UNIVERSITY OF CALIFORNIA • COOPERATIVE EXTENSION • GLENN COUNTY
P.O. Box 697 (821 E. South St.), Orland, CA 95963 • (530)865-1107 • FAX (530)865-1109

ORCHARD FACTS

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Bill

Bill Krueger
Farm Advisor

Checking Your Annual Report Card: Reading a P-1 Sheet

Franz Niederholzer, UCCE Farm Advisor, Sutter/Yuba Counties*

Grower returns are based on fruit size, fruit quality, and tonnage. Key pieces of information are contained in the P-1 sheet, which is the report generated by the DFA (Dried Fruit Association) based on their evaluation of a sub sample of a fruit lot (maximum weight of 60,000 pounds). Packers contract with the DFA to provide inspection services and report the results of their findings. While it takes some diligence and practice to read through a P-1, doing so may help improve grower income.

To help take in what is reported on the P-1 form, it helps to understand how the information from the P-1 is obtained. It is generated from size and quality evaluation of a sample of approximately 40 pounds of dried prunes. The total weight of the delivery that any particular P-1 documents is listed at the far right of Line 5 on the P-1 form.

At the DFA grading station in Yuba City, the entire sample is run over a series of five screens with different sized holes. First there is a 'Trash' screen of ¼" slots, followed by an 'Undersize' screen of 23/32 inch or 24/32 inch diameter holes. Then the fruit runs over 'D', 'C', and 'B', screens of 26/32, 28/32, and 30/32 inch diameter holes, respectively. The fruit that goes over the end of the grader (the overs) is called 'A screen' even though it doesn't fall through any of the screen openings. The total weight and number of prunes in each size category, A, B, C, and D, is recorded. Total weight, only, is determined for trash and undersize which is subtracted from the gross weight (reported in Line 5) and the net weight after trash and undersize is removed is reported on the right side of line 7.

The percentage and weight of the delivery for each screen size are reported on the right side of lines 8, 10, 12, and 14. The percentage and weight of substandard prunes in each screen category are presented in lines 9, 11, 13, and 15 on the P-1. Whether fruit is standard or substandard depends on fruit quality.

Fruit quality is evaluated (quality analysis) by visual inspection of a sub sample of prunes from each screen, A, B, C, and D. Once the sample fruit is sized (screened) it is weighed, and a sub sample of 100 prunes is taken from each screen for each 10 pounds of weight on each screen up to a maximum of 400 prunes. In the P-2 Analysis section of the P-1 form (at the bottom of the page), the numbers of fruit checked for fruit quality from the four screen size categories are reported, along with the number of fruit scored in a particular defect category or group of

categories. Five groups of defects are reported by DFA, and the individual categories are listed starting at line 6 of the P-1, along with the threshold tolerances between standard and substandard fruit for different defect groups.
If I were a grower, I would first check Line 20 to find out if my fruit were analyzed as standard or substandard. If the fruit is standard, then I'd check the percentage fruit that fell into the four screen categories. Growers net more money for big fruit (A and B screen), as packers pay more for big fruit and it costs less to harvest and dry big fruit vs. small fruit. The higher the percentage of the delivery in the larger screens, the more money I should make. If the sizes are evenly distributed or skewed to the smaller sizes, I should start thinking about how I farm and whether I need to prune harder, thin, or better manage fertilizer, disease, and/or mites. If my prunes were substandard (Line 20), I would then look at lines 8-17 to see what defect(s) caused the substandard grade. Since some categories are lumped together (1-2, 4-7 and 8-10) in the P-1, I would call DFA and ask to see the sample to really know what the problem was. DFA holds the fruit for 30 days after sampling, so I need to act quickly to get to the bottom of the problem. Even if the overall grade is for standard prunes, checking the P-1 sheet for percent off-grade fruit is helpful in evaluating orchard management practices.

Bottom Line:
- The P-1 form is a grower's report card for a fruit lot.
- Accurate reading of a P-1 can help make a grower more money/acre.

*This article was written using information provided by Greg Thompson, PBA and Pat Ferriera, DFA.

Insect and Mite Management in Prune: 2007

Franz Niederholzer, UCCE Sutter/Yuba Counties and Carolyn Pickel, UCCE IPM Area Advisor

What will the 2007 season look like for insect and/or mite problems? Good Question! We won't really know for sure until it's over, but in this article we'll discuss what we know about the season so far and how that might influence pest management in the coming months.

Fall, 2006 was warm and dry and this could mean a potential for higher aphid pressures in 2007 -- especially in blocks with a history of any aphid problems and no fall or dormant spray. Here's why… aphids fly back into prune orchards in the fall from their summer hosts outside prune orchards. The returning females feed on prune leaves and give live birth to females who lay eggs that overwinter behind bud scales and hatch just before or during bloom. The longer the leaves are on the trees in the fall and the warmer, it is the greater the opportunity for aphid generations to build up leading to more eggs overwintering and hatching in the spring. Each aphid egg will grow to a pregnant female who can produce up to 500,000 live young in her lifetime.

What are the chances of having aphid problems this season? Growers who sprayed a carefully applied fall, dormant, or delayed dormant spray (with or without oil) for aphids should not have an aphid problem in 2007. Oil doesn't harm aphids, so not using oil in a dormant spray [because of concerns about oil burn] shouldn't make any difference in aphid. <u>Growers with a history of aphid damage who haven't sprayed before bloom could be at risk for aphid infestations this spring</u>. Using diazinon or a pyrethroid (Asana, Warrior, etc.) after bloom will control aphids, but risks flaring mites as those pesticides can harm beneficial mites that help control spider mites. Growers who didn't spray for aphids before bloom, but want to avoid spraying in season can still get very good aphid control by spraying 4% spray oil (4 gallons of oil in 100 gallons of water) at green tip and full bloom (two sprays roughly 10 days apart). This spray, which will not harm flowers if the spray is properly agitated in the tank, is expensive – but not as expensive as an in-season aphid spray plus a miticide.

Scale and peach twig borers are two pests commonly controlled with a dormant spray. How much trouble will these pests be in 2007 for growers who tried the fall spray or a 'lite' dormant spray (little to no oil)? So far, our dormant spur monitoring of blocks that were sprayed in fall 2005 have shown no difference in scale levels compared to blocks that were dormant sprayed that year. Spur monitoring will help you know for sure what level of scale population is in the orchard.

A dormant spur sample is the best way to know if you have a scale problem. Another approach is to hang pheromone traps in late February to monitor male San Jose scale. The most important data that these traps show is the level of scale parasites or natural enemies in an orchard. Blocks with high counts of scale natural enemy levels are at lower risk of having to make an expensive spray to control San Jose scale.

Peach twig borer (PTB) is not usually a problem in prunes, but any growers not spraying for the pest before bloom should monitor their block in the spring to make sure there really is no problem. Fruit should be checked for PTB at 400 degree days (DD) after biofix – usually in May. If a spray is needed, it can be applied at that time without risk of damage at harvest. When is 400 DD after biofix? To find out, hang at least one pheromone trap in each block by late March or early April. Once the first moth is caught (the day the first moth is caught is the biofix date), track degree days (heat units) on the internet (www.ipm.ucdavis.edu) or by calling your local UCCE office.

Spider mites can't be controlled with dormant sprays. Monitoring orchards for spider mites should begin in June (or earlier if it is a warm spring) to determine if and when a spray is needed to control spider mites. All of the monitoring practices mentioned in this article are described in detail in the Integrated Prune Farming Practices binder for sale at the UCCE office in your county.

Bottom Line:

1. Warm, dry fall in 2006 could mean more aphid pressure in 2007.
2. Hang pheromone traps (San Jose scale by late February; PTB by late March)
3. Monitor for PTB in orchards at 400 DD after biofix (usually in May).

Bloom Fungicides and Disease Resistance

Joseph Connell & Rick Buchner, UCCE Farm Advisors – Butte & Tehama Counties

Brown Rot. Blossom/twig blight is caused by two species of Monilinia, M. laxa and M. fructicola. The fungus produces ascospores from apothecia that develop on mummies on the orchard floor and conidia from mummified fruit, twig/spur cankers and any remnants of infected flower parts. Flower parts are most susceptible to blossom / twig infections from green bud through petal fall. Brown rot fungi grow and reproduce rapidly at temperatures ranging from 60° to 80°F. Infections do not develop below 50°F. Initially infected flowers turn brown, wither and remain attached to fruit spurs. Ultimately, blossom infections extend into the twigs, causing shoot death by girdling. Gumming occurs at infection sites and grey-brown spore masses may be visible under high humidity.

Orchards with a history of brown rot should be treated and all orchards are vulnerable in a severe brown rot year. The challenge is trying to anticipate or predict severe disease conditions. Sprays are preventive and do little if any good when applied after infection. Grower surveys following the severe brown rot year in 1993 suggested waiting to apply a single spray for brown rot at full bloom did not provide adequate control. A two-spray program (green bud/white bud and full bloom) aimed at both brown rot (green bud and full bloom) and russet scab (full bloom, only) may be a good choice.

Disease Resistance. Work by Dr. Jim Adaskaveg, Plant Pathologist at UC Riverside, indicated that in almonds once we're past the green bud/white bud stage, an every other row spray program will not provide adequate coverage for good disease control. This is especially true if we have high disease pressure and rainy conditions that will promote disease.

Another major concern with an every other row spray program is that sub-lethal fungicide residues are deposited on the side of the tree away from the sprayer. This is an ideal way to more rapidly select for fungus strains that are resistant to the fungicides you're using. We don't want to lose their effectiveness because you only put on a half rate with an every other row spray program. This is especially risky for the new materials that have a single site mode of action. Don't let this happen! Do your part to spray in an effective manner that reduces the chance of disease resistance developing. Research has identified rates that were shown to be effective. Label rates per acre are based on this information. Why would you expect to get good disease control by using less material?

In addition, Dr. Adaskaveg has data from almonds that clearly demonstrates that at full bloom or once trees have leafed out the coverage is poor on the side of the tree away from the sprayer. Good disease control requires an adequate rate and good coverage. Once you're past the green bud/white bud stage, a solid spray will do a better job with less risk of developing resistance than will a half spray.

We have some great new materials available. Select materials from different classes of fungicides and rotate their use each time you spray to provide good disease control. Don't use the same materials for both spring disease control and for pre-harvest fruit brown rot control --- you run the risk of developing fungicide resistance more quickly. Preserve our excellent new brown rot materials by rotating the use of these materials between fungicide classes (materials with the same FRAC # in the table below are in the same fungicide class) as a means of delaying the development of resistance.

Efficacy and Timing of Fungicides for 2007

J. Adaskaveg, B. Holtz, T. Michailides, D. Gubler

PRUNE (OR DRIED PLUM)—FUNGICIDE EFFICACY

Material	Resistance risk (FRAC#)[1]	Brown rot: Blossom	Brown rot: Fruit	Russet scab	Rust
Benlate[2] + oil[3]	high (1)	++++	++++	----	----
Orbit (Bumper)	high (3)	++++	NR	----	NR
Pristine	medium (7/11)	++++	++++	ND	ND
Rovral[4] + oil[3]	low (2)	++++	NR	----	NR
Scala	high (9)	++++	+++[5]	----	ND
Topsin-M[2] + oil[3]	high (1)	++++	++++	----	----
Vangard	high (9)	++++	+++[5]	----	ND
Benlate[2]	high (1)	+++	+/-	----	----
Elevate	high (17)	+++	+++	ND	----
Rovral[4]	low (2)	+++	NR	----	NR
Topsin[2]	high (1)	+++	+/-	----	----
Abound	high (11)	++	+	----	+++
Botran	high (14)	++	++	ND	ND
Bravo/Echo[6,7]	low (M5)	++	++	++	----[7]
Captan[6]	low (M4)	++	++	+++	----
Flint/Gem	high (11)	++	+	----	+++
Rally	high (3)	++	++	----	----
Sulfur	low (M2)	+/-	+/-	----	++

Rating: ++++= excellent and consistent, +++= good and reliable, ++= moderate and variable, += limited and erratic, +/- = minimal and often ineffective, ---- = ineffective, ? = insufficient data or unknown, NR=not registered after bloom, and ND=no data.

[1] Group numbers are assigned by the Fungicide Resistance Action Committee (FRAC) according to different modes of actions. Fungicides with a different group number are suitable to alternate in a resistance management program. For more information, see http://www.frac.info/.

[2] Benlate label withdrawn. Strains of *Monilinia fructicola* and *M. laxa* resistant to Benlate and Topsin-M have been reported in some California prune orchards. No more than two applications of Benlate and Topsin should be made each year.

[3] The oil is "light" summer oil, 1-2% volume/volume. If applied in summer causes fruit to lose bloom and look red. They dry to normal color.

[4] Blossom blight only; not registered for use after petal fall.

[5] High summer temperatures and relative humidity reduce efficacy.

[6] Do not use in combination with or shortly before or after oil treatment.

[7] Do not use after jacket (shuck) split.

PRUNE (OR DRIED PLUM)—TREATMENT TIMING

Note: Timings listed are effective but not all may be required for disease control.

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.

Timings used will depend upon orchard history of disease, length of bloom, and weather conditions each year.

[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.

Considerations For In-Season Nutrition of Prunes

Bill Krueger, UCCE Farm Advisor, Glenn County

Prune trees will not respond to fertilizer if they are not deficient in the particular element at the time of application. In this area, prune trees commonly need nitrogen, potassium and zinc. Boron may be deficient at certain times of the year in specific locations. A July leaf analysis is helpful for identifying nutrient deficiencies.

Nitrogen application will normally be required every year in every location. As a general rule trees will utilize less than 50% of applied nitrogen. Losses can occur through volatilization, leaching and denitrification. A July leaf level of 2.3 per cent or above is considered adequate. Percents above 3.0 may be excessive. Nitrogen uptake relies on actively transpiring leaves and is most efficient during the period of rapid shoot growth. Efficiency can be increased by multiple applications during the growing season as opposed to a single application. Splitting applications will help reduce risks to losses such as volatilization or leaching. Applying nitrogen with irrigation water can improve efficiency compared to broadcasting or banding. Nitrogen requirements are increased with larger crops. As a general rule, about 100 lbs. per acre per year of actual nitrogen is required for heavy production.

Ensuring adequate potassium (K) is critical to producing large crops of high quality fruit. Tree demand for K increases dramatically with larger crops. Potassium deficiency results in smaller fruit, reduced drying ratio and (in more severe cases) defoliation and limb dieback. In season potassium management is generally limited to foliar sprays or fertigation for drip irrigated orchards. Foliar application of potassium nitrate (KNO_3) can be used to manage potassium deficiency in season or prevent K deficiency under heavy croploads. In season K management usually requires four sprays of 20 to 30 lbs. per acre of KNO_3. Fertigation is thought to be more efficient at getting K into the root zone. Rates of 250 to 500 lbs of potassium fertilizer per acre are usually sufficient. Be very careful with potassium chloride (KCl, muriate of potash) and check chloride levels in July leaf analysis to monitor for chloride accumulation.

Concerns related to the potential for rapid development of K deficiency in heavy cropped trees and observations of higher K levels in productive orchards has led to questions about UC critical levels for potassium. Research conducted in 1996 in a single orchard found leaf levels higher than 1.3% did not correlate with higher yields or fruit quality. Results from survey sampling in 1998 and 1999 indicated no benefit from additional K application when potassium levels were greater than 2.0 percent.

Unfortunately, July leaf samples offer limited opportunity for adjusting fertilizer practices for that year. Research conducted under the Integrated Prune Farming Practices project in 2002 and 2003 evaluated early leaf sampling predictions but was unable to establish a significant correlation for N and K levels using May leaf tissue samples. This is likely due to the influences of crop load, fertilizer application and residual N and K in the soil. Generally, orchards with May K levels above 2.3 percent did not develop deficiency symptoms during that year. Orchards below 1.3 percent in May with no K applied generally showed deficiency symptoms in July and August.

Zinc deficiency is common in California prune orchards. Check July leaf analysis for adequate levels of zinc and look for deficiency symptoms (delayed bud break, small leaves with interveinal chlorosis). Foliar sprays are often the best way of correcting zinc deficiency. Fall sprays with zinc sulfate or spring sprays with other zinc materials are effective in correcting zinc deficiency.

Boron deficiency is not common in Upper Sacramento valley prune orchards. If boron levels are marginal , bloom sprays may improve fruit set. Too much boron can actually reduce set. In University experiments it has been difficult to show a benefit from boron sprays applied at bloom. One test showed a trend towards higher set but no significant differences between treatments. Other experiments have showed no benefit. If applied, boron is usually mixed at 1 to 2 lbs Solubor per 100 gallons and applied with a spray volume of 100 gpa. Remember, higher rates can actually reduce set and might be phytotoxic.

Glenn County
Cooperative Extension
P. O. Box 697
Orland, CA 95963