Co. and Yuba Co. plots. Results from the Wolfskill site have not been given because it is a non-replicated 'first look' trial with many unusual rootstocks. Results on yield and size are not presented here because interpretation is complicated by different rootstocks having different numbers of replants at different sites. As trees fill in, yield and size will be reported in the future. The complete report can be found at the UC Davis Fruit and Nut Research and Information Center website (<http://ucanr.edu/repositoryfiles/2015-37-160083.pdf>).

Although all of these results are preliminary, we will be closely watching to see if trends begin to develop. One possible trend to watch for is the similarity of anchorage and suckering rankings between the Butte and Yuba rootstock sites. Krymsk 86 and Viking had amongst the best anchorage and suckering scores (least deflection and lowest suckering, respectively) at both sites. Krymsk 1 and M58 which were amongst the highest yielding at both sites (data not shown) also had the worst anchorage. In the Butte plot, summer observations confirm poor growth and performance for Krymsk 1 and HBOK 50 suggesting they will not be candidates for commercial adoption. We will continue to report on these trials as the trees mature.

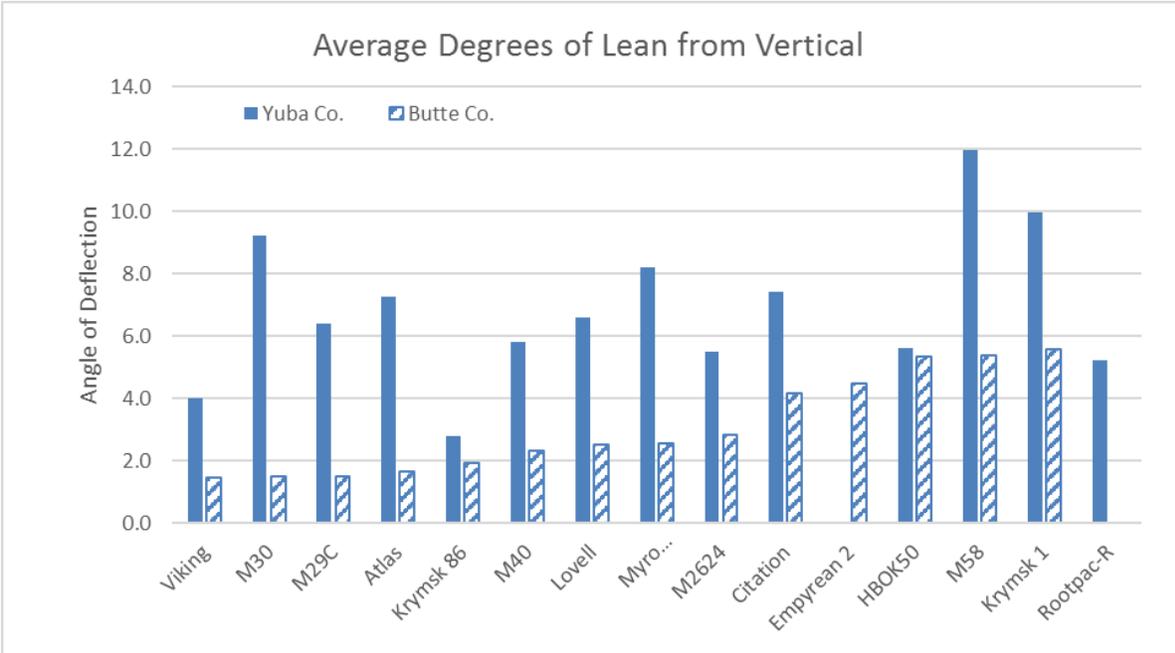


Figure 1. Leaning measurements for the Butte and Yuba County rootstock experiments. Measurements recorded degrees of deflection from vertical when pushing on the tree trunk. Higher numbers mean greater lean or poorer anchorage. Yuba County was measured shortly after irrigation and may be higher as a result.

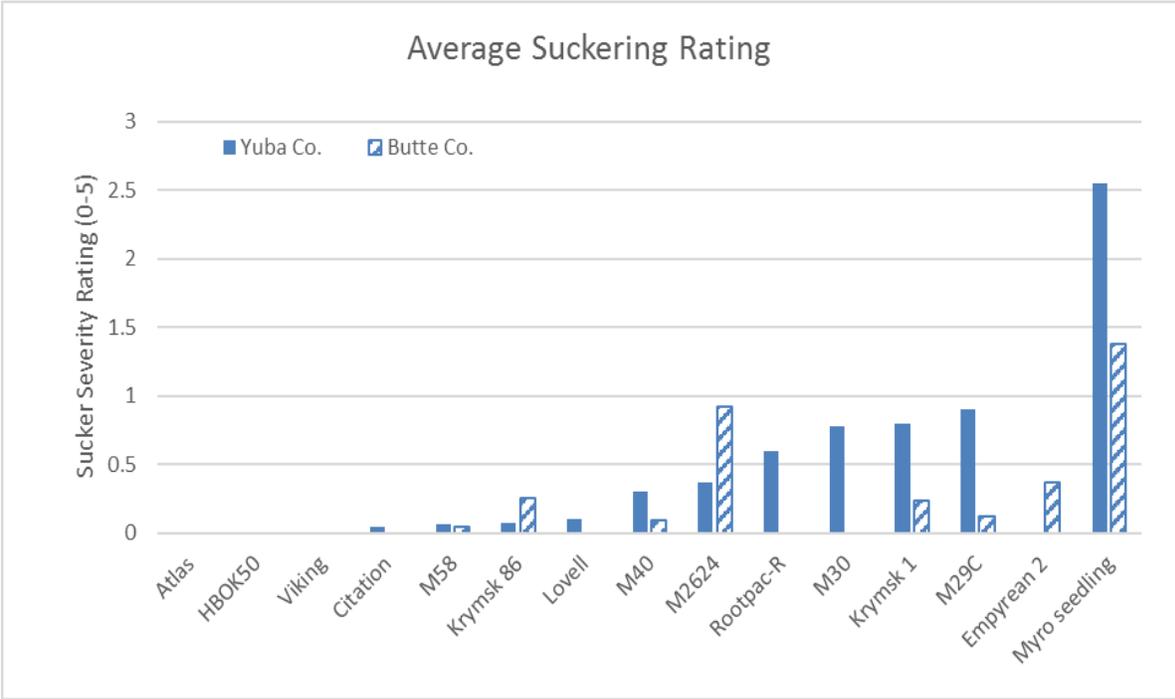


Figure 2. Comparison of average sucker rating per rootstock for the Butte and Yuba County experiments. Suckers were rated 0 to 5, with 5 as most severe.

New Website Resource for Sac Valley Tree Crop Production

The UC Cooperative Extension orchard crop advisors in the Sacramento Valley are excited to announce the launch of our new website – the Sacramento Valley Orchard Source! This site will bring together the wealth of information we provide in one location, including:

Timely newsletter articles through our Blog (we'll continue to send email and hard copies of the whole newsletter for those who prefer it that way).

Weekly Soil Moisture Loss (ET) Reports for the Northern and Southern Sacramento Valley

Pest Catch Reports based on weekly scouting in the Northern Sacramento Valley

Crop-specific production and management information for almonds, prunes and walnuts

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