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ORCHARD FACTS

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Sacramento Valley Dried Plum Newsletter

Prune Crop Control

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Fruit size and quality are the major factors affecting crop value in French Prune production. The prune farmer's goal is to produce high yields of high sugar fruit while targeting specific fruit sizes to maximize crop value. Crop load, or more specifically, the number of fruit per tree primarily influences fruit size, sugar accumulation and drying ratio. Excessive crop loads usually result in high yields of lower value prunes resulting in decreased monetary return to the farmer. Conversely, if crop loads are too light, fruit size and sugar accumulation are favored, but yields are too low to achieve high crop value. Prune crop control provides many benefits in prune production. Crop load is usually adjusted to:

- Improve fruit size and sugar accumulation.
- Manage or eliminate limb breakage.
- Decrease alternate bearing.
- Balance potassium nutrition.
- Decrease tree stress and improve orchard health.

Many techniques are available or have been tried to manage crop load for prune production. Hand thinning is one possibility, but costs outweigh the potential economic return. Dormant pruning is the first step to reducing crop load, but may have to be supplemented with mechanical fruit thinning to achieve desired number of fruit per tree. Chemical thinning in California has not been widely used mostly because of the risk of thinning in a light crop set year or the possibility of over-thinning. Chemical thinning has shown promise, but more research is necessary to substantiate the technique. Mechanical thinning is currently the best option.

Sizing prunes is largely a numbers game. There are various ways to remove excessive numbers of fruit (pole, shake individual limbs, etc.). The most typical technique is to mechanically shake whole trees with harvest equipment for specific time durations to remove specific numbers of fruit. Mechanical thinning has a long history of success if properly done. Concerns include potentially barking trees, fruit damage if the crop is sold fresh pick, differential removal of large high value prunes and possible brown rot exposure from shaken fruit on the orchard floor. In general, the earlier fruit are removed, the greater the size benefit.

Success with mechanical thinning relies upon five steps:

- The target number of prunes desired per tree at harvest.
- Determine the number of prunes per tree prior to thinning.
- Determine how many prunes need removal to achieve target size.
- Estimate prune drop due to natural causes.
- Timed shake to remove excess prunes.

Mechanical shaker thinning is the most reliable technique currently available for controlling crop load after bloom. Success depends on carefully developing shaking times and applying them uniformly throughout the orchard. Plan on investing a day to shake trees, calculate fruit loads and develop a good sense of what crop loads are and numbers to remove to achieve target size and tonnage. Remember, mechanical thinning can damage fruit. Minor skin damage has not been a problem for dried prunes, but could be for fresh market prunes. For that reason, mechanical thinning is not recommended for fresh market prunes. Growers have been concerned that larger fruit on the upper outside of the canopy may be preferentially removed compared to smaller fruit on the lower inside part of the canopy. While that might appear to be a problem, numerous tests have confirmed the benefits of mechanical thinning compared to unthinned trees.

Step by step instructions for mechanical thinning are available from your Extension Office.

Early to Mid Season Irrigation Considerations Related to Fruit Quality

Bill Krueger, UC Farm Advisor, Glenn County

With a dry winter and early warm weather, irrigation season got an early start this year. It will be important to pay close attention to tree water needs, especially early to mid season to see that fruit quality is maximized and fruit quality problems related to water stress are avoided or minimized.

To maximize fruit size, it is critical that trees be well supplied with water during the early growing season and into July. To ensure that trees are adequately supplied, it is important to know how much water they will use. Evapotranspiration (ET), a measure of tree water use, is a combination of evaporation and transpiration. It will typically be 0.25 inches per day and can be as high as 0.33 inches per day during peak water usage. ET values can be found in local newspapers, on the California Irrigation Management System web site at:
http://www.cimis.water.ca.gov
or the Tehama County web site at http://cetehama.ucdavis.edu/Agriculture/Real-Time_Crop_ET.htm. Moisture monitoring for irrigation management can be soil based, weather based or plant based. For more information on moisture monitoring and irrigation scheduling, contact your local Farm Advisor or UC cooperative Extension Office.

End cracking of prunes is caused by moisture stress followed by irrigation and normally occurs from spring to mid summer (especially May and June). To avoid end cracks, make sure that trees do not become water stressed during this time period. From mid July on little end cracking will occur even if stressed trees are irrigated. Additionally, prune trees infested with mealy plum aphid will be more prone to end cracking than fruit from uninfested trees.

Side cracking results from internal water pressure building in the fruit during the night in combination with high humidity and dew such that internal water pressure exceeds the elasticity the skin.. Side cracking is generally greater on larger fruit since they often have greater diurnal changes in internal fruit pressure or their skins are less elastic since fruit are more exposed. Side cracking begins about a week after the cheek diameter exceeds the suture diameter and continues for about three weeks. This is usually in early through mid July. Cool weather during this time will greatly increase the number of side cracks. Some growers try to minimize side cracking by avoiding irrigation around the 4th of July.

Blue Prune Drop/Leaf Scorch (heat damage) is occasionally seen in Central Valley prune orchards and was a significant problem in some orchards last year. It often occurs when cool spring weather is followed by a rapid onset of high temperatures. The sunny side of exposed prunes develops premature color, may be sunken or flattened, and fruit can drop prematurely. Leaf scorch may develop in leaves near damaged fruit. As the damaged leaves dry they often have darkened veins. Anything that reduces heat in the orchard will potentially reduce damage. Make sure that trees are adequately irrigated prior to onset of heat to insure maximum evaporative cooling.

World Prune Outlook

Franz Niederholzer, UCCE Farm Advisor, Sutter/Yuba Counties

The season after a good prune crop and good prices for medium to large fruit, what does the long term situation look like for prunes? For most California prune growers, those without a specialty or other niche market, this means looking at the projections for world prune production and consumption, since prunes are a commodity in a global market and prunes from Chile and Australia and France and California compete for the same buyers around the world. (Prune sales within the US have been flat or declining for the past decade and export sales had been steady until the light crops of 2004 and 2005.)

At the World Congress of the International Prune Association (IPA) in Italy in June, 2006, information on projected world production figures were presented. Rich Peterson, Executive Director of the California Dried Plum Board, was at the meeting and gave me the numbers that appear in Table 1.

While there are questions about quality differences between different lots of prunes in the world market, prune growers should be aware of these data in Table 1 as they plan for the future. All the presentations and some discussions from the June, 2006 IPA meeting are presented on the internet at: http://www.ipaprunes.org and clicking on "World Congress" on the left side of the page. (The 2007 World Congress of the IPA will be held in Santiago, Chile from November 4-11.)

Prune prices and production were good in 2006, but growers should consider world market conditions/predications when making long term decisions.

Table 1. Predicted prune production in short (US) tons for prune producing countries for 2006 and 2011 and percent change between those years.

Producing Country	2006	2011	Percent change
Argentina	27,560	55,100	**+100%**
Australia	4,300	8,800	+105%
US (California)	180,000	170,000	- 6%
Chile	46,850	93,700	**+100%**
France	56,000	49,600	- 11%
Italy	1,600	1,800	+ 12%
South Africa	1,900	2,800	+ 47%
Total IPA Production	318,210	381,800	+ 20%

Spray Drift Management

Franz Niederholzer, UC Farm Advisor, Sutter/Yuba Counties

Sprayer Best Management Practices:

1) Know the label requirements of the material(s) planned for use.
2) Practice IPM. Monitor pests so spraying -- when needed -- is done when drift or runoff risk is low. Avoid spraying when winds are above 10 mph (too windy) or below 3 mph (higher inversion risk) or just before a significant rain event or irrigation (higher risk of runoff).
3) Know your neighbors: Identify sensitive areas such as roads, homes, adjacent crop fields, open water, etc. that could be harmed by drift. Avoid spraying at certain times or change spray practices to protect sensitive areas. These practices might include spraying near a road very early in the morning with the help of a spotter, spraying into the outside one or two rows of an orchard that is adjacent to a sensitive area, spraying next to a sensitive area when the wind is blowing away from that location, or using a low pressure hand gun application adjacent to the sensitive area.
4) Target the Tree. Equipment should be set up for the most efficient application possible. This includes using sensor-guided orchard and weed sprayers (Smart Sprayers, etc.), placing properly sized nozzles in the correct positions on the spray boom, and adjusting air flow to match the air delivery to the target.

5) Avoid spraying when temperatures are high and humidity is low. Low humidity and high temperatures result in rapid water evaporation and increasingly smaller droplet sizes as the spray moves away from the sprayer. Drift risk increases with decreasing humidity and rising temperatures.

6) Turn off sprayer when exiting ANY spray row. If the applicator shuts off the sprayer outside the tree row regardless of the location on the farm, the practice will more likely be followed when it is most necessary. "If you always do it, you'll always do it".

7) Lower spray pressure -- within the nozzle manufacturer's recommended pressure range -- can reduce the number of small droplets produced by conventional nozzles without reducing efficacy. High spray pressures increase the risk of equipment failure (hoses, seals, etc.). Follow sprayer manufacturer's recommendations for sprayer pressure.

8) Pesticide selection can be a key part of drift management. Certain pesticides are more prone to drift via volatilization –that is, they move as a gas -- such as 2,4-D. Using a lower toxicity pesticide -- even if it costs more -- when spraying close to sensitive areas will help reduce harm from any potential drift.

Use a pesticide registered for the crop in the next field whenever possible, so if drift occurs there is not an illegal residue on that crop.

Drift control adjuvants can increase droplet size and may help reduce spray drift. There are many different drift control adjuvants in the market.

9) Reduce the distance from the nozzle to the target: The shorter the distance the droplet has to travel, the less chance for loss from wind, evaporation, etc. Lower the spray boom on herbicide sprayers or use a tower on orchard air blast sprayers to get the nozzle(s) closer to the target.

10) Protective Shields on herbicide sprayers help reduce movement of fine droplets off target.

11) Use largest spray droplets whenever possible. Droplet size is the single most manageable factor that affects spray drift (Table 1), but specific information on how to use droplet size to manage drift in orchards is limited. Select nozzles that deliver the largest droplets possible without compromising spray efficacy. Larger droplets may not provide the same degree of spray coverage quality as smaller droplets, so a compromise between coverage and droplet size may have to be made. Systemic pesticides (glyphosate, etc.) often work well when applied using large droplets, but pesticides requiring full coverage may require smaller droplet sizes to deliver effective control.

Attitude and Training:

Growers, applicators, managers, and Pest Control Advisors must work together to ensure that spray drift is managed so that there is a reasonable certainty of no off-site drift.

Spray equipment should be properly set up, calibrated and maintained to maximize efficient targeting of the crop.

Establish a spray safely program that ensures that Best Management Practices (BMPs) for sprayer operations are followed before and during a spray application. Keep careful records of your drift control program.

Table 1. Influence of droplet size on potential distance of drift.

Droplet Diameter(microns)	Type of Droplet	Time required to fall 10 ft	Lateral distance droplets travel in falling 10 ft in a 3 mph wind
5	Fog	66 minutes	3 miles
20	Very fine spray	4.2 minutes	1100 feet
100	Fine spray	10 seconds	44 feet
240	Medium spray	6 seconds	28 feet
400	Coarse spray	2 seconds	8.5 feet
1000	Fine rain	1 second	4.7 feet

Source: http://www.weeds.iastate.edu/mgmt/2002/windy.htm

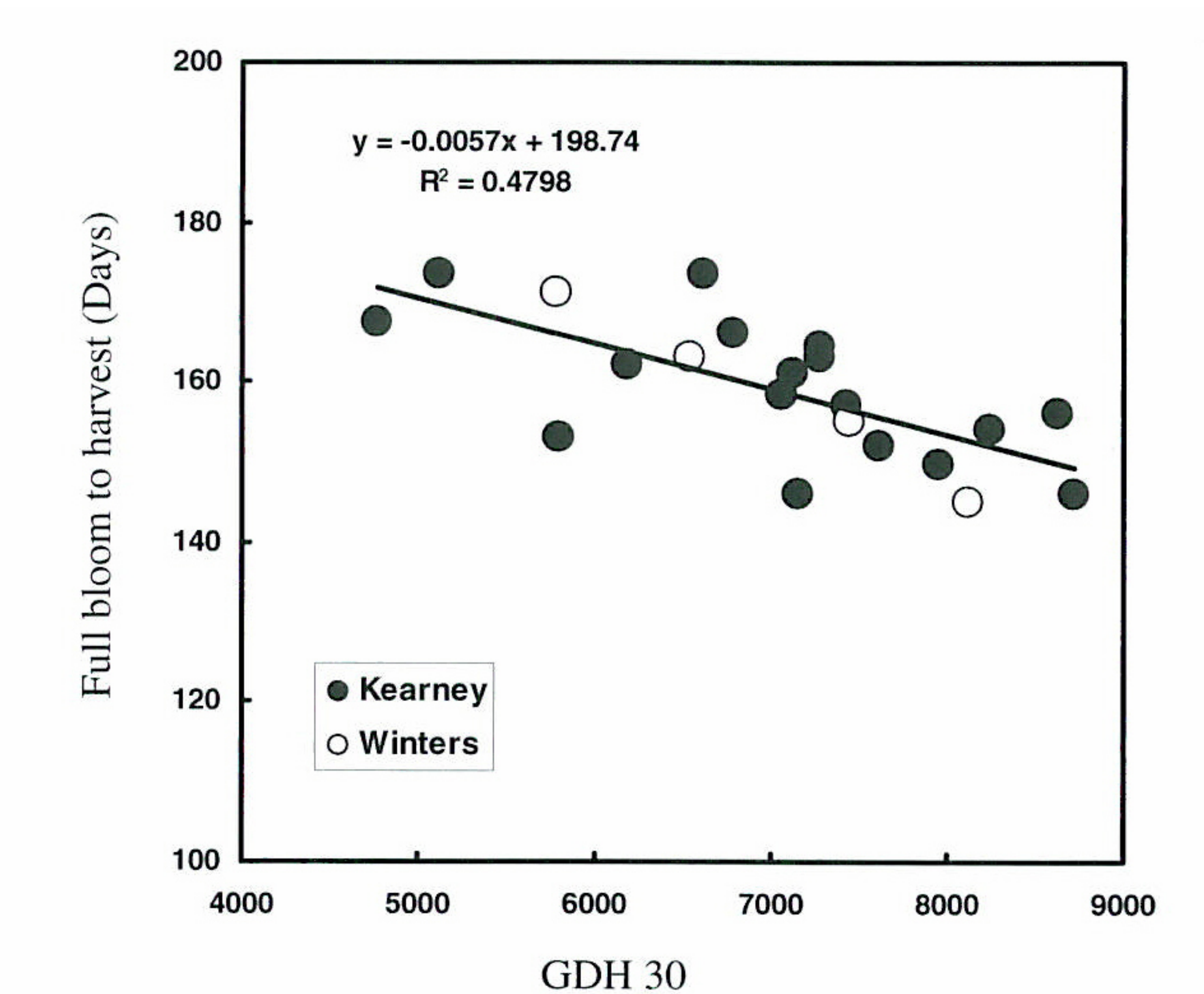
Professional stewardship of agricultural chemicals and the equipment used to apply them is essential to the future of cost effective orchard management.

Using Spring Weather Data to Predict Harvest Date for "Improved French" Prune

Ted DeJong, Carolyn DeBuse and Gerardo Lopez, Department of Plant Sciences, UC Davis

It has been established in peaches, Japanese plums, and nectarines that the accumulated temperatures (GDH or growing degree hours) during the first 30 days after full bloom are highly correlated with the number of days between full bloom and the harvest maturity date for specific cultivars (Ben Mimoun and DeJong, 1999). This means that the date of fruit maturity can be predicted by knowing the bloom date and the GDH accumulation 30 days after full bloom. To see if a similar relationship exists in dried plums/prune, the harvest dates of Improved French prune collected at UC's Wolfskill Orchard (Winters, Yolo County) and Kearney Research and Extension Center (Parlier, Fresno County) over the last eight years were correlated to the associated accumulated GDH 30 days after full bloom for each year. A relationship was found in French prune that is similar to what has been found in the other *Prunus* crops (Figure 1).

This relationship signifies that the spring temperatures in the first 30 days after full bloom govern fruit developmental rates and are a major factor in determining the harvest date in any given year. This relationship can be used as a tool, early in the season, for growers to estimate the approximate harvest date for Improved French prune. This can be easily accomplished, 30 days after bloom, by going to the UC Fruit & Nut Research and Information Center web site (http://fruitsandnuts.ucdavis.edu). Once there, select 'Weather Services,' then 'Harvest Prediction Model.' Select the location of your nearest California Irrigation Management Information System (CIMIS) weather station (click directly on the closes weather station location, not the county) and enter the date of full bloom. The data that will be shown are the accumulated GDH during the first 30 days after bloom. Using this number, you can estimate from Figure 1 how many days there will be from full bloom to harvest for this year.



of days from full bloom to harvest for the cultivar 'Improved French' at Kearney and Winters.

In 2006, the predicted Improved French harvest date using this method was September 10th at in Winters, CA, approximating 157 days from full bloom to harvest. For Kearney we predicted the harvest date of French would be about September 4th approximating 160 days from full bloom to harvest. This estimate was within 5 days of the actual harvest at both locations. Actual harvest for Wolfskill was September 5th and for Kearney August 30th. One additional note: data on peach harvests (Lopez, Johnson and DeJong, *California Agriculture* 2007 http://CaliforniaAgriculture.ucop.edu) indicate that fruit size is more difficult to obtain when the GDH 30 is above 6000 whereas fruit sizes are generally better when Springs are cool and GDH 30 is less than 6000. We believe that similar relationships probably hold for prunes so if spring temperatures 30 days after full bloom are warm, take special care to monitor your crop loads and thin accordingly.

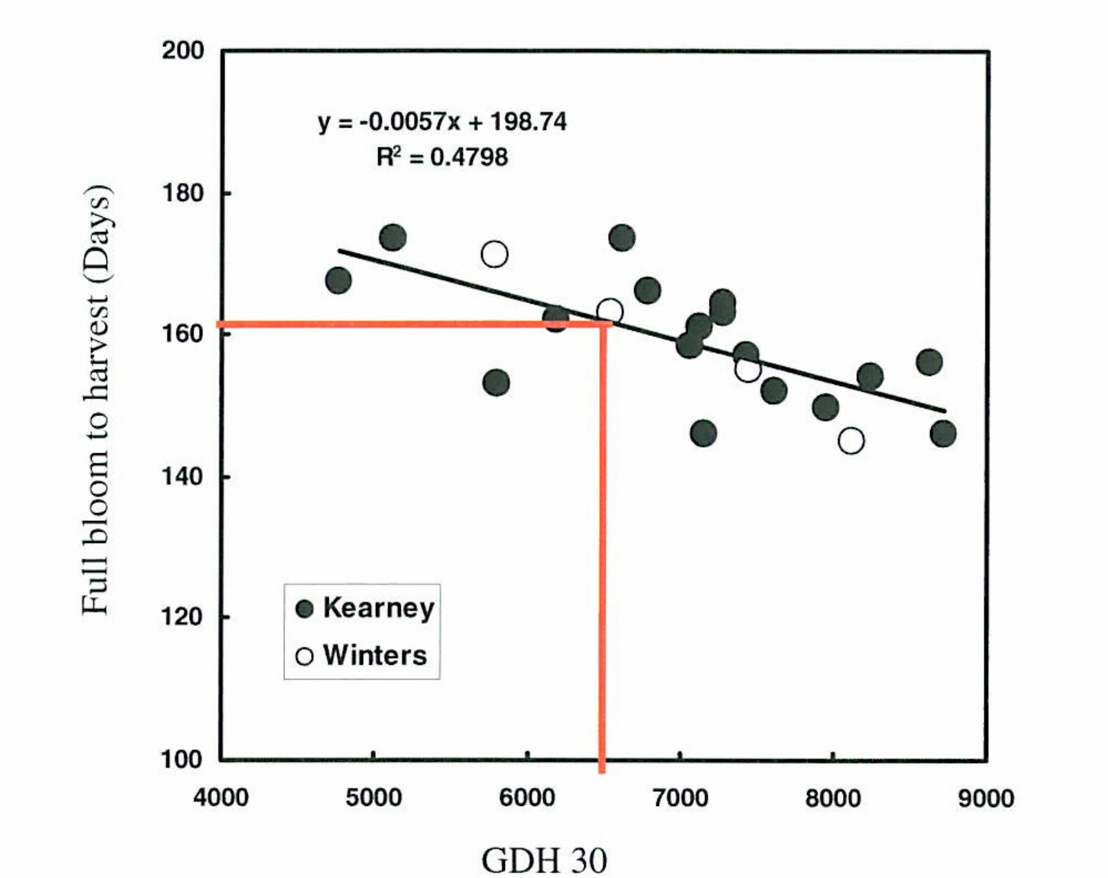


Figure 2. If the GDH 30 (growing degree hours from full bloom to 30 days after full bloom) for your orchard location this year is 6500 then you can use the figure above to estimate that your fruit maturity date will be about 162 days (+/- 5days) after full bloom.

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