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In This Issue

Statewide Prune Day

Frost Control Suggestions

Planting Deciduous Trees

Fungicide Treatment for Bloom and Leaf Diseases in Almonds and Prunes - Material Efficacy and Timing

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To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

UCCE Statewide Prune Day

March 2, 2005

Vets Building, 1425 Veterans Circle Dr., Yuba City

- 8:00 **Sign-in and refreshments**
Donuts and coffee courtesy of Growers Ag Service, Inc., Yuba City
Cookies and prunes courtesy of California Dried Plum Board
CE Units (requested) sponsored by Prune Bargaining Association
- 8:15 **Managing a large prune crop**
Bill Krueger, Farm Advisor, Glenn County
- 8:45 **PCA/Grower Panel: Managing a large crop**
 - 1) John Post, crop consultant, Ag Advisors
 - 2) Gary Walker, PCA, Growers Ag Services
 - 3) Kulwant Johl, PCA and grower, John Taylor Fertilizers
 - 4) Erick Nielsen or Hilary Porter, Erick Nielsen Enterprises
 - 5) Ken Kaplan, Glenn County grower

Extended Break for Refreshments and to View Posters

- 9:45 **Is there really no hope of improving the California Dried Plum industry by using improved rootstocks and scion cultivars?**
Dr. Ted DeJong, UC Davis
- 10:15 **Progress for breeding resistance to Plum Pox.**
Carolyn DeBuse, UC Davis
- 10:30 **Aphid Biology and Research**
Dr. Nick Mills, UC Berkeley
- 11:00 **Aphid control options**
Franz Niederholzer, UCCE Sutter/Yuba Counties.
- 11:15 **Dried Plum Industry Overview**
Richard Peterson, California Dried Plum Board

Adjourn by 11:30

(continued on back)

FROST CONTROL SUGGESTIONS

1. Maintain a sheltered minimum recording thermometer in the orchard. This temperature can be compared to area temperatures and used to adjust forecasts.
2. Soil preparation. Firm, bare moist soil absorbs more heat during the day and will release it more readily during the night. Recent cultivation, sod or weed cover impedes heat movement from soil to air and will result in a colder orchard. If sod or weed cover is present, it should be mowed as short as possible.
3. Running water can raise orchard temperatures. As the water cools, it gives up heat which will help warm the orchard. The warmer the water, the more heat will be given up. Well water is generally warmer than canal water. Water should be turned on well in advance of the expected low temperature and should run out the end of the row by the time the freezing temperature occurs and be left running until the temperature has risen above freezing.

Under-tree sprinklers are widely used and if properly designed, will give from 2° to 4° of frost protection.

Sprinkling water into relatively dry air (nights with low dewpoints) will result in high rates of evaporation and rapid temperature drop until the air becomes saturated. Consequently, sprinklers must be turned on enough in advance of the critical temperature to allow for this. Following is a table developed by Rick Snyder, UC Bioclimatologist, which can be used to determine minimum turn-on temperatures. When to turn off sprinklers can be determined by waiting until all ice has melted or by using the table.

Air temperature at which sprinkler systems should be turned on to prevent a rapid temperature drop below the critical temperature for freeze damage. In order to maintain wet-bulb temperatures above the critical temperature for various ranges in dewpoint temperature, turn on the sprinklers at or above the indicated air temperature.

Critical Temperature °F	Dewpoint °F	Minimum* Turn-on or Turn-off Temperature °F
32	16 to 21	41
	21 to 24	39
	24 to 28	37
	28 to 31	35
	31 to 32	33
30	15 to 20	38
	20 to 24	36
	24 to 27	34
	27 to 30	32
28	14 to 19	35
	19 to 23	33
	23 to 27	31
	27 to 28	29
26	10 to 16	33
	16 to 20	31
	20 to 24	29
	24 to 25	27

*Absolute minimum temperatures for turning on or off the irrigation system. It is recommended that the system be turned on or off 2°F or 3°F higher than the indicated minimums.

ALMOND VARIETY BLOOM HARDINESS

The table shows percent damage observed on several cultivars following artificial freezing of almond branches with bloom in the indicated stage of development. Values are based on temperature durations of 30 minutes. For clarity, actual percentages have been rounded off to 1, 5, or to the closest 10%. It is wise to be conservative in frost control practices, since a couple of degrees can make the difference between no damage and severe damage. The duration of low temperatures, flower stage and position, tree vigor, and weather conditions preceding a frost all have considerable influence on the amount of damage that will occur. Any increase in duration of cold temperatures beyond 30 minutes will increase the percentage of damage.

Temperature	30°	29°	28°	27°	26°	25°	24°	23°	22°	21°	20°
NePlus Ultra											
Pink Tip						1	10		20		20
Pink Bud					0	70	90	90	90	90	
Full Bloom			5	70	90	100					
Small Nuts	1	5	20	50	100						
Sonora											
Green Bud						1			5		5
Pink Bud						20	10	30	10	5	10
Full Bloom					70	80	70	80	90		
Small Nuts		1	5	60	100						
Peerless											
Green Bud						5			5		10
Pink Bud			0	1	50	100					
Full Bloom		0	5	90	100						
Small Nuts		0	5	60	100						
Nonpareil											
Pink Bud						20	40	40	30	50	40
Full Bloom				50	70	90	90	90			
Small Nuts	1	1	40	90	100						
Price											
Pink Bud						30	30	30	40	40	20
Full Bloom				50	70	90	100	100			
Small Nuts		0	30	80	100						
Carmel											
Pink Bud						40	50	40	70	40	70
Full Bloom				60	90	100	100	100			
Small Nuts	1	10	30	70	100						
Butte											
Pink Bud					40	80	70	80	90	90	
Full Bloom		0	0	60	90	100					
Small Nuts		1	5	80	100						
Padre											
Pink Bud					70	90	90	100	90		
Full Bloom		0	1	50	100	100					
Small Nuts		1	5	30	100						
Mission											
Pink Bud					90	70	90	80	100		
Full Bloom		0	1	80	100	100					
Small Nuts		0	40	90	100						

PLANTING DECIDUOUS TREES

Selecting quality trees from a reputable nursery is an important first step to getting your orchard off to a good start. Vigorous trees, $\frac{1}{2}$ to $\frac{5}{8}$ (almonds and prunes) inch in diameter, with good root systems and smooth graft unions, should be selected. Trees should be ordered well in advance of planting time, the previous spring if possible, to insure good selection. Late orders are often filled from outside sources and quality may suffer.

Upon receiving the trees, select a well-drained, premoistened area and heal them into the same level as they were in the nursery. Select a site where no other trees have been grown or, if the orchard has been fumigated, use fumigated soil. Care should be taken not to overwater the trees. They are not using water at this time. Long storage should be avoided by having the planting site prepared in advance. Avoid freezing or drying roots by digging trees only as needed.

When the orchard is to be furrow irrigated or Phytophthora Crown Rot problems are anticipated, trees are often planted on berms. If this is the case, throw up the berms in advance of planting. To avoid undesirable settling of the tree, the holes should be only as deep as the trees will be planted and can be dug by hand or with an auger. If the auger glazes the side of the hole, break in the sides at planting. Because of glazing, which may create a "flower pot" effect and lead to drainage problems, it may be preferable to dig the holes by hand.

For precision planting, a planting board (a three to four feet long board with notches on both ends and in the middle) may be used. Place the middle notch around the tree stake and drive stakes at each end of the board. Remove the board and dig the hole. Replace the board and plant the tree at the center notch.

Prune the roots at planting time. Remove all damaged or dead roots and any roots that will not fit into the hole without bending. To prevent infection by crown gall bacteria, treat with Galtrol or Norbac prior to planting. Just barley cover the upper roots and work the soil around the roots by hand. Planting too deep may result in a scion rooting and loss of rootstock advantages and may contribute to losses due to Phytophthora Crown Rot. A possible exception to this is prune on plum rootstock. On well-drained soil, plum rootstock probably has enough resistance to crown and root rot to allow planting deeper. This will reduce the amount of root and trunk suckers and may reduce blow-over problems down the road. Be careful that the bud union is not buried after the tree has settled. Position the largest, most vigorous root into the wind to improve anchorage and, if possible, position the outside of the bud curve to the southwest to reduce sunburn.

Do not fertilize at planting time and avoid incorporating plant residues into the hole. Young tender roots are easily burned by fertilizers and or killed by methane gas given off by decomposing organic matter. If necessary, one to two ounces actual nitrogen may be applied in an 18" circle around the tree about the first of June. Use tree growth as a guide. It may not be necessary to fertilize the tree for the entire first growing season. Too much fertilizer may do more harm than good.

If the trees are planted into good moisture, it should not be necessary to water at planting time. If the soil is dry, the trees may be tanked with two to four gallons of water or they may be furrow irrigated by flashing water down the furrow. Care should be taken to avoid waterlogging. Jiggle trees to drive out air pockets. If the trees settle, pull them up to the intended planting depth before growth starts. Young trees require frequent, light irrigations to maintain continuous growth. Watch the tree growth and check the soil moisture regularly.

Trees are topped at planting to balance the top with the roots to insure vigorous growth. Almonds and prunes should be topped at 30 to 36 inches to allow adequate space for the shaker and walnuts are topped 4 to 5 buds above the graft union. Remove all side branches flush with the trunk.

Protect trees from sunburn and Pacific Flathead Borer by using a tree protector or by painting with white interior latex paint. Tree wraps, protectors, or milk cartons shade the trees continually, are easy to apply and settle with the soil. If the trees are painted, use white interior latex paint, one part paint to one part water, and paint trees before they are planted or after the soil has settled.

ALMOND—FUNGICIDE EFFICACY

Fungicide	Resistance risk	Brown rot	Jacket rot	Leaf blight	Shot hole	Scab	Rust ¹	Anthracnose	Alternaria	Silver leaf
Benlate ²	high	++++	++++	++++ ⁷	----	+++	+	----	----	----
Pristine ¹	medium	++++	+++	?	++++	++++	ND	+++	+++	----
Rovral + oil ³	low	++++	++++	?	+++	+/-	++	----	+++ ⁹	----
Topsin M ²	high	++++	++++	+++ ⁷	----	+++	+	----	----	----
Vanguard	high	++++	++++	?	++	----	?	?	+ ⁹	----
Abound	high	+++	----	+++	+++	++++	+++	++++	+++	----
Elevate	high	+++	++++	?	+	?	?	----	?	----
Flint	high	+++	----	+++	+++	++++	+++	++++	+++	----
Laredo	high	+++	----	+++	++	----	+	++	----	----
Rovral	low	+++	+++	?	+++	----	----	----	+++ ¹⁰	----
Bravo/Echo ⁴	low	++	NR	NR	+++	?	NR	+++	NR	----
Captan ⁵	low	++	++	+++	+++	+++	----	+++	----	----
Maneb	low	++	+	++	++	+++	+++	++	----	----
Rally ⁵	high	++	----	+++	+/-	----	+	++	----	----
Ziram	low	++	+	++	+++	+++	----	+++	+	----
Copper	low	+/-	+/-	----	+ ⁸	----	----	----	?	?
Sulfur	low	+/-	+/-	----	----	+++	++	----	----	----
PlantShield (NR)	low	----	----	----	----	----	----	----	----	+++

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

1. Of the materials listed, only sulfur, Abound, and Flint are registered for use in late spring and early summer when treatment is recommended. Applications of Pristine only at 5 weeks after petal fall will not adequately control late-season diseases.
2. Benlate label withdrawn. Strains of the brown rot fungi *Monilinia laxa* and *M. fructicola* resistant to Benlate and Topsin have been found in some California almond orchards. Resistant strains of the jacket rot fungus, *Botrytis cinerea*, have been reported in California on crops other than almond and stone fruits. Resistant strains of the scab fungus, *Cladosporium carpophilum*, have been reported on other crops but not in California.
3. Oil is a "light" summer oil, 1 to 2% volume/volume.
4. Echo, Bravo Ultrex, and Bravo Weather Stik are currently registered.
5. Do not use in combination with or shortly before or after oil treatment.
6. Efficacy is better in concentrate (80-100 gal/acre) than in dilute sprays.
7. Excellent control obtained with combination of Benlate and Captan; activity of Topsin should be similar to that of Benlate.
8. The low rates necessary to avoid phytotoxicity in spring reduce the efficacy of copper.
9. Not registered for use later than 5 weeks after petal fall; three spring applications improve the effectiveness of Abound summer treatments.
10. Efficacy reduced at high temperatures and relative humidity; experimental for Alternaria.

ALMOND—TREATMENT TIMING

Note: not all indicated timings may be necessary for disease control.

Disease	Dormant	Bloom			Spring ^a		Summer	
		Pink bud	Full bloom	Petal fall	2W	5W	May	June
Alternaria	----	----	----	----	----	+++	+++	+++
Anthracnose ^b	----	+++	+++	+++	+++	+++	+++	+++
Brown rot	----	++	+++	+	----	----	----	----
Green fruit rot	----	----	+++	----	----	----	----	----
Leaf blight	----	----	+++	++	+	----	----	----
Scab ^c	+	+	+	+	+++	+++	++	+
Shot hole ^d	+ ^e	+	++	+++	+++	++	----	----
Rust	----	----	----	----	----	+++	+++	+ ^f

Rating: +++ = most effective, ++ = moderately effective, + = least effective, and ---- = ineffective

- a. Two (2W) and five (5W) weeks after petal fall are general timings to represent early post bloom and the latest time that most fungicides can be applied. The exact timing is not critical but depends more on the occurrence of rainfall.
- b. If anthracnose was damaging in previous years and temperatures are moderate (63F or higher) during bloom, make the first application at pink bud. Otherwise treatment can begin at or shortly after petal fall. In all cases, application should be repeated at 7- to 10-day intervals when rains occurs during periods of moderate temperatures. Treatment should, if possible, precede any late spring and early summer rains. Rotate fungicides, using different fungicide classes, as a resistance management strategy.
- c. Early treatments (during bloom) have minimal effect on scab; the 5W treatment usually is most effective. Treatments after 5W are useful in northern areas where late spring and early summer rains occur. Dormant treatment with liquid lime sulfur improves efficacy of spring control programs.
- d. If pathogen spores were found during fall leaf monitoring, apply a shot hole fungicide during bloom, preferably at petal fall or when young leaves first appear. Re-apply when spores are found on new leaves or if heavy persistent spring rains occur. If pathogen spores were not present the previous fall, shot hole control may be delayed until spores are seen on new leaves in spring.
- e. Dormant copper treatment seldom reduces shot hole infection, but may be useful in severely affected orchards and must be followed by a good spring program.
- f. Treatment in June is important only if late spring and early summer rains occur.

PRUNE—FUNGICIDE EFFICACY

Material	Resistance risk	Brown rot		Russet scab	Rust
		Blossom	Fruit		
Benlate ¹ + oil ²	high	++++	++++	----	----
Orbit (Break)	high	++++	NR	----	?
Pristine	medium	++++	++++	ND	ND
Rovral ³ + oil ²	low	++++	NR	----	NR
Topsin ¹ + oil ²	high	++++	++++	----	----
Vanguard	high	++++	+++ ⁷	----	?
Benlate ¹	high	+++	+/-	----	----
Elevate	high	+++	+++	?	?
Rovral ³	low	+++	NR	----	NR
Topsin ¹	high	+++	+/-	----	----
Abound	high	++	+	----	+++
Botran	high	++	++	?	?
Bravo/Echo ^{4,5}	low	++	++	++	----
Captan ⁴	low	++	++	+++	----
Rally	high	++	++	----	----
Sulfur	low	+/-	+/-	----	++

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

1. Benlate label withdrawn. Strains of *Monilinia fructicola* and *M. laxa* resistant to Benlate and Topsin have been reported in some California prune orchards. No more than two applications of Benlate and Topsin should be made each year.
2. 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.
3. Blossom blight only; not registered for preharvest use.
4. Do not use in combination with or shortly before or after oil treatment.
5. Do not use after shuck split.
6. Effective but cannot use at proper timing (summer).
7. High summer temperatures and relative humidity reduce efficacy.

Fungicide Tables for Fruit and Nut Crops and Grapevines—Edited in 2004
University of California -- 26

PRUNE—TREATMENT TIMING

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

Disease	Green bud	White bud	Full bloom	May	June	July
Brown rot ^a	+++	+++	++++	----	+	++
Russet scab ^b	----	----	+++	----	----	----
Rust ^c	----	----	----	+	++	+++

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

- a. Flower are susceptible beginning with the emergence of the sepals (green bud) until the petals fall, but are most susceptible when open.
- b. A physiological disorder, no pathogens involved.
- c. More severe when late spring rains occur.

Prune Day (continued)

The annual meeting of the Prune Bargaining Association (PBA) follows this meeting. All interested persons are invited to attend. Lunch will be available (see reservation sheet below) during that meeting. The keynote speaker will be Rodger Wasson, President of the California Strawberry Commission, and past president and CEO of the Almond Board of California. He will speak on marketing the nutritional value of agricultural products. Mr. Wasson has a wealth of experience working in and with six different commodity groups over the past 30 years, and will address a key topic to the future of prune marketing.

Prune Bargaining Association (PBA) Luncheon Registration Form

Registration must be received by Friday, February 25, 2005. To enable PBA to provide a lunch, pre-paid reservations are needed.

Please make ___ reservation(s) for lunch. Cost: \$10.00/person. A check for \$_____ payable to Prune Bargaining Association is enclosed.

Please mail this form and a check for lunch payment to:

PRUNE BARGAINING ASSOCIATION, 335 TEEGARDEN AVE., SUITE B; YUBA CITY, CA 95991

Name: _____ Address: _____

City/State/Zip: _____ Phone: _____

email: _____

If your reservation is for more than one person, please list the names of others covered by your check:

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