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ORCHARD FACTS

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Sacramento Valley Prune Newsletter

Prune Crop Load Assessment

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Fruit size, quality and yield are the major factors affecting crop value. The goal is to produce high yields of high sugar fruit while targeting specific fruit sizes to maximize crop value. Crop load or the number of fruit per tree influences fruit size, sugar accumulation and drying ratio. Excessive crop loads usually result in high yields of low value prunes resulting in less 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. Crop load is usually adjusted to:

- Improve fruit size and sugar accumulation.
- Manage or eliminate limb breakage.
- Decrease the tendency for alternate bearing.
- Reduced potential for potassium limb dieback
- Decrease tree stress and improve tree health and vigor.

Mechanical fruit removal using harvest shakers with modified weights is the most common method to decrease crop load in California prune production. The most important first step is to evaluate the initial number of fruit per tree. The process may seem complex at first glance but is fairly simple if taken one step at a time. The following steps will guide you through the technique and the data sheet will help to organize information.

1) Select a "typical" tree or trees that accurately represent the crop load in the orchard. Multiple trees are used to improve accuracy. Selecting three representative trees per orchard is a good compromise of time and accuracy.

2) Place tarps under selected trees and using a mechanical shaker, shake off as much crop as possible. Early shaking for fruit counts seldom removes 100% of the crop. Any prunes remaining on the tree can be stripped by hand. If hand stripping is not practical, estimate the number of prunes remaining on the tree and add them back to the weighed count.

3) Collect shaken prunes and remove leaves, twigs, yellow or shriveled fruit. Remove anything that would not contribute to an accurate fruit weight. After cleaning, weigh the entire fruit green sample. If the tarp is part of the weight, be sure to subtract its weight from the sample.

4) Select three approximately 1-pound fruit samples from the weighed whole tree sample. Count the number of fruit and determine the green fruit per pound. The count/weight relationship is used to calculate total number of prunes from the total weight shaken from the test tree.

5) Multiply the total fruit weight times the count per pound to calculate the number of prunes per tree.

Tree fresh crop weight (lbs.) x number of prunes per pound

= Number of shaken prunes per tree

Finally, if all the prunes were not stripped from the tree, visually estimate how many prunes remain and add those prunes to the shaken count. The following data sheet will help organize test tree shake information and calculate how many prunes are on test trees.

Step 1	Total pounds of fruit per tree from the test shake.	_____
Step 2	Counted number of fruit per pound.	_____
Step 3	To calculate the number of prunes in the test shake, multiply values for step one and two.	_____
Step 4	Estimate the number of prunes remaining on the tree.	_____
Step 5	To calculate the total number of prunes on the test tree, add steps three and four.	_____

Estimating initial crop load is the first step toward fruit thinning decisions. Having actual numbers rather than just a visual estimate may be quite surprising and will help with the decision of how to manage the crop. The complete process also involves fruit sizing potential or the target number of prunes per tree, potential for natural fruit drop and timed tree shakes to remove enough fruit. The complete procedure can be found at http://cetehama.ucdavis.edu. Click on orchard crops, click on prunes and click on prune thinning instructions.

Eriophyid Mites Can Damage the Growth of Young Prune Trees

Carolyn DeBuse, UC Farm Advisor, Solano and Yolo Counties

Eriophyid mites are a group of very small plant feeding mites. The two most common eriophyid mites found in prune orchards are the Plum rust mite (Aculus fockeui) and the Big-beaked plum mite (Diptacus gigantorhynchus). They are so small that you need a 15x hand lens to see them. Their feeding habits often create a leaf curling effect with drying at the edges and a bronzing of the leaf. Studies in prunes have shown that even high populations on mature trees do not decrease yields or fruit quality and natural predators usually keep the numbers of eriophyid mites under control.

So why talk about them? Under certain circumstances the damage can affect the growth habit of the tips of branches and reduce the growth of scaffolds and limbs on young trees. The goal for the first 1-3 years of an orchard's life is to grow the largest trees you can. All management is aimed at promoting growth so when you have a mite that restricts growth it becomes a problem. The eriophyid mite attacks the growing shoot tip, damages emerging leaves, and increases bud breakage at the growing tip creating a 'witch's broom effect' much like a peach

twig borer strike but worse because it continues to feed on the newly emerging leaves. The mite feeding slows productive shoot growth on affected limbs for this season and will need to be pruned off during the next dormant season.

Symptoms: Tips of young tree limbs have a yellowish reddish hue. The tip growth is slowed and newly emerging leaves from the terminal bud are deformed and yellowish. Multiple buds just below the terminal bud begin to grow creating a sickly looking witch's broom.

Identifying the mite: Peel back the emerging leaves on the damaged terminal bud and look for small tear shaped mites with a yellow, pinkish or purplish color using a hand lens of 15x strength or greater. The mites are translucent with only four legs.

Control: Treating early in the season provides more effective control for reducing damage. These mites decline naturally during the hot summer so make sure they are still active when you spray. Control the mite with an application of one of the following; wettable sulfur, sulfur dust or fenbutatin oxide (Vendex®, etc.). Not all miticides will control eriophyid mites. Check with the label or with your PCA to make sure the material you use is labeled for eriophyid mites. See guidelines for treatment at http://ipm.ucdavis.edu/PMG/r606400511.html . Care should be taken with the use of any sulfur product during the summer to avoid burning. Do not use sulfur with oil or within two weeks after an oil spray.

Big-beaked plum mites

In-season Prune Aphid Control

Franz Niederholzer, UC Farm Advisor, Sutter/Yuba Counties

Aphids, leaf curl and/or mealy plum aphid, are the key insect pest in prune production in California. High populations of either of these pests can reduce tree vigor, reduce fruit size and/or increase the risk of fruit end cracking.

For optimum fruit quality and tree health, aphids should be controlled when significant populations are found in the orchard. A "significant population" = 10% or more of the tree canopy on 12 out of 40 trees in a block are infested with aphids. Check for signs of aphids on 40 trees per orchard at least every week from petal fall through July or until the orchard is properly treated. Complete information on spring scouting for plum aphids is available on line at: http://ipm.ucdavis.edu/PMG/r606900211.html.

Leaf Curl Plum aphid damage.

Mealy Plum aphid damage.

A quick look at each tree will tell you if aphids are present in high numbers. Leaf curl aphids do just that - they make the prune leaves curl tightly. Mealy plum aphids produce lots of sticky honeydew and an ashy/silvery look to leaves. See photos below to help with ID for prune aphids.

Effective control of either or both plum aphids is possible with several insecticides. Provado®, Actara®, and Asana® each gave excellent, in-season mealy plum aphid control in University of California field research. Generic versions of Provado® are registered as Couraze®, Imidacloprid, Pasada®, etc. Assail® and BeLeaf™ are also registered for prune aphid control in California. Diazinon is a very effective aphid material and growers have used it successfully for aphid control at low rates. A high rate of oil - 6 gallons/acre - reduces aphid populations, but does not give complete control.

Help manage pesticide resistance in aphids -- and all pests in general - by alternating between pesticide chemistry groups every time you spray. Provado, Actara, and Assail are all the same class of insecticide - neonicitinoids (Group 4A insecticides). BeLeaf is Group 9C insecticide. Diazinon is a group 1B material. Pyrethroids (Asana, Warrior, Mustrang, etc.) are all Group 3 insecticides.

Consult with your packer regarding pesticide residue requirements for certain markets. Consult with your PCA for insecticide selection, rates, and timings.

Use of Actara®, Provado®, and Asana® may contribute to increased spider mite populations later in the season.

Good spray coverage is essential for good plum aphid control. Every-other-row spraying for plum aphids is a waste of time and money. Contact pesticides such as pyrethroids (Asana, etc.) must reach aphids inside curled or distorted leaves to give good control. Provado®, Actara®, and other similar pesticides move locally into the leaf where the aphids are feeding and so don't require perfect spray coverage to give excellent control.

Careful aphid management is a key to producing high quality prunes.

July - Time for Prune Leaf Analysis

Joe Connell, UC Farm Advisor, Butte County

Leaf analysis is best taken in July when nutrient levels in leaf tissue are stabilized. Critical values to help with fertilization decisions have been established for prunes by University of California researchers. Analysis can reveal specific nutrient deficiencies or alert you to developing nutrient problems. Having a baseline of nutrient levels also provides a useful standard that allows you to compare to future trends. In addition, by keeping the trees in the optimum zone for nitrogen, leaf analysis can reduce costs by avoiding over fertilization.

Concentrations of nitrogen, phosphorus, and zinc on a leaf dry-weight basis start very high early in the season and decline rapidly to a fairly steady state after mid-June. Levels plateau and then drop off again from September to leaf fall. Potassium starts high in the spring then decreases reaching a plateau about the same time as nitrogen, phosphorus and zinc. Concentrations of magnesium, manganese, boron and chloride remain fairly constant or

increase slightly during the season. Boron, chloride, and sodium however, will increase steadily if excess amounts are present in soil or irrigation water and leaching is not adequate. Calcium is the one element that always starts low and increases steadily over the season as leaves age.

To represent the nutrient status of a large uniform orchard collect representative leaves from many trees in a survey pattern across the orchard. Collect one to two leaves picked at different heights from each of about 50 spurs (about 75 leaves) from around the trees and place them in a paper bag. Leaves selected for analysis should be free of obvious tip burn, insect or disease injury, mechanical damage, etc., and should be from normal, healthy trees. If you have a weak area and you'd like to diagnose the problem, sample that area and compare the results with those of a sample from your best area to see if tree nutrition might be involved.

Critical Nutrient Levels for Prune Leaves in July

	Deficient Below	Optimum
Nitrogen (N)	2.2%	2.3 - 2.8 %
Potassium (K)	1.0%	adequate over 1.3 %
Zinc (Zn)	18 ppm	----------
Manganese (Mn)	---------	adequate over 20 ppm
Boron (B)	25 ppm	30-80 ppm

Deficiencies that are most common in this area are nitrogen, potassium, and zinc. Prune is an especially heavy potassium feeder and potassium levels should be watched closely. Zinc deficiency, most common in sandy soils and old barnyard locations, is easily identified in the field from leaf symptoms early in the season. Zinc residue from sprays containing zinc is difficult to wash off so zinc leaf levels are not meaningful if surface contamination has occurred. Boron deficiency is sometimes deficient near the foothills. Manganese deficiency is sometimes seen where soils are kept too wet or in areas with high water tables. Useful critical values are not established for iron or sulfur levels in prune leaf tissue.

Remember, leaf analysis is only a helpful guide in orchard management. Leaf levels should be considered along with past experience, orchard appearance, and current growth before corrective action is taken. Visual observation is an excellent complement to any lab analysis. Make sure that a deficient element is really the problem before you seek fertilizer applications as a solution.

Prune Rust Management Plan

Carolyn DeBuse, UC Farm Advisor, Solano/Yolo Co.

It is not too early to think about management plans for prune rust in the orchard. Leaf rust is caused by a fungal pathogen Tranzschelia discolor which over winters as spores on the buds and branches of the tree. Orchards that were infected heavily last year have a good chance of having the disease show up again this year. Wet or humid weather promotes the growth and spread of the disease so the Sacramento Valley often has more trouble with rust then the drier San Joaquin Valley. The disease starts on young leaves in spring and progresses through the summer until it causes defoliation of the infected leaves. If the defoliation happens after harvest then, there is no effect on prune quality or the next year's return bloom. But if defoliation happens before harvest, the fruit may have a reduced dry away and lower quality. So it is a good idea to manage the disease from early spring (May) up until 4 weeks before harvest (or July 15th).

- Symptoms: The top of the infected leaf has yellow angular spots and the underside of the leaf has red-brown spore masses.
- Monitoring: Starting May 1st, in the Sacramento Valley you should monitor weekly and in the San Joaquin Valley every other week. Select 40 trees randomly in each block or orchard. If the orchard is larger than 40 acres increase number of trees monitored. Look at the lower leaves in the canopy for the disease symptoms. The disease favors vigorous trees and younger replants in the orchard so make sure to check those as well as any "hot spots" that had rust last year.
- Treatment Threshold: If you find one leaf with disease symptoms treat the orchard for rust.
- Treatment: You can treat with sulfur or a registered fungicide for rust on prunes. For more information go to the IPM web site (http://ipm/PMG/r606100611.html) and the 2009 Timing and Efficacy of Fungicide (http://ipm/PDF/PMG/fungicideefficacytiming.pdf) page: 38-39.
- Preventative treatment can be done by applying a fungicide before a rain event in spring or summer if prune rust has been an issue in that orchard previously.

After treatment continue monitoring orchard for new signs of the disease and treat again when disease is found. Monitor and treat up until July 15th. Keep a record of where the rust was found in the orchard for increasing monitoring efficiency next year. Rust often shows up in the same area from year to year.

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Maximum and minimum daily temperatures (°F) in Sacramento Valley prune orchards for bloom season, 2010. For each orchard site, full bloom temperatures are boxed and bold.

Location/County	Temp	18-Mar	19-Mar	20-Mar	21-Mar	22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	29-Mar
Winters West	Max.			75	**72**	71	76	71	62	67	72	75	66
Yolo	Min.			38	**42**	48	43	38	41	42	43	41	53
Winters East	Max.			72	75	**71**	76	70	62	68	73	73	67
Yolo	Min.			37	40	**44**	47	38	40	35	42	42	50
Stevenson's Bridge	Max.			73	75	**72**	77	70	63	67	72	73	65
Yolo	Min.			38	40	**44**	52	39	41	36	40	42	51
Yolo (town)	Max.			73	74	71	75	**70**	62	67	71	74	68
Yolo	Min.			37	38	43	50	**38**	38	35	41	44	49
Woodland	Max.			73	75	69	75	69	63	**66**	72	74	65
Yolo	Min.			39	39	44	50	38	40	**35**	43	42	49
Rio Oso	Max.		77	70	72	70	**76**	69	63	66	70	73	64
Sutter	Min.		51	42	42	44	**46**	46	41	34	36	42	50
Tudor	Max.	76	82	72	**72**	72	77	71	64	68	71	75	68
Sutter	Min.	41	40	42	**43**	45	48	47	43	35	37	45	52
South Yuba City	Max.	77	81	72	**73**	72	78	70	63	68	71	75	67
Sutter	Min.	42	43	41	**42**	44	48	46	42	35	37	43	52
Live Oak	Max.	76	81	**72**	73	71	77	72	64	67	72	76	67
Sutter	Min.		50	**44**	44	47	49	44	41	34	43	44	51
Los Molinos	Max.			73	69	72	76	**71**	61	64	73	72	67
Tehama	Min.			39	37	47	43	**39**	40	30	36	45	55
Corning	Max.			74	69	70	76	**71**	62	65	73	74	65
Tehama	Min.			43	40	48	46	**43**	40	33	42	48	55
West Red Bluff	Max.			71	67	70	74	70	**60**	63	71	72	67
Tehama	Min.			43	41	45	45	44	**41**	33	41	48	53
Red Bluff	Max.			72	68	71	76	**71**	59	65	72	72	65
Tehama	Min.			42	39	43	42	**40**	40	34	40	45	53
Jelly's Ferry	Max.			71	67	70	77	69	57	**65**	72	69	65
Tehama	Min.			40	39	37	38	39	35	**32**	35	44	54