UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

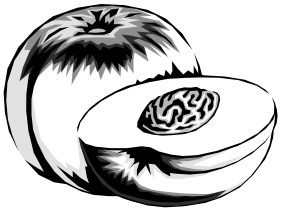
May, 2010 Vol. 15.2

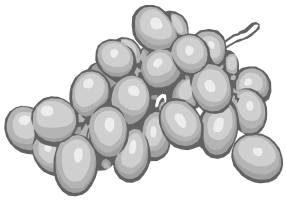
THE SCOOP

on fruits and nuts in Stanislaus County

U.S. Department of Agriculture, University of California, and Stanislaus County Board of Supervisors cooperating

by Roger Duncan
Pomology & Viticulture Advisor





1.0 hour of Continuing Education Credits & 3.0 hours of CCA

Almond Production & Pest Management Field Day

Sponsored by the University of California Cooperative Extension
Thursday, May 27, 2010
Claribel Road, 6 miles east of Albers Road

8:15 Registration / 9:00 Talks Begin

Observation and Discussion of Almond Tree Spacing and Minimum Pruning Trial
Roger Duncan, UC Cooperative Extension Farm Advisor, Stanislaus County

Irrigation Scheduling in Almond Using Soil and Plant Based Measurements
David Doll, UC Cooperative Extension Farm Advisor, Merced County

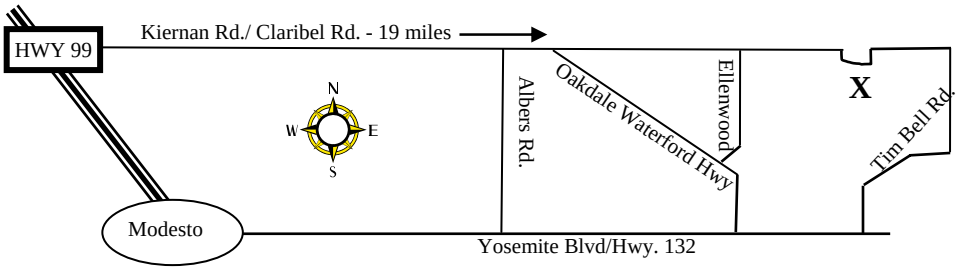
Managing Farm Activity Impacts on Water Quality
Parry Klassen, Coalition for Urban/Rural Environmental Stewardship (CURES)
Wayne Zipser, CEO, Stanislaus County Farm Bureau

Drip or Microsprinklers; Which System is Best Suited for Your Orchard?
John Edstrom, UC Cooperative Extension Farm Advisor, Colusa County

What Almond Growers Need to Know about Bees: Contracts, Hive Placement, Pollen Supplements, Colony Collapse Disorder and Effects of Pesticides on Hives
Eric Mussen, UC Cooperative Extension Apiculturalist, UC Davis

Glyphosate Resistant Rye Grass and Other Problem Weeds
Brad Hanson, UC Cooperative Extension Weed Specialist, UC Davis

This orchard is WAY out Claribel Road in the Sierra foothills. The orchard contains untrained and minimally pruned almond trees in their 11th growing season. Tree planting density ranges from 90 trees per acre (22' x 22') to 198 trees per acre (10' x 22'). Attendees will also have the opportunity to observe an herbicide demonstration on glyphosate resistant ryegrass. Please call if accommodations need to be made for people with mobility limitations.



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Cool Spring in 2010 Will Lead to Long Growing Season & Large Fruit

The rate of cell division and respiration within a developing fruit is driven largely by temperature. The warmer it is during Phase 1 of fruit development, the faster the fruit develop and the larger the demand for carbohydrates. Recent studies at UC Davis have shown that the demand for carbohydrates can be 5 to 10 times higher during a warmer spring than during a cooler spring. Any limitation to carbohydrate accumulation by the fruit can ultimately lead to smaller fruit. During cool springs like 2010, fruit takes much longer to develop and there is more time to accumulate necessary carbohydrates for fruit development and to obtain larger size.

Temperatures during the first 30 days of fruit development have the greatest effect on harvest date and fruit size. A model has been developed at UC Davis that calculates heat units, called growing degree hours (GDH). The lower the GDH, the longer the growing season and the larger the fruit potential. By tracking the accumulated GDH during the first 30 days after bloom and comparing the bloom date and GDH to previous years, growers can predict the approximate harvest date of his/her orchard and estimate fruit size potential.

In an "average" spring, we accumulate about 6000 growing degree hours during the first 30 days after bloom. This spring we accumulated only 4800 GDH. This is very low and is similar to 2006 (a year with very big fruit). This means we will have a relatively long growing season; maybe a week longer than 2009. (Actual harvest dates in 2010 may be about the same as 2009 because bloom was nine days earlier this year). When you combine a long growing season with the slightly lighter fruit set we had in many orchards, this year fruit size should be very large in 2010.

Canning Peach growers get the maximum yield potential from their orchards when they thin trees just enough to have fruit slightly large enough to make number 1 size at harvest. If you have really large fruit at harvest and almost no number 2 fruit, you thinned too heavily and have lowered your yield. In my opinion, growers should leave at least 10% more fruit on their trees this year than 2009 in order to obtain maximum yields.

In summary:

- Cool temperatures during the first 30 days after bloom = slow fruit development
- Slow fruit development = delayed reference date and delayed harvest
- Delayed harvest = large fruit potential
- Large fruit potential = leave more fruit on the tree to obtain maximum yield

Thin lightly in 2010 for maximum production.

Mechanical Blossom Thinner to Reduce Peach Labor Costs

In 2009, we tested a new mechanized blossom thinner in an attempt to reduce hand thinning costs of peaches. This is a very simple, tractor-mounted implement consisting of a 10 foot-long spindle with two columns of 24-inch stiff rubber cords attached along the length of it. The spindle rotates like a high speed car wash brush and knocks flowers off the tree limbs as the tractor moves by. The spindle can be placed in a vertical position to thin blossoms from the sides of the trees and lifted up and over the trees in a horizontal position to thin the tops of the trees. By adjusting the tractor speed and the rotation velocity of the spindle, the operator can take more or fewer blossoms off.

In 2009 we focused our efforts on two peach orchards with heavy flower sets and trees trained to a "V" system. We felt we had a better chance of reaching more flowers in "V" shaped trees than with "vase" shaped trees. The varieties were Loadel and Tuolumne. The results were very positive in these preliminary trials. In these two

orchards, we removed 52% – 56% of the flowers on the hangers we could reach with the machine (we cannot reach flowers on the inside or between trees). This blossom thinning resulted in a 22% - 27% reduction in time to hand thin. At normal thinning time, if laborers were paid $8.00 per hour plus 45% overhead (total of $11.20 per hour), this would have resulted in a savings of $300 - $390 per acre.

The largest benefit to using the mechanical blossom thinner turned out to be an increase in fruit size and thus an increase in yield. The Loadel yield was increased by 2.8 tons of marketable fruit per acre while the Tuolumne yield was increased by 3.2 tons. When the increase in yield was combined with the savings in thinning costs, we increased gross income by $1251 per acre in the Tuolumnes and by $1383 in the Loadels.

We also experimented with the blossom thinner on a row or two in some "less ideal" orchards to gain experience and determine the limitations of the machine. While it is difficult to emphasize yield data when we just compared one or two blossom-thinned rows to adjacent untreated rows, we think we reduced hand thinning time in nine of the twelve tests and are confident that we increased fruit size in all of the orchards. It became obvious that it will be difficult to use the blossom thinner in orchards with long, stiff hangers cascading down from the tree tops. Ideally, trees should have several shorter hangers up and down the scaffolds. Heavy setting orchards of early and extra early varieties will benefit the most from blossom thinning.

This year we are testing the machine in more orchards with "vase" shaped trees. We also have several commercial scale plots covering many acres each. Even though set is generally lighter this year than last and fruit size should be large due to the cool, extended spring, we still hope to significantly reduce the need for hand labor at thinning time while increasing fruit size and yield.

Thanks to the California Canning Peach Association for partially funding this project and thanks to Britton Konynenburg Partners, Norman Kline, John & Chris Miller, Mike Noeller, Tony Rodin, Superior Fruit Ranch, Chuck Voss & Kevin

Use of Mechanical Blossom Thinner Reduced Hand Thinning Time & Increased Yield

	Loadel Orchard		**Tuolumne Orchard**	
	Blossom thinned + hand thinned trees	Hand thinned only trees	Blossom thinned + hand thinned trees	Hand thinned only trees
Hand thinning time (hours / acre)	92	126	92	119
Thinning costs (@ $11.20 / hour)	$1027	$1413	$1031	$1328
No.1 fruit (tons/acre)	14.9	12.2	28.0	24.3
No. 2 fruit (tons/acre)	2.8	3.9	0.7	1.2
Undersized fruit	2.9	3.8	0.1	0.3
Total salable fruit	16.9 tons/a	14.1 tons/a	28.7 tons/a	25.5 tons/a
Decrease in Thinning Costs	$386		$297	
Increase in Gross Income	$997		$954	
Total Increase in Income per Acre	**$1383**		**$1251**	

Powdery Mildew of Peach – Pathogens, Biology, and Management

J. E. Adaskaveg, Professor and H. Forster, Project Scientist, University of California, Riverside and Davis, CA
R. Duncan, J. Hasey, and M. Norton, UCCE Stanislaus, Sutter/Yuba, and Merced Co., CA, respectively

Powdery mildew of peach and nectarine occurs worldwide, but is most damaging in semi-arid growing areas. The disease can be caused by several different species of fungi that commonly occur on Rosaceous plants. Four species have been reported on peach: 1) the peach-rose powdery mildew fungus *Podosphaera pannosa* (formerly *Sphaerotheca pannosa*); 2) the apple powdery mildew fungus *P. leucotricha* that causes rusty spot of peach; 3) the cherry powdery mildew fungus *P. clandestina*; and 4) the late-season powdery mildew *P. tridactyla*. *P. clandestina* has not been reported on peach in California but has been found on peach seedlings in the eastern United States. The most common and important species on peach in California are *P. pannosa* and *P. leucotricha.* These species commonly cause fruit infections and significant economic damage, but leaf and twig infections are important sources of inoculum. In nurseries, powdery mildew leaf infections can cause significant damage to seedlings and small trees.

The susceptibility of peach and other stone fruit crops varies greatly among cultivars. The eglandular (without glands at the leaf base) peach cultivars are more susceptible than the glandular ones. Furthermore, in some cultivars, tissues also vary in their susceptibility with fruit being more or less susceptible than leaves, depending on the mildew species involved and maturity of host tissue. Leaves, buds, green shoots, and fruit are commonly attacked, but flower infections are rare. Fruit are susceptible to *P. pannosa* from the early stages of development until pit-hardening on peach and nectarine, but not other *Prunus* spp. (infection periods of other powdery mildew species are not known). White circular spots may enlarge, coalesce, and cover large areas of the fruit. Infections usually result in some deformation of the fruit surface with depressed or slightly raised areas. Infections on peach fruit become necrotic after pit-hardening, whereas on nectarine and occasionally also on peach the tissue remains green. Any fruit with blemishes caused by powdery mildew are generally unmarketable.

Management of powdery mildew is by cultural practices and by the use of protective fungicide treatments. Less susceptible cultivars should be planted in areas that commonly have favorable environments for high disease incidence. To reduce the relative humidity in the orchard, the frequency of irrigation periods should be minimized and low-angle sprinklers should be used to keep foliage dry. For managing powdery mildew, fungicide applications should be timed from full bloom until the pit hardening stage of fruit development. A guide to timing of fungicide applications for selected spring/summer diseases of peach and nectarine is shown in Table 1.

Table 1. Treatment timing of fungicides for spring and summer diseases of peach and nectarine.*

Disease	Dormant	Bloom		3-6 weeks postbloom	Preharvest[1]	
		20-40%	80-100%		3 weeks	1 week
Brown rot	----	++**	+++	+	++	+++
Powdery mildew	----/ND	++	+++	+++[2]	----	----
Scab	----	+	++	+++	----	----
Rust	+[3]	----	----	+++	++	----

* - Visit the UCIPM program at www.ucipm.ucdavis.edu.
** Rating: +++ = most effective, ++ = moderately effective, + = least effective, ---- = ineffective, and ND = no data but needs to be evaluated. Note: Not all indicated timings may be necessary for disease control if environmental conditions are not favorable or the pathogen is not present.
[1] Timing not exact; weather conditions determine need for treatment.
[2] Apply until pit hardening.
[3] Fall application before winter rains begin is the most important; additional spring sprays are seldom required but may be needed to protect the fruit if heavy persistent spring rains occur.

Numerous fungicides are available and in 2010 several new materials will be registered for managing diseases of peach in California. Table 2 indicates selected fungicides registered in California for powdery mildew and other spring/summer diseases of peach. The products are grouped by their FRAC Group or mode of action.

Table 2. Fungicides registered or planned for registration for managing selected diseases of peach*.

New Products	Fungicide [1,3]	Resistance Risk (FRAC#)[1]	Brown rot [2] Blossom	Fruit	Powdery mildew[2]	Scab	Rust
	Elite/Orius/Tebuzol	high (3)	++++	++++	+++	++	+++
	Indar/Enable4	high (3)	++++	++++	+++	++	ND
	Orbit/Tilt/Bumper	high (3)	++++	++++	+++	++	+++
Late 2009	Quash	high (3)	++++	++++	+++	ND	+++
	Rally	high (3)	+++	+++	++++	ND	ND
	Pristine	medium (7/11)5	++++	++++	+++	+++	+++
Late 2010	Luna Sensation	medium (7/11)5	++++	++++	+++	+++	+++
	Inspire Super	medium (3/9)	++++	++++	+++	++	+++
2009	Adament	medium (3/11)	++++	+++	+++	ND	+++
2010	Quadris Top*	medium (3/11)	++++	+++	+++	ND	+++
2010	Quilt Xcel*	medium (3/11)	++++	++++	+++	ND	+++
	Topsin-M /T-Methyl/Thiophanate-Methyl3	high (1)5	++++	++++	+++	+++	+
	Elevate	high (17)5	+++	+++	+	ND	ND
	Abound	high (11)5	++	+	++	++++	+++
	Gem	high (11)5	++	+	++	++++	+++
Late 2009	Quintec	high (13)	----	----	++++	----	----
	Sulfur10	low (M2)	+/-	+/-	+++	+++	+++

* - Visit the UCIPM program at www.ucipm.ucdavis.edu.

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

[1] Do not use fungicides with the same FRAC number and high resistance risk more than twice in one year.

[2] Strains of *Monilinia fructicola* resistant to Benlate (label withdrawn), Topsin-M, and T-Methyl are present in some peach and nectarine orchards. Resistant strains of the jacket rot fungus, *Botrytis cinerea*, and powdery mildew fungi have been reported in California on crops other than almond and stone fruits and may have the potential to develop in peach and nectarine with overuse of fungicides with similar chemistry. Sub-populations of both *Monilinia* spp. have been shown to be resistant to AP (FRAC 9) fungicides in a few prune orchards in northern CA.

[3] To reduce the risk of resistance development start treatments with a fungicide with a multi-site mode of action; rotate or mix fungicides with different mode of action FRAC numbers for subsequent applications, use labeled rates (preferably the upper range), and limit the total number of applications/season.

New products include the single fungicides Quash (metconazole-FRAC Group 3) and Qunitec (quinoxyfen-FRAC Group 13). Quash joins a number of other DMI fungicides previously registered on peach that are very good to excellent against mildew and other diseases like brown rot. Quintec has been registered on sweet cherry and grapes for several years but is a brand new mode of action on peach that is highly specific and highly effective against only powdery mildew fungi. The fungicide can be applied from full bloom to several weeks after petal fall based on host susceptibility, history of the disease in the orchard, and if favorable environments for mildew occur. Quintec should never be applied once symptoms have developed because of the high potential for resistance to develop in pathogen populations. It can be mixed with other fungicides and has two to three weeks of residual activity.

One of the latest trends in the development of fungicide products is the introduction of pre-mixtures. Registrants of fungicides have been able to increase the spectrum of activity and reduce the potential of selection for resistant populations of pathogens by mixing two single-site mode of action fungicides (provided that both active ingredients are effective against the pathogen). New products include: Adament (tebuconazole/trifloxystrobin), Quilt Xcel (azoxystrobin/propiconazole) and Quadris Top (azoxystrobin/propiconazole) that combine FRAC Groups 3/11; Luna Sensation (fluopyram/ trifloxystrobin), a new product that combines Groups 7/11; and Inspire Super (difenoconazole/ cyprodonil), a new product that combines Groups 3/9. All of these fungicides are highly active against powdery mildew, brown rot, and other diseases. Just as using single-site mode of action fungicides, when using pre-mixtures or tank mixtures rotate between the FRAC Groups, never apply more than two consecutive applications of the same FRAC Group number, and, ideally, rotate between the FRAC Groups with every application.

New Publication from UC Cooperative Extension-

Reducing Runoff from Irrigated Lands: Understanding Your Orchard's Water . . .

Publication Number: 8212 **Author:** L. SCHWANKL

Free publication. Pick up in the office or download at: www. anrcatalog.ucdavis.edu

Look Inside for more information on:

- Almond Production & Pest Management Field Day
  Sponsored by the University of California Cooperative Extension
  Thursday, May 27, 2010
- Cool Spring Will Lead to Long Growing Season & Large Fruit
- Mechanical Blossom Thinner to Reduce Peach Labor Costs
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