tree and vine notes

UC COOPERATIVE EXTENSION
MERCED COUNTY

JULY - August 1998 **Volume 2 Issue 16**

IN THIS ISSUE

ANT CONTROL IN ALMONDS
ALMOND HULL ROT
OFF-CHANDLER WALNUTS
VOICE MAIL / USEFUL INTERNET WEB SITES
PEST & DISEASE NOTES
TRAINING & TRELLISING
FINAL STAGES OF PRUNE GROWTH

UPCOMING EVENTS

AGRICULTURAL AIR QUALITY SHOW
WEDNESDAY, SEPTEMBER 23, 1998
WESTSIDE FIELD STATION
LASSEN AND OAKLAND AVENUES IN FIVE POINTS
WESTERN FRESNO COUNTY

ANT CONTROL IN ALMONDS (Hendricks)

Walt Bentley from Kearney Ag Center and I have a big test plot underway for ant control in almonds. Lorsban and Pounce are registered for ant control in almonds. The other treatments are experimental, and are being compared to our standard Lorsban treatment. These treatments were made to one set of plots on May 7th. A second set of plots were treated July 7th, and we added Clinch (avermectin) bait. Avermectin is a biological insecticide that is also sold as Agri-Mek. A final treatment of Lorsban at 4 pints will be made two weeks before harvest. We are evaluating early and late treatments separately. No plots received double treatments.

For the evaluation we used hot dogs as bait in plastic vials to trap ants for a two-hour timed period. The California fire ant and pavement ant are attracted to fats and protein, and they love hot dogs. The vials are capped after two hours and ants are counted back at Walt's lab. We also plan to place Nonpareil almonds in these plots at harvest and evaluate ant damage after the nuts are on the ground for a week. I will have the final results in a later newsletter.

TREATMENT MAY 7TH	RATE PER ACRE FORMULATION	ANTS PER REP JUNE 4TH	
LORSBAN	8 PT	0.0	insecticide
AMDRO (hydramethylnon) Bait in piles	2 LB	0.5	insecticide
AMDRO Bait broadcast	2 LB	3.5	insecticide
IMIDAN	8 LB	8.5	insecticide
KNACK (pyriproxyfen) Bait in piles	2.0	182	insect growth regulator
LOGIC Bait broadcast	1.5 LB	470	insect growth regulator
SPINOSAD Bait in piles	1.5 LB	455	biological insecticide
POUNCE	16 OZ	587	insecticide
LOGIC (fenoxycarb) Bait in piles	1.5 LB	759	insect growth regulator
UNTREATED	NONE	1215	no treatment

I want to thank Stan Morimoto and Danny Wade at Morimoto Farms for their great cooperation and lots of help with these applications. This is a BIG experiment that covers about 32 acres!

ALMOND HULL ROT – Hendricks

Hull split is finally here on Nonpareils (About July 20th) and this means that **hull rot** could be on the way! Nonpareil, Kapareil, and Sonora are the most susceptible to hull rot which is caused by both *Rhizopus* (bread mold) and *Monolinia fructicola* (brown rot). *Rhizopus* causes the gray mold or a "beard" inside hulls, and *Monolinia* causes the brown rot of the hull. Both cause the shoot to die back with wilted leaves attached, and both cause the nuts to stick. Vigorous, well-watered, heavily fertilized orchards with a dense

canopy are the ones most likely to have severe hull rot. In effect, do everything right and you pay the price. But there are a few long-term aids to reducing hull rot.

Management:

1) Nitrogen - 2.5% - 2.7% n

2) Induce a slight moisture stress at early hull split

*__**mid-june**__ skip an irrigation

*__**july**__ - irrigate ~50% normal

*__**august**__ - resume irrigations

OFF-TYPE CHANDLER WALNUTS (Hendricks)

Chandler trees that are not productive are showing up again, as they did in 1995. This has been reported mostly from the Sacramento Valley, but there are some Chandlers in Merced County with the non-productive condition.

What is known about this condition?

- Usually only 1-2% percent of the trees are affected, and the same trees continue to be affected in subsequent years.
- In some years the trees will bear normally, but in bad years they drop a large percentage of the small (about ¼") nuts. This year the nutlet drop was reported in late May.
- This is a budwood selection problem. It is not contagious and does not move from tree to tree.

This is a problem with the grafting wood. Young trees that are affected should be grafted over with scions from a **proven** productive tree. Grafting may not be the best solution for older trees when you factor in the crop loss, number of remaining productive years, and the cost of grafting and maintenance of the grafts. We can’t predict the occurrence of this drop, but it may be worse in wet years such as ’95 and ’98.

Check your Chandlers carefully before and during harvest. Have the shaker operator mark unproductive trees. Please let me know about any unproductive Chandlers so I can keep some record of its occurrence in Merced County.

Training and Trellising

A 3-year study (1989-91) compared 8 training-trellising systems suited to mechanization and San Joaquin Valley conditions. It compared cordon height, numbers of vertical foliar support wires, cordon-type (bilateral vs. quadrilateral), and distance of quadrilateral cordon separation. Barbera and French Colombard were used to represent moderate to high vigor cultivars. The results are summarized as follows:

Cordon height - An 11-inch increase in cordon height (53" vs. 42") increased yield in both cultivars, averaging 6.9%. Additionally, 0.5^{o}Brix in Barbera increased fruit soluble solids. Thus, cordons should be at 52 to 60 inches to be at a good working height, suitable for mechanization and for yield and fruit maturation potential.

Foliar wires – Adding a single foliar support wire 11 inches above a bilateral cordon increased berry and cluster weights overall and vine yields in some years by as much 7.1%. Fruit soluble solids were also favored with a single foliar wire over not catch wire in one year. Thus, directing some of the growth vertically, as well as increasing canopy height, tended to improve yields. However, the effect was not as consistent or pronounced as an increase in cordon height

Adding a second foliar support wire (3-wire vertical system) was not very beneficial. Yields were lower, while soluble solids were higher as compared to a single catch wire (2-wire vertical system). The lower yield with 3 wires was due to lower cluster numbers, presumably from more canopies shading of the spur positions on the cordon. Thus, the cost and inconvenience of using more than one vertical foliar support wire is not warranted.

Overhead "T" trellis - An overhead, 24-inch, 2 wire T trellis with an intermediate catch wire increased yields by 8.5% overall, while increasing fruit soluble solids, as compared to a 2-wire vertical system. Brush weights were also highest with this system due to the invigorating effects of additional foliar support. However, growers must weigh this potential response against the added trellising and pruning costs, as well as lowered convenience in mechanized practices.

Quadrilateral cordons - Using quadrilateral as compared to bilateral cordons gave the most dramatic yield response. Leaf area was spread by 2 to 4 feet and spur positions increased by 75%. Yields were increased by 53% and 69% in Barbera and French Colombard, respectively. The trade-off was lower fruit soluble solids of 1.1-Brix (Barbera) and 0.5-Brix (French Colombard).

Widened quadrilateral separation provided marginal benefits. Four-foot quads as compared to 2-foot quads improved yields by only 12% in French Colombard and 0% in Barbera and with no improvement in fruit composition. Thus, it appears that there is no

economic advantage to going to quad separation wider than 24-30 inches, especially since machine harvesting would be more difficult.

Pruning Systems

Machine hedge (non-selective) pruning and minimal pruning (bottom trimming only) are gradually increasing in California as we gain experience and confidence in the practices. They are widely practiced in Australia due to their more severe labor constraints. The practices can be expected to increase in California whenever labor is in short supply and economic returns are low.

Machine hedge pruning and minimal pruning were incorporated into our training/pruning trials during 1993-95. Machine pruning was compared to hand pruning on bilateral cordon and quadrilateral (2-foot separation) training systems. Two minimal pruning treatments were also included: No bottom trimmings vs. bottom trimming after fruit set for crop adjustment.

Machine pruning was the best system for vigorous French Colombard, especially with bilateral cordons. Hand pruning with bilateral cordons was too restrictive, producing the lowest yields with no improved fruit composition. Quadrilateral cordons showed comparable yield and fruit composition with machine and hand pruning after the first year of treatment. During the first year, machine pruning on quadrilateral cordons delayed fruit maturation one week along with a yield increase. By the second year and thereafter there were only minor differences among bilateral cordon-machine pruned, quadrilateral cordon-hand pruned, and quadrilateral cordon-machine pruned. Thus, French Colombard is very forgiving in terms of pruning method, adjusting well to the higher node numbers of machine pruning, regardless of training method.

Barbera responded dramatically to machine pruning with a 45% overall yield increase over hand pruning. However, this response corresponded with a 1.7’Brix or about a 2-week delay in fruit maturation. These responses were fairly consistent over the three years of study and were similar with either bilateral or quadrilateral cordon training. Barbera represents the moderately vigorous or highly fruitful cultivars that may continue to show some delayed fruit maturation from the higher node numbers with machine pruning. However, previous studies have shown that most cultivars will adjust to the higher node numbers by the third year, if not sooner.

Overall, as in previous studies, machine pruning can produce economical results with certain cultivars. Highly vigorous, moderately fruitful, or self-thinning, loose-clustered cultivars most often respond favorably to machine pruning. They tend to adjust crop load to vine capacity with lower fruit set and smaller berries when high node numbers are retained. French Colombard and Sauvignon Blanca have been notable examples in Kearney trials. Other cultivars such as Carignane, Ruby Cabernet, and Grenache may take one or several years to completely adjust.

Chenin Blanca continues to show some delayed fruit maturation. Very vigorous vineyards of any cultivar tend to respond favorably to machine pruning. A number of commercial vineyards have been successfully machine-hedge pruned for over 15 years.

Minimal pruning produced higher yields than hand pruning; it was similar to or poorer than machine pruning, yield-wise. However, fruit ripening was delayed by 1 to 3 weeks as compared to hand or machine pruning. It also contributed to lower titratable acidity, higher pH, and lower skin anthocyanin content in Barbera.

Adjusting crop by trimming the bottom half of the canopy (including clusters) after fruit set was not beneficial. It reduced yield while not improving fruit composition. Apparently, this was due to the fact that shoots and leaves were removed in the same proportion as the clusters. Thus, the leaf/fruit ratio tended to stay the same on the remaining canopy. Some commercial vineyards have successfully used minimal pruning for over 10 years. Yields have been consistent and with acceptable fruit quality. However, some harvest delay is usually expected. The system is best suited to vigorous vineyards with a high bilateral cordon or retrained to a high cordon. According to our studies, the bottom of the canopy can just as well be trimmed in the winter rather than in late spring.
.

Summary Recommendations

Row Spacing

8 to 10 feet for single curtain or vertical systems, depending on equipment.

11 to 12 feet for quadrilateral systems or GDC (Geneva Double Curtain).

Vine spacing

6 to 8 feet, depending on vine vigor and training system. Quadrilateral can be 1 foot closer **than** bilateral systems with comparable vigor.

Training and Trellising

Bilateral cordon at about 54 inches with a single foliar support wire (10"-12" above) for low to medium, vigor or highly fruitful cultivars. Examples are Barbera, Ruby Cabernet, Rubbed, Zinfandel, Sangiovese, Viognier, and Chardonnay.

Quadrilateral cordons separated 24 to 30 inches on a T trellis at about 54 inches for high vigor and small, loose-clustered cultivars. No foliar support wires are recommended.

Examples are Syrah (Shiraz), Cabernet Sauvignon, French Colombard, and Sauvignon Blanc. Most cultivars grated onto a vigorous rootstock such as Freedom can also be trained in this manner due to the high vigor characteristics.

Pruning

Conventional hand pruning for low to medium vigor or large-clustered cultivars. Spur and node numbers are adjusted to vine capacity. Examples include Zinfandel, Chenin Blanca, Sangiovese, Viogneir, and Chardonnay.

Machine hedge pruning is best adapted to high vigor and/or small cluster cultivars. Cultivars such as Syrah (Austrialia experience), Rubbed, French Colombard and Sauvignon Blanca respond very favorably in the first year. Others, such as Ruby Cabernet, Carignane, and Grenache, may take 1 or 2 years to adjust to the higher node numbers with a balanced crop load (no delay in fruit maturation).

Minimal pruning takes the most courage but is the easiest to endure. Basically, no pruning is involved, only bottom trimming or skirting. It is suited to almost any vigorous cultivar trained to a high bilateral cordon. Yields will increase and maintain a certain level. Ripening is usually delayed by 1 to 3 weeks. Bunch rot is almost eliminated. Shaking the canopy with in-phase horizontal rods performs machine harvesting.

VOICE MAIL

Voice mail is available 24 hours a day on our phone at 385-7403. If you cannot call during business hours, leave a voice mail message. We will return your call as soon as possible.

USEFUL INTERNET WEB SITES:

CDFA Programs, ag news and ag info

CALIFORNIA DEPT OF FOOD AND AGRICULTURE: **www.cdfa.ca.gov**

DONATE DON'T DUMP: Partnering Agriculture and Local Communities: **www.foodlink.org**

- pick up donations at times that fit your schedule
- provide loading equipment, and refrigeration of perishables if required
- no donation is too large or too small
- donation is tax deductible
- CA law protects donors from liability for any injuries that might result from donated food

DEPARTMENT OF PESTICIDE REGULATION: **www.cdpr.ca.gov**

- pesticide registration information

- look up resticide laws and regulations
- endangered species information
- upcoming continuing education classes
- news releases
- communicate via e-mail with individuals at DPR

PEST & DISEASE NOTES (Norton)

Projections for the major fruit crop pests were difficult to make this year and we don't have a high level of confidence that we were able to accurately predict treatment periods. This is due to the early development of the insects being interrupted by cold spring weather. My best guess, along with other observations are as follows. THERE ARE BROAD PROJECTIONS - FOR SPECIFIC PROJECTIONS AND RECOMMENDATIONS FOR YOUR SITE CONSULT WITH YOUR PEST CONTROL ADVISOR.

Peaches:

In peaches the day-degree (DD) projections for oriental fruit moth indicate 500-600DD was approximately was July 20-23. The 4th generation of OFM should begin about August 4th.

For peach twig borer, the treatment window of 400-500DD was July 19-23.

Some blocks have had to be treated for mites. Scattered brown rot in Loadels and Carsons are being reported. If it is incipient brown rot, there is little you can do besides grade carefully in the field.

Grapes:

Omnivorous leaf roller in grapes is treated at 700-900DD and that occurred about July 20-27.

Once temperatures were in the optimum range for powdery mildew, the disease exploded in many blocks. Once the mildew was brought back under control, most blocks look pretty good. Botrytis strikes on leaves, stems, and shoots have many growers worried about bunch rot at harvest. Many applied a fungicide just before the bunches "closed up" in the hopes of preventing bunch rot as fruit starts to ripen. At this point there is little we can do other than careful irrigation management.

Watch closely for mites and accompanying predators. I have seen what looks like leaf roll virus symptoms on vines that are young or had no symptoms last year. Even though

they look just like leaf roll, the visual symptom is not always reliable. If they appear one year and not in subsequent years, the symptoms were probably due to some other cause.

Prunes

Aphids were a big problem for many prune growers this year and many blocks had to be treated. The problem was worst in blocks that could not be dormant sprayed. Cool weather and a lack of predators contributed to the problem. Aphid infested trees that became wet with excrement may have fruit cracking. The "honeydew" disrupts the waxy layers on the epidermis and makes them susceptible to cracking.

Note: We are looking for sites that have still have some mealy plum aphid. UC is rearing a new aphid parasite that looks promising and we need sites to release it. Give me a call if you observe any.

My technician has found some peach silver mite like some have seen in almonds but I have not seen it do economic damage to prunes. Lacey scab was severe enough to cause economic losses in some blocks. The full bloom fungicide spray is critical to controlling this physiological disorder.

Apples:

Once we got past all the fire blight, most apple blocks look pretty good. Most were diligent in controlling apple scab and I have seen very little. I am surprised by how little mildew we had.

One report of late stink bug damage underscore how this type of pest can appear any time in the spring and early summer. While early season damage results in dimples and deformed fruit, late season damage is hard to detect except for tiny drops of excrement. Under the skin, the sting area will become pithy and white and gradually turn brown. Stink bug often prefer the stem end of the fruit while lygus damage is more dispersed.

Almond rust, caused by the fungus *Tranzschelia discolor*, will begin to show in May or June, if the disease follows our wet spring, as expected. This disease makes rusty spots which look very much like iron rust on the under side of leaves, and the tops of the leaves show yellow color to match the rust spot below. Rust can cause severe defoliation. Sulfur is a very effective control if applied before, or at the first sign of rust.

Almond scab, caused by another fungus, *Fusicladium carpophilum*, makes greasy gray spots on the leaves and on the tops of the nuts. These symptoms will usually start showing about mid-June. Control is best done at 2 weeks to 5 weeks after petal fall. There is still some chance to control scab in orchards where scab has been a problem in the past years. Control is very poor if you wait until scab shows in the orchard - scab control is a preventive program based upon past history and weather conditions. Defoliation from scab can be very severe in some orchards, especially in Carmel variety.

Each year we see damage to young almonds in particular, from **peach silver mite**. It usually starts to show in June. Hundreds of these tiny mites can be found on the under side of each leaf in heavily infested almonds. They cause leaf yellowing or silvering, curling margins and tips, scattered necrosis of the leaves, shotholing, and defoliation. They can be very destructive to young trees. Many mature orchards now show a bronzing of the terminal shoot leaves, but it does very little harm to mature trees. The peach silver mite is very easily overlooked, and its leaf damage can easily be blamed on something else like potassium deficiency. Peach silver mite is easily controlled by wettable sulfur, or by a number of miticides including oils and soaps.

Be sure to carefully identify the causes of foliage symptoms and defoliation now. Next year take measures, if needed, to control these problems.

Leafhoppers cause defoliation in almonds nearly every year. We can see two different leafhoppers in almond. One is the apple leafhopper, *Empoasca maligna* which is yellowish green with white dashes, and the other is the rose leafhopper, *Empoa rosae,* which is yellowish white with dark eyes and tarsal claws. Leafhoppers have two generations per year, but the generation starting now is the one that often damages almonds.

Nonpareil seems to be the least damaged. Ruby, Mission, Monterey and Aldrich seem to be very susceptible to leafhopper damage. Some experienced PCAs tell me that they use counts of 1 nymph per leaf as the spray trigger for Nonpareil and only 1/2 nymph per leaf for more susceptible varieties.

Some insecticides which are reported to control leafhoppers, often when spraying for another targeted and labeled pest are oils and soaps, Omite, Lorsban, malathion, AGRI-MEK, and Imidan. Consult with your PCA for his/her best advice.

IT'S THE PITS

Some have observed shattered pits in Loadel and Carson peaches.

This is probably due to very good growing conditions during May and June with cooler than normal temperatures with lots of water. The combination of high cell turgor, coupled with lower crop loads caused excessive tension on the developing pits.

SAMPLE ALMONDS FOR BORON NUTRITION NOW (Hendricks)

Collect almond hulls at harvest to analyze for boron status in your trees. Collect up to 10 hulls at 6' high around each tree from a number of trees, or collect hulls from the windrows. The laboratory that runs your leaf samples can also analyze hulls for boron. Don't use the old guidelines for leaf tissue levels. These are the standards for hulls:

30-80 ppm-Deficient! Apply foliar spray of 2 lbs of Solubor or 1 quart of Borosol per 100 gallons per acre soo0n after harvest. Soil applications of 5 oz per tree may help, especially in our sandy soils.

80-150 ppm-Adequate, but nut set may still benefit from foliar boron applications after harvest.

>200 ppm-May be toxic. Don't add boron. In high boron areas take measures to reduce boron. Hybrid root (or almond root) is more tolerant of high-boron soils.

Boron can be applied at bud swell in the spring, but timing with the bloom sprays is too late.

REMEMBER:

1) Hull levels are well above what we see in leaves, so be sure to use the new standards.

2) Foliar applies boron in the fall or at bud swell so that boron will be available at bloom for pollination.

3) Boron can easily become toxic, so calibrate carefully. Soil applied boron should be broadcast, **not banded**.

PEACH SILVER MITE - Hendricks

Peach silver mite has been a problem in many almond orchards since June. Hundreds of these tiny mites can be found on the under side of each leaf in heavily infested almonds. They cause leaf bronzing or silvering, rolling margins and tips, scattered necrosis, shotholing, and defoliation. These mites can be very destructive to young trees.

Many mature orchards now show a bronzing of the terminal shoot leaves. This is also PSM, but it does very little harm to mature trees. The peach silver mite is very easily overlooked, and its leaf damage can easily be blamed on some other cause. The PSM is very easily controlled with wettable sulfur, insecticidal soaps, oils, or a number of miticides at very low rates per acre.

Final stages of prune growth

Dry-weight accumulation in the developing prune begins following fertilization and continues until maturity. The process is ultimately interrupted when the prune drops from the tree. Dry matter increases, as carbohydrates produced by photosynthesis in the leaves are transported in the phloem through the stem into the fruit. The necessary minerals, such as nitrogen, are transported through the xylem and phloem. Good foliage and adequate moisture are essential right up to maturity as they continue to contribute to the weight and quality of the fruit. Defoliation or moisture stress during this phase can also adversely affect final size and quality. About this time, levels of the compound abscisic acid begin to increase, resulting in pre-harvest drop. The abscission zone forms rapidly in the mature fruit and cannot be prevented without treatment with growth regulators. We are aware these processes in the mature fruit, and we can see the formation of the abscission layer at the junction of the fruit and stem. About that time, the fruits are easily removed from the tree by mechanical harvesting, when the reaction of the exhausted tree is often dramatic: the crop is removed and the limbs rise. Remember that the orchard manager tries to maintain a "large bank account" for carbohydrate and protein storage for next year's crop; thus, the conditions in which the tree finds itself from August through October are critical because the differentiation of the flower bud for next year's crop is taking place. Good management must be maintained right up to dormancy. Pests that get out of hand, or stress produced by lack of moisture, can result in partially developed flower buds or partially-developed conducting tissue to the young flower buds. Orchard management is a never-ending process of paying attention to detail.

Prune Cracking

We have had some fruit cracking in some prune orchards. Here is an excerpt from the Prune Orchard Management (out of print).

End cracks of fruit are caused by tree moisture-stress followed by irrigation. In early to mid-June the flesh of fruit on trees subjected to moisture stress tends to separate from the pit (stone). Then, after irrigation in late June to mid-July, there is a rapid uptake of water into the fruit causing fruit expansion and end cracks. Irrigations applied after mid-July, however, cause very little end cracking even if the trees have been under moisture stress.

Side cracks are caused by a combination of fruit exposure to direct sunlight and changes in fruit size caused by normal fluctuation in 24-hour (diurnal) moisture both within the

fruit and on its surface (dew). At night and particularly in early morning hours, a tree builds up internal water pressure because its roots are functioning fully and transpiration is low. At the same time, relative humidity is also high and dew may form on the fruit. These increases in moisture cause the fruit to expand and its skin to stretch, but the skin on fruit exposed to direct sunlight is less able to do so and side cracks develop. (That is why side cracks develop on the exposed side of prunes on the south and west sides of the trees.)

The side-cracking period is generally about the first two weeks in July. A cool weather pattern at this time will greatly increase the number of side cracks on prunes. Large fruit is more susceptible to side cracking because its diurnal movement is greater and more internal pressure is applied to the skin. In the central valleys the amount of side cracking varies more from year to year than it does between orchards.

End cracking can be minimized by applying enough irrigations in May and June to avoid tree moisture stress. However, avoiding such stress may not be possible with flood-irrigated prune orchards on heavy or shallow soils. Some growers try to minimize side cracking by avoiding irrigations around July 4, the "normal" time side cracking begins. Unfortunately, side cracking does not occur during the same calendar period every year.

Side cracking begins about a week after the cheek diameter becomes larger than the suture diameter and continues for about three weeks. By making weekly cheek and suture, the side-cracking period can predict measurements during June, each year. Side cracking can also be caused by severe aphid infestations (see Pest Management Notes).

Central valleys the amount of side cracking varies more from year to year than it does between orchards. End cracking can be minimized by applying enough irrigations in May and June to avoid tree moisture stress. However, avoiding such stress may not be possible with flood-irrigated prune orchards on heavy or shallow soils. Some growers try to minimize side cracking by avoiding irrigations around July 4, the "normal" time side cracking begins. Unfortunately, side cracking does not occur during the same calendar period every year.

Side cracking begins about a week after the cheek diameter becomes larger than the suture diameter and continues for about three weeks. Making weekly cheek and suture, the side-cracking period can predict measurements during June, each year. Side cracking can also be caused by severe aphid infestations (see Pest Management Notes).

Farm Advisors
Lonnie Hendricks lchendricks@ucdavis.edu
Maxwell Norton mnorton@ucdavis.edu