



Pomology Notes



MARCH 2004

UPCOMING MEETINGS:

<u>DATE</u>	<u>TITLE/SUBJECT</u>	<u>LOCATION</u>	<u>CONTACT</u>
FEBRUARY 24	UCCE YOLO/COLUSA NUT MEETING	COLUSA	458-0750
FEBRUARY 26	UCCE TEHEMA PRUNE MEETING	RED BLUFF	527-3101
MARCH 3	UCCE SUTTER/YUBA PRUNE DAY	YUBA CITY	822-7515

Pollinization + Fertilization of Healthy Flowers = good fruit or nut set = potential for good crop.

PRUNE ORCHARD CHECKLIST FOR FEBRUARY/MARCH:

- Decide if you want to put out bees in your orchard this year and place order for hives if you want them. (See article in this newsletter for more info).
- Get orchard ready for bloom -- a plowed or mowed orchard is warmer than an orchard with tall weeds/cover crop.
- Get air-blast sprayer ready to apply bloom fungicides.
- If you have sprinkler (impact or micro-jet) irrigation, check out/maintain irrigation system used for frost control.
- Make plans to protect flowers at bloom -- if bloom time weather is wet. Prune flowers are susceptible to brown rot beginning at green bud. (See article in this newsletter for more info).
- Place your order for [peach twig borer](#) traps. Traps should be up by April 1, and UC recommends 2 traps per block.
- Call me (Franz at 822-7515) and invite me out to your orchard. I'd like to meet you and learn about your operation.

ALMOND ORCHARD CHECKLIST FOR DECEMBER/JANUARY:

- Line up your bees for bloom. Current UC recommendations are for 2-3 hives per acre. When bloom weather is cold and wet, more hives (3 per acre) = more nuts at harvest.
- Check out/maintain irrigation system used for frost control.
- Prepare/maintain your orchard sprayer.
- Have clean spray strips and close-mowed orchards when frost season starts.

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- ❑ Check accuracy of your frost alarm and thermometers.
- ❑ Protect almond flowers with the right fungicide for the particular timing and target disease(s). (See information in this newsletter for more info).
- ❑ Place your order for [peach twig borer](#) and [navel orangeworm](#) traps. Peach twig borer traps should be up by April 1, and one trap will cover 20 acres. Navel orange worm traps should be up by April 1. Use four traps per block or 1 trap per 10 acres in large blocks.
- ❑ Call me (Franz at 822-7515) and invite me out to your orchard. I'd like to meet you and learn about your operation.

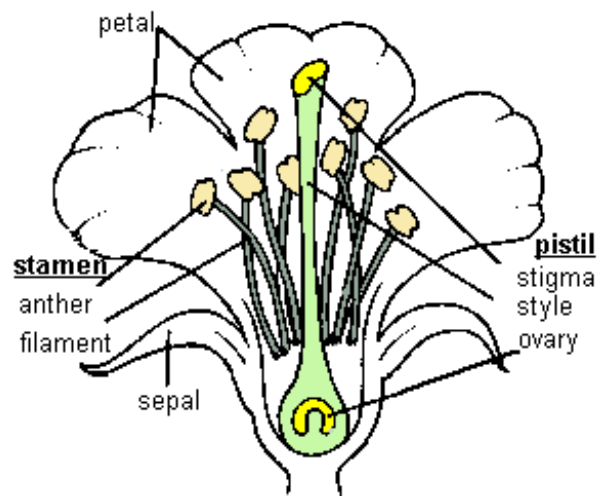
BEES AND BLOOM BASICS, A REVIEW

A good crop starts with good pollination, and good pollination of almonds AND prunes requires the presence of healthy, active bees in the orchard. The following is a very brief, basic, review of the processes that are involved in establishing good crop set.

Almond and prune flowers have sticky, heavy pollen that requires “help” from bees to move from the anthers (where the pollen grows and develops) to the female parts of the flower (the pistil), starting with the stigma (see picture below). Wind does not move enough, if any, pollen to make a prune or almond crop.

- There are pollen- or nectar-foraging bees in the same hive. Pollen-foraging bees unintentionally move pollen from the anthers onto the stigma (see picture below) when crawling over flowers. In almonds, pollen from a flower is self-incompatible – it can't fertilize the same flower or any other flower from that variety. Almond flower fertilization requires pollen from a compatible variety (another tree, pollen insert, or bouquet). However, prune flowers are self-fertile -- the pollen that fertilizes a flower can come from that same flower.
- Once a pollen grain has reached the stigma, it grows down inside the style until it reaches the ovary where fertilization occurs.

General Picture of Prunus Flower.



- ❑ Pollinization: Pollen is deposited on the stigma. (Boy travels to meet girl.)
- ❑ Fertilization: Pollen tube grows down the style and successfully fertilizes the ovary, creating a fruit. (Boy and girl make baby.)
- ❑ You can have pollination without fertilization, but no fertilization without pollinization – at least in almonds and prunes.
- ❑ Unpollinated flowers drop soon after bloom.
- ❑ Unfertilized flowers show some fruit growth, but the very small fruitlets drop within weeks of bloom.
- ❑ Healthy, fertilized fruit can drop in the spring or early summer (AKA “June drop”) when a tree sets more fruit than the leaves can support.

Research by Robbin Thorp, UC Davis Entomology Department (retired), shows the advantage of having bees work in a prune orchard at bloom.

Bee Situation	% Fruit Set
No Bees (Trees caged to keep bees out)	1
Wandering Bees (no cage around tree)	4 -- 22
With Bees (bee hive inside cage around tree)	15 -- 19

In prunes, Dr. Thorpe recommends one bee hive per acre. In almonds, the UC recommendation is for two strong hives per acre, and three hives per acre in poor weather (wet and cold).

How far can bees fly to find food? Bees can forage at least 3 miles from their hive, but most foraging bees stay within 100-200 yards of their hive if there is a good food source nearby. Prune flowers are a good food source for bees.

Bees do not fly if temperatures are 55°F or cooler and/or if winds are above 15 mph.

10 THINGS TO DO TO IMPROVE YOUR PRUNE RETURNS IN 2004.

(Some or all of these points are review for many growers.)

1. Buy a pressure gauge to measure fruit maturity, time harvest and improve dry away.
2. Learn to ID prune fruit reference date.
3. Get a copy of “How to shaker thin your crop...” from Franz at the UCCE office in Yuba City.
4. Check each cropload in each block at reference date. Thin crop if needed.
5. Compare the costs of propping and tying up trees in summer vs. shaker thinning at reference date.
6. Learn to use a pressure bomb to know when trees need water. There is a program in 2004 to pay prune growers to learn about irrigation scheduling using the pressure bomb. See info in this newsletter.
7. To save \$ and improve dry away, cut off your irrigation water at 30-45 days before expected harvest. If you haven’t tried this before, TEST it on a small block or part of a block.
8. Clean up the sizer on your harvester. There is a good chance that D-screen fruit will be a net money loser in 2004.

9. Try to avoid spraying an insecticide for aphids in season. You probably will have to spray for mites later. Diazinon and Asana can harm beneficial insects and mites, and diazinon residue on fruit is a problem in some markets. Money is available in 2004 to help prune growers learn aphid, mite, and rust monitoring practices. See info later in this newsletter.
10. Talk to your packer and banker and, for each block, evaluate if not growing a crop this year in any or all blocks should be part of your 2004 business plan.

FREE – TO A GOOD HOME – ALMOND AND PRUNE TREES

I have 100 almond ('Price' on Lovell) and 100 prune (French on Myro29C) nursery trees in cold storage. The trees were used in a defoliation study in the fall, 2003. The trees were grown by a commercial nursery with an excellent reputation, but are all different sizes. (I bought a continuous row of nursery trees to defoliate.) I will give them to anybody who will plant them, take good care of them, and let me take growth measurements until June, 2004. If you are interested, please call me (Franz) at 822-7515.

FERTILIZER PROGRAM:

Good crop yield is key to orchard profitability – especially in commodity production.. A big crop uses -- and then removes from the orchard at harvest -- large amounts of nutrients – especially nitrogen and potassium. Careful monitoring of cropload and, orchard fertilizer needs are key to good fruit and nut production. Careful use (timing and placement) of fertilizer is essential to getting the most from your fertilizer dollar and avoiding water pollution due to off-farm loss of fertilizer (especially nitrogen and phosphorous).

Here is a general table of the amounts of actual nutrient removed* by a prune or almond¹ crop depending on the crop yield.

Nutrient (pounds per acre)	Prune (2 dry tons/acre)	Prunes (3 dry tons/acre)	Almond (1500# nut meats/acre)	Almond (2500# nut meats per acre)
Nitrogen as N	36 lbs	54 lbs.	98 lbs	163 lbs
Potassium as P ₂ O	52 lbs	78 lbs.	128 lbs	213 lbs
Phosphorous as P ₂ O ₅	12 lbs	18 lbs.	38 lbs.	63 lbs.
Boron as B	0.8 lbs	1.2 lbs.	0.2 lbs.	0.35 lbs.

*Data are from the Potash Phosphate Institute (<http://www.ppi-ppic.org>), except for almond boron values (from work by Dr. Patrick Brown, UCD Pomology Department.)

¹ Kernels, shells, and hulls.

NITROGEN: Much more actual nitrogen (N) than the amounts listed above must sometimes be applied to meet the crop need. Why? When soil or covercrop N is not sufficient to meet crop needs (and this is usually the case if there is a good crop in the orchard), N fertilizer must be applied to make up the difference between soil/covercrop N and crop N needs.

- N fertilization is an inefficient practice. That is, all soil applied fertilizer N doesn't get into the crop. (Foliar feeding can be more efficient than soil applied N, but is less effective practice because as it would take many sprays to get the same amount of N into a tree compared to one soil application.)
 - Why is soil N fertilization so inefficient? On the journey from the fertilizer placement site (soil surface, shank hole, etc.) to the tree root surface, N can be misdirected in many ways. Before it can get to roots, fertilizer N can be absorbed by soil microorganisms and/or weeds, leached down out of the root zone by
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rain or irrigation water (potentially contaminating groundwater), volatilized up from the soil as a gas (ammonia or nitrous oxide), or fixed on soil particles. In addition, since trees can only use so much N at any one time in the growing season, fertilizer N that reaches the root surface may not be absorbed because the tree can't use or store it at that time. [Trees are like people in this way – they can't "eat" what won't fit inside. Five hundred pounds of actual N applied to an acre of orchard at one time is like ordering five, large sundaes for dessert – the waiter can bring them to the table but you can't eat the last two (or three?!) Fertilizer N applied in excess of plant needs remains in the soil and can be lost out of the root zone thru the processes listed above. So, the most cost efficient and environmentally sound fertilizer N program uses multiple applications of relatively small amounts of N at different times of the season. [Note: Applying nitrogen when there are no leaves on the trees is the most inefficient (costly) fertilizer program possible, since trees use no N when leaves are not present.]

The nitrogen budgets for prunes or almonds listed below help calculate the rates and timings of nitrogen needed and at what time(s) to match crop needs through the season while minimizing waste of grower dollars and environmental contamination.

NITROGEN BUDGETS

PRUNES N BUDGET: The UC Integrated Fruit Production Practices binder includes a prune nitrogen fertilizer budget. Please call Franz (822-7515) for more information.

ALMOND N BUDGET: An almond nitrogen fertilizer budget is available on-line at:
http://fruitsandnuts.ucdavis.edu/almond/html/almond_n_model.html

POTASSIUM: This nutrient is usually immobile in soil, and there is little danger of leaching of potassium from most soils in the Yuba and Sutter County areas. However, potassium can be "fixed" on clay particles, so UC recommends significantly more potassium be applied annually as a maintenance application than is actually removed in the crop.

PRUNES: UC recommends 500 pounds of potassium sulfate (sulfate of potash) as an annual maintenance application, and up to 2,000 pounds of material if summer leaf potassium levels were deficient (less than 1.0% leaf potassium).

ALMOND: Orchards are considered to have adequate potassium if mid-summer leaf levels show 1.4% leaf potassium or higher. Similar rates of potassium fertilizer are recommended for maintenance and deficiency correction in almonds as in prunes.

FUNGICIDE PROGRAM IN ALMONDS AND PRUNES

A good prune or almond crop starts with healthy flowers. Diseases such as blossom brown rot, green fruit rot, shothole, and anthracnose attack flowers and young fruit or nuts when wet conditions exist for extended periods of time in the orchard. Shothole and anthracnose attack almonds and not prunes, while brown rot and green fruit rot fungi attack both prunes and almonds. Flowers and/or small fruit should be protected before infection

conditions occur. Good pesticide coverage is essential to good disease protection at any time of the year. Here are some key points to remember when protecting prune and/or almond orchards in late winter:

- **Alternate fungicide chemistries** during the season to avoid development of pesticide resistance. See the UC Fungicide Efficacy and Timing publication for information on which different fungicides have similar or different chemistries.
- **Use labeled rates of fungicide** to reduce the chances of pesticide resistance developing in an orchard.
- **Know what stages of tree growth are most sensitive to disease.** For example, prune and almond flowers are susceptible to brown rot infection beginning at green and pink bud, respectively. However, flowers from these crops are MOST susceptible to brown rot infection at full bloom.
- To get the best disease control and reduce the risk of developing resistance to fungicides, **use every-other-row spraying only at pink-bud (almonds) or green-bud (prunes)**. At 40% bloom, fungicide coverage was much less and disease levels were higher on the back side of Peerless and Carmel trees when sprayed every-other-row compared to the front side (sprayer side) of the tree. At pink bud (5% bloom) there was no statistical difference in disease levels on either side of the tree. This research was done by Dr. Jim Adaskaveg, UC Riverside Plant Pathology Department, and his lab, with funding from the Almond Board of California.
- Please see the 2004 UC Fungicide Efficacy and Timing guidelines for almonds and prunes attached in this newsletter. In addition, the entire Fungicide Efficacy and timing for Deciduous Tree Fruit and Nut Crops and Grapevines, 2004 is now available on the web at: www.uckac.edu/plantpath. If you don't have internet access, please call Franz at the UCCE Yuba City office (822-7515) and arrangements can be made to get you a copy.

\$ AVAILABLE FOR SCOUTING

Money is available for growers interested in trying certain potentially money saving prune orchard monitoring practices. Please contact Franz at 822-7515 for more information.

FRANZ NIEDERHOLZER, U.C. FARM ADVISOR

UCCE STATEWIDE PRUNE DAY
MARCH 3, 2004, VETERANS MEMORIAL BUILDING,
1425 VETERANS MEMORIAL CIRCLE, YUBA CITY



- 8:00 A.M. SIGN-IN AND REFRESHMENTS
- 8:30 HOW PRUNE FRUIT GROW - *Franz Niederholzer, UCCE Sutter/Yuba Counties*
- 9:00 INDUSTRY/GROWER PANEL: GROWING THE CROP -- 2004
 •*Sunsweet Growers, Inc. Representative*
 •*Keith Larrabee, prune grower and Prune Bargaining Assoc. President*
 •*Grower/Packer to be announced*
- 9:30 BACTERIAL CANKER: RESEARCH RESULTS AND MANAGEMENT SUGGESTIONS.
 Dr. Bruce Kirkpatrick, UC Davis Plant Pathology Department
- 10:00 INTEGRATED PRUNE FARMING PRACTICES UPDATE - *Bill Olson, UCCE Farm Advisor, Butte County*
- 10:30 BREAK
- 10:45 BROWN ROT REVIEW - *Dr. Beth Teviotdale, UCCE Plant Pathologist*
- 11:15 TOPPING FRUIT TREE - *Maxwell Norton, UCCE Merced County*
- 11:45 DRIED PLUM INDUSTRY OVERVIEW - *Richard Peterson, California Dried Plum Board.*

COOKIES AND PRUNES COURTESY OF CALIFORNIA DRIED PLUM BOARD
 DONUTS AND COFFEE COURTESY OF JOHN TAYLOR FERTILIZER, YUBA CITY.

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