



FIELD NOTES

A QUARTERLY PUBLICATION OF COOPERATIVE EXTENSION

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A Welcome...And a Farewell

Brent Holtz became San Joaquin County's new University of California Cooperative Extension Director and Farm Advisor on January 1, 2010. Brent's responsibilities will be both administrative and programmatic. Programs in San Joaquin County include: 4-H Youth Development; Nutrition, Family and Consumer Sciences; Grape Production; Fruit and Nut Crops; Environmental Horticulture; Irrigation Management; Master Gardener; and Vegetable Production. Cross-county advisors with Stanislaus County provide support in dairy science, livestock and range science, and agricultural labor management. If you have suggestions or concerns for Brent, or would just like to introduce yourself, feel free to call him at the San Joaquin County Cooperative Extension office 209-953-6100.

Before coming to San Joaquin County, Brent was the Pomology Farm Advisor for the University of California for 15 years in Madera County. Brent's research and extension programs have had one underlying theme; that is to help deciduous tree fruit growers in production agriculture find more environmentally friendly ways to produce their crops without compromising product quality or price.

Brent provided leadership to the almond industry as growers shifted from burning their prunings to wood chipping or shredding as a sustainable alternative that improves both soil and air quality. Efficacy data generated from Brent's program has been used in the registration of environmentally softer fungicides and insecticides. Brent also examined the control of hull rot through reduced irrigations at hull split; that Kaolin-based particle films can reduce stress and bud failure on almonds and enhance tree growth and yield; and that chloropicrin is a viable alternative for methyl bromide as

a pre-plant soil fumigant to control replant disease in almonds. Brent was also involved in a pistachio breeding program that eventually released "Lost Hills," "Golden Hills," and "Randy," selections that ripen earlier and avoid late season Navel Orangeworm damage. Welcome Brent!

Later this month we will bid farewell to our Environmental Horticulture Advisor, Ashley Basinger, who is leaving to return home to west Texas and a new job with a non-profit food bank that has a farming operation. We wish Ashley the best in her new endeavor!

Too Much of a Good Thing

If a little is good, then more must be better, right? Not always, and especially not when it comes to feeding your animals. This article describes a basic concept of feed management, and why you might want to take a closer look at the practice on your dairy. Overfeeding nutrients results in higher feed costs and potentially negative consequences for your animals and the environment.

Phosphorus is a great example of "too much of a good thing." During the '70s, '80s and early '90s many researchers, nutritionists, veterinarians, and producers were under the impression that increased phosphorus was necessary for reproduction, milk production, and animal health. As an example, the basic lactating cow diet without added mineral contains 0.40% phosphorus, well above the requirement for the highest producing cow. However, phosphorus was added to rations with total levels often exceeding 0.60%. Phosphorus fed above the requirement leaves the animal in feces and urine. In a survey conducted in the Northeast and Mid-Atlantic regions of the U.S. in 2002, on average, phosphorus in rations exceeded NRC guidelines by 34%. The extra phosphorus finds its way into the lagoon, then to the field, and

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in some situations to surface waters. Excess phosphorus in surface waters can cause serious environmental problems. Under normal conditions, algae growth is limited by a lack of phosphorus. When phosphorus is present in high concentrations, algae flourish and consume all the oxygen (thus killing oxygen-dependent life).

Regardless of milk price, everyone is concerned with maximizing the amount of milk produced while decreasing costs of production. In an attempt to achieve the greatest production, it is easy to fall into the trap of, "more must be better!" Take a step back, and keep the animal's requirements in mind. Here are some ways to make sure your animals are getting what they need in their diet, and you're keeping costs down while minimizing impacts to the environment: We will further explore each of these concepts in a series of future articles.

- Calculate **feed efficiency** (FCM / lbs of DM fed).
- Feed for **stage of lactation** and intake.
- Balance rations according to **animal requirements** and minimize the amount of nutrients leaving in the manure.
- Measure (and monitor) **MUNs** (milk urea nitrogen) as an indicator of protein efficiency.



A

word of caution: feeding excess of a nutrient decreases the nutrient utilization efficiency, thus increasing excretion of the nutrient into the environment and increasing cost of production. Because of the current economic conditions, many producers are trying to cheapen rations by dropping ingredients. However, simply cutting ingredients because they "cost too much" will not benefit you in the long term and may result in a scenario you cannot recover from. Feeding cows based on their nutrient and energy requirements is the best approach. Every cost must be evaluated against its benefits, both short and long term.

Jennifer Heguy, Dairy Advisor
and
Jed Asmus, Independent Nutritionist

Walnut Research Reports

Each year, many walnut research projects are conducted with support from the California Walnut Board, using some of the assessment funds paid to CWB by walnut handlers. Researchers prepare written reports on the outcomes of these projects, and these reports are submitted to CWB in late December.

If you wish to keep up with the latest results of CWB-funded research and we don't happen to cover a project or topic of interest at our regular walnut meetings, you can access research reports on-line to keep abreast of the latest developments. Late each winter, the UC Davis Fruit and Nut Research and Information Center (FNRIC) posts walnut research reports from the previous year to a database on its web site,

<http://fruitsandnuts.ucdavis.edu/>. From the FNRIC home page, click on "Fruit & Nut Information," then "Fruits & Nuts," then "Walnut." The Walnut Research Report database is listed under "General Sources" and can be searched by title, author, or year of the report.



One word of advice as you read these and other research reports, many CWB-funded projects run for multiple years and each report focuses mainly on the previous season's work. Unless you happen to be reading the report on a project in its final year, keep in mind that 1) previous reports on the project may contain background or important findings not necessarily detailed in the current report and 2) research-in-progress is just that: results of future work may well modify or refine the results obtained in any given year. Reports submitted while a project is on-going may not necessarily contain the "final word" on a project or problem. As much as possible, we try in our meetings and newsletters to bring the "full story" to you as final project results and conclusions become available. Still, with this in mind, there is much good and interesting information to be found in the reports.

Joe Grant
Farm Advisor

2010 Spotted Wing Drosophila (SWD) Recommendations for Sweet Cherry

Growers and PCAs handling cherries and other soft fruits should by now be aware of the arrival of the spotted wing drosophila, *D. suzukii*, in California orchards. At the California Cherry Research Review held last month in Stockton, Dr. Robert VanSteenwyk presented information on SWD biology and control, derived from our short experience with this pest to date and test results from foreign countries where SWD has been established for a longer time.

The following is a summary of provisional suggestions for controlling SWD in California sweet cherry orchards discussed during the meeting. They are based on Japanese research articles, preliminary trapping data from Janet Caprile (UCCE Farm Advisor - Contra Costa County) and Bill Coates (UCCE Farm Advisor - San Benito County), insecticide efficacy data from Mark Bolda (UCCE Farm Advisor - Santa Cruz) and fruit maturity susceptibility data from Jana Lee (USDA - Corvallis, OR). These controls are our best guesses with limited data on California cherries. We expect them to change over time and will publish more information as it becomes available.

Monitoring: Place a commercial bucket style trap or a 1 qt. plastic container with screen (hardware cloth with 3/16 inch openings) on the top and bait the trap with 1 inch of apple cider vinegar. The wire screen will limit the number of large moths, flies and bees captured in the traps. Replace the vinegar weekly (remove spent bait from the orchard – do not dump the spent bait on the ground in the orchard). Place trap about 3-5 ft. off the orchard floor and monitor twice weekly from first color change (light green to straw) until completion of harvest. Count only flies with spots on the tip of the wings (male SWD). Magnification will aid in the identification of flies. If any SWD are found in the traps, take control action immediately (see below).



Adult Male SWD

Generation time: SWD has a very short generation time, driven by temperature. Multiple generations and rapid population build-up can be expected. The table below shows the approximate generation times throughout the spring and summer in the northern San Joaquin Valley and the central coast based on 30-year average temperatures.

Infestation date (egg laying)	Number of days until adult emergence	
	Northern San Joaquin Valley (Linden)	Central Coast (Hollister)
April 1	28 days	34 days
May 1	20 days	29 days
June 1	15 days	22 days
July 1	13 days	18 days

Cultural Control: If conventional insecticide treatments are not an option (organic growers), and if fruit from pollinizer varieties matures earlier than the main variety and the pollinizer fruit will not to be picked and sold, then pick and remove pollinizer fruit one week or more before harvest of the main variety. This will prevent the SWD from emerging from the pollinizer fruit during the main variety harvest. Fruit removal is a critical control step for organic growers because of the relative lack of knowledge on effective organic insecticides. Conventional growers can suppress SWD on pollinizer fruit by insecticide applications (below).

Chemical Control: Begin applications when the pollinizer or the earliest variety in the orchard, changes color from pink to red. Repeat applications at 7 to 10 day intervals until harvest with one of the materials listed below. Preliminary fruit susceptibility tests and Japanese literature suggest that the SWD will infest ripe cherries of red to mahogany color. From the Japanese literature, it appears that 3 or 4 applications are required to control the pest and that the organophosphate and pyrethroid insecticides are effective for one to possibly two weeks. Observe all pre-harvest intervals (PHI) and re-entry interval (REI) periods and rotate between materials of different chemical classes between applications to slow the development of resistance. At this point in time, we are recommending adding Nu-Lure bait at 3 pt/100 gal with a final spray volume of 50 gal/ac. Do not include surfactants with Nu-Lure. This will help ensure that Nu-Lure residues will be removed in post-harvest washing.

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Oviposition scars caused by spotted wing drosophila, *Drosophila suzukii*

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Trade Name	Common Name	Chemical Class ^a	PHI	REI	Rating ^b
GF-120 ^c	spinosad	SPIN	0 days	0 hr	4
Sevin 80S	carbaryl	CAR	1 day	12 hr	3
Malathion	malathion	OP	3 days	12 hr	1
Ambush/ Pounce	permethrin	PYR	3 days	12 hr	2
Renounce/ Tombstone	cyfluthrin	PYR	7 days	12 hr	1
Baythroid	beta-cyfluthrin	PYR	7 days	12 hr	1
Provado	imidacloprid	NEONIC	7 days	12 hr	3
Leverage (Baythroid + imidacloprid Provado)	beta-cyfluthrin imidacloprid	PYR + NEONIC	7 days	12 hr	1
Entrust/ Success	spinosad	SPIN	7 days	4 hr	3
Delegate ^d	spinetoram	SPIN	7 days	4 hr	1
Actara	thiomethoxam	NEONIC	14 days	12 hr	3
Asana	esfenvalerate	PYR	14 days	12 hr	2
Warrior II	lambda-cyhalothrin	PYR	14 Days	12 hr	2
Diazinon 50WSB	diazinon	OP	21 Days	24 hr	1

^a The chemical classes are: SPIN is spinosyns, CAR is carbamates, OP is organophosphates, PYR is pyrethroids, NEONIC is neonicotinoids.

^b The rating scale is: 1= control for 7 to 14 days, 2 = control for 3 to 7 days, 3 = control for 1 to 3 days, and 4 = control for only 1 day.

^c GF-120 is slow acting and does not have knock-down activity but will suppress populations over time.

^d There is no MRL established for Delegate in Japan, Korea, or Taiwan. Please consult your packer/shipper for export implications.

Robert A. VanSteenwyk
University of California, Berkeley

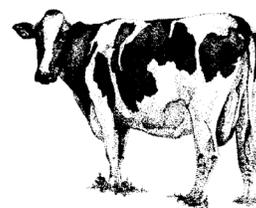
Joe Grant
Farm Advisor



Sponsored by:

University of California
Cooperative Extension

Dairy Herdsman Short Course



April 27-29, 2010
Consumer Education Pavilion
University of California-Davis
Veterinary Medicine
Teaching and Research Center
18830 Rd. 112
Tulare, CA

This short course is designed for working dairy employees. Its purpose is to provide the people who do the actual work on the dairy the opportunity to receive information about the latest technology and training in all aspects of dairy management.

Registration fee for the short course is \$280.00. Fees for companies and/or dairies with more than one participant will be \$280 for the 1st participant and \$260 thereafter. Students will be charged \$220.00. The fee includes a notebook with handouts, lunch, plus a short course shirt. Pre-registration is required. No registration at the door will be accepted.

To register on-line and pay by credit card:
http://cefresno.ucdavis.edu/Dairy/Dairy_Herdsman_Short_Course.htm

For more information contact Gerald Higginbotham, UCCE Dairy Advisor at, (559) 456-7558.

Carbon Sequestration on Rangelands

Carbon sequestration has been a topic of interest lately. Whether you believe in global warming or not, there has been an increase in carbon dioxide in the atmosphere. Carbon credits are being sold. Are rangelands a good way to store carbon? Is there any possibility to sell carbon credits for your ranch? There are many unknowns but research has been providing some answers to rangeland's potential.

More research has been done on perennial systems than annuals and common thinking was that annual grasses would not be able to store as much carbon as perennial grassland since roots are shallower. However, a review of research projects in California by Whendee Sliver, a professor at UC Berkeley, has provided some insight.

Regardless of the system (annual or perennial), there is relationship between climate and carbon storage as well as type of soil. Cool, moist climates and clay soils typically have the largest soil carbon. With California's Mediterranean climate, our rangelands are set to have cool, moist climate during forage growth. Moderate forage production typically has more soil carbon as well. Annual grasses typically have shallow roots, and it has not been believed that carbon could be stored at deep levels. However, California rangelands were found to have carbon stored to similar depths as perennial grasslands. A majority of the carbon was found stored in the top 8-16 inches, but there was an increasing carbon content up to about 40 inches. Some of the annual grasses were found to have up to 30% of their root mass below 12 inches. Deeper storage of carbon in the soil profile can offset increasing carbon dioxide in the atmosphere.

Oak woodlands add more carbon to the soil. Annual grasses have been shown to have carbon levels down to 40 inches. Oaks can store carbon down to 80 inches because of their deeper roots. Oak woodlands and savannas (a patchy appearance of oak trees) tend to also have higher levels of soil carbon than grasslands. The deeper roots allow oaks to more completely utilize all of the available water, and therefore store and keep more soil carbon. Coastal rangelands with other woody species also have been shown to increase soil carbon. However, an increase in woody species results in a decrease in forage available to livestock.

So are there any management practices that can help

increase soil carbon? Moderate stocking rates have been shown to significantly increase soil carbon in perennial grasslands. Timing of grazing affects composition and can favor vegetation with deeper roots. There may be more management practices that can affect soil carbon in California systems that research has not discovered.

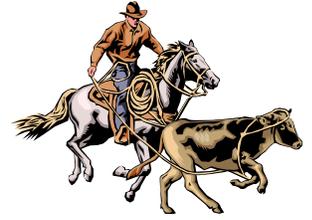
Want to learn more and ask questions from an expert? Then be sure to mark March 2nd on your calendar and plan to attend the Oakdale Livestock Forum. Bill Stewart from UC Berkeley will be presenting on carbon sequestration on rangelands. In addition, Frank Mitloehner will also discuss livestock and air quality.

Theresa Becchetti
Livestock Advisor





58th Annual Oakdale Livestock Forum



March 2, 2010
 Oakdale Community Center
110 South Second Street
 Oakdale, CA 95361

This meeting is sponsored by the University of California Cooperative Extension, the California Beef Cattle Improvement Association, and the Calaveras, Tuolumne, and San Joaquin/Stanislaus Cattlemen's Associations.

Register by February 19, 2010 and pay \$10 (or pay \$15.00 at the door).
Contact: Theresa Becchetti, Livestock Advisor, (209) 525-6800

- 9:30 a.m. **Registration and Morning Hospitality**
- 10:00 a.m. **Welcome, Opening Remarks**
- 10:10 a.m. AgriTourism: What Options Do I Have?
 Holly George, Livestock-Natural Resource Advisor, Plumas and Sierra Counties
- 10:40 a.m. Capeweed Risks and Opportunities in Weed Management
 Diana Waller, NRCS Stanislaus County
- 11:00 a.m. Range Seeding: Clover varieties
 Theresa Becchetti, Livestock-Natural Resource Advisor, Stanislaus and San Joaquin
- 11:15 a.m. Passion for the Land: Amplifying Rural Voices
 Holly George
- 12:00 p.m. **Barbecue Lunch**
 Prepared by the San Joaquin/Stanislaus Cattlewomen's Association
- 12:45 p.m. Digital Stories
- 1:00 p.m. Carbon Sequestration: Facts and Myths for Rangelands
 Dr. Bill Stewart, UCCE Forest Management Specialists
- 1:45 p.m. Clearing the Air: Livestock's Contribution to Climate Change
 Dr. Frank Mitloehner, UCCE Livestock Systems Air Quality Specialist
- 2:30 p.m. **Afternoon Hospitality Break**
- 2:45 p.m. Pinkeye Treatment and Prevention
 Dr. John Maas, UCCE Veterinary Specialists
- 3:30 p.m. **Closing Remarks**

Plant Picks for a Green 2010 Landscape

Spring is the season for new plants and for the San Joaquin garden I have picked out some of my favorites that are low-maintenance, drought-tolerant, and a beautiful addition to any home. The plants selected are from the UC Arboretum All-Star list, which may be found at: <http://arboretum.ucdavis.edu>. Local nurseries that sell these plants can also be found in a link on the same website. Many of the Arboretum All-Star plants are being tested at the Robert J. Cabral Ag Center demonstration gardens which are open to the public to view during business hours.



My first pick is butterfly rose (*Rosa x odorata* 'Mutabilis'). What would February be without a great rose? While roses in general have gotten a bad reputation for being pest-prone and high-maintenance, there are many varieties of

roses that can fit in well in the low-maintenance garden. Butterfly rose is such as rose, with many wonderful, fun qualities, being multi-colored and with a wonderful nose. In the Central Valley it can flower almost year-round, and is semi-deciduous. The flowers are not sterile like many hybrid tea roses, and its pollen will attract many beneficial insects, including bees. The common name, butterfly rose, is due to it appearing to be covered in butterflies when in full bloom. Bloom fragrance is lightly sweet and later has hints of spice as it ages.

My second pick is "Walker's Low" or hybrid catmint (*Nepeta x faassenii* "Walker's Low"). It is a low growing perennial that grows in a mound and blooms profusely almost all year. Bloom is a purplish blue, and leaves are an attractive gray green that is aromatic. Flowers attract bees and mostly small butterflies. "Walker's Low" needs to be pruned back in the winter to renew its shape. In recent research, this plant demonstrated the potential to inhibit weed seedling growth which may prevent weeds from invading close to this plant.



My third pick is another rose; golden pearl polyantha rose, (*Rosa* 'Perle d'Or'). A great attribute of this rose is it has fewer thorns than most roses.



Golden pearl is drought-resistant which means you should water this less than your traditional roses, allowing it to dry out between irrigation cycles. This rose would do well on a drip system on the same valve as other drought-tolerant perennial bushes. Although low-maintenance, it should be pruned back once a year like traditional roses. Flower color is a peachy pink, and it will bloom spring, summer, and fall. Golden pearl has a medium sized growth habit, 3 to 4 ft in height. It's fragrance is powerful, great to bring into the house to scent a room.

My fourth pick is a Cape balsam (*Bulbine frutescens*). This is a small evergreen perennial with long-blooming spikes of star-shaped yellow or orange flowers. Bright green foliage adds a nice sculptural addition to the garden. Cape balsam can tolerate very low amounts of water and poor soils. However, do not overwater, for this plant grows best with dry areas in its root zone. Length of flowering is from spring to late fall. This plant can also handle partial shade. The succulent leaves are similar to *Aloe vera* in that they contain glycoproteins, which are believed by some to have healing properties to ease burns, rashes, and itches (not my personal recommendation).



My final pick is a low-maintenance tree named Turkish madrone, (*Arbutus andrachne*). Turkish madrone is a medium-sized tree, great for its winter bloom of bell-shaped, white flowers that turn into orange/red berries that last into winter. Turkish madrone attracts hummingbirds and butterflies and has attractive red bark. Besides its beauty, my main reason for putting Turkish madrone on the list is for its tolerance of heat and alkaline soils, two things of which San Joaquin has plenty.



The key to low maintenance of these varieties is to allow the natural habit of the plant to form. Deadheading may be done often, but major pruning of the branches should only take place about once a year. With trees, pruning of most major structural branches should happen early on before a limb is over an inch in diameter.

Happy spring planting and for further help on growing plants in the home garden contact the Master Gardeners Hotline at 209-953-6112 or visit them at our UCCE office.

Ashley Basinger
Environmental Horticulture Advisor

Almond Bloom/Post-Bloom Period

Almond bloom time is nearly here! Welcome winter rains are filling the soil profile, the soil is warming and root activity is picking up. Plans have been made for mowing down winter vegetation for frost protection and bee management, and bee hives will be placed around orchards just prior to bloom (see the UC Almond Production Manual for excellent chapters on frost protection and bee management for pollination). It is difficult to predict the weather more than a week out but there is likely to be rain during the bloom period and fungicides are very often necessary under wet conditions for the prevention and control of blossom and foliar diseases. The good news is that growers know what disease pressures their orchards have faced in the past and monitoring for fruiting structures and lesions can inform treatment decisions for some diseases. More good news is that there are easy-to-follow, printer-friendly *Fungicide Efficacy and Timing* tables to be found in the Almond Pest Management Guidelines at the UC IPM website (www.ipm.ucdavis.edu). These tables are pulled from the 'Bible' of bloom disease management: *Fungicide Efficacy and Timing for Deciduous Tree Fruit and Nut Crops*. This publication can also be found at the website, but the following is a brief rundown of some disease-specific management guidelines.

Generally, a good disease control program is based upon a wise choice of fungicides and good timing and coverage. Growers should assess the diseases present in their orchards and select materials carefully. Not all fungicides are equally effective on all diseases. Resistance to fungicides can develop over time and repeated use, thus we need to rotate the fungicides we use. The Fungicide Resistance Action Committee (FRAC) has assigned fungicides to groups based on their modes of action. Fungicides with different group numbers are suitable to alternate in a resistance management program. When making fungicide applications, keep track of their FRAC numbers, and make only one application of materials in groups 1, 4, 9, 11, or 17. After using one of these fungicides rotate to another number, don't use the same number for two consecutive sprays. For other fungicides, make no more than *two* consecutive applications before rotating to a fungicide with a different FRAC number. Dr. Jim Adaskaveg, has done a great job authoring the 'Fungicide Efficacy' document and has put together a color guide that shows the symptoms of different diseases. The Almond Board of California has printed this color handout, and it is available through www.AlmondBoard.com.

Brown Rot. Usually two sprays are made for brown rot control. The first is usually done at 5-20% bloom using

a systemic fungicide, although a contact fungicide might be added to manage resistance. The second spray should be done near 80% to full bloom or 7-10 days after the first spray. This is the most effective brown rot spray! Depending on the weather, a third spray may be necessary if rains persist and the two week period of protection has passed. Application techniques are important. Ground applications are better than air, but care must be taken that both are applied correctly. In general, spray using properly calibrated and directed nozzles and maintain a slow speed. The brown rot fungus (*Monilinia laxa*) attacks the tree by invading the anthers and pistils of the flower when it is open. From there the fungus can move into and kill the spur or shoot. Young fruit are also susceptible in early spring and infection of fruit may extend to spurs and shoots. Although all cultivars of almond are susceptible to brown rot, they vary in their degree of susceptibility, Nonpareil is very resistant to brown rot. In recent trials conducted by Dr. Jim Adaskaveg, Butte, Wood Colony, Mission, and Livingston were some of the most susceptible varieties, followed by Sonora, Fritz, Monterey, and Carmel. Nonpareil, Peerless, Aldrich were the least susceptible to brown rot. Varieties that are susceptible to Green Rot or Jacket Rot (caused by *Monilinia laxa*, *Botrytis cinerea*, *Sclerotinia sclerotiorum*) are Butte, Ne Plus Ultra, Merced, Carmel, Price or any variety with tight clusters. If bloom is strung out and the weather is wet and rainy, no more than ten days should elapse between treatments.

The **Shot Hole** fungus (*Wilsonomyces carpophilus*) is notoriously more prevalent in wet years. This fungus requires water for all its activities, so periods of extended rainfall create a situation that favors shot hole disease epidemics. The fungus can cause lesions on leaves and fruit, but most of the time it infects the leaves as they emerge from the leaf bud. Leaf infections lead to defoliation, which usually occurs in early spring. Shot hole infections of young fruit, shortly after they emerge from the jacket, can cause the fruit to drop. As fruit enlarges, shot hole infection results in a lesion but the fruit no longer falls. About the first of May, when the embryo of the nut begins to grow, the hull becomes resistant to infection and no further lesions develop. Shot hole is usually controlled by fungicide applications after bloom, usually from petal fall to two weeks after petal fall. An IPM strategy for shot hole control is to monitor orchards in the fall and spring for shot hole lesions and fruiting structures. Fruiting structures appear in the center of leaf lesions as small black spots (sporodochia) and can be seen with a hand lens (www.ipm.ucdavis.edu). If fruiting structures are present in leaf lesions in fall, then a petal-fall treatment the following spring should be applied. If fruiting structures are not present, you can skip the petal-fall spray and monitor leaves in the spring for lesions. As soon as fruiting structures are evident, apply a fungicide as long as con-

ditions are conducive to disease development (wet). If fruiting structures are not present, delay treatment until they are. Zinc sulfate (20-40 lb/acre) applied in late October to early November will also hasten leaf fall and prevent shot hole inoculum from increasing.

Scab (*Cladosporium carpophilum*) was initially easily controlled with the strobilurin fungicides (Abound, Gem), but resistance to these fungicides has developed and we now recommend not using FRAC number 11 fungicides (quinone outside inhibitor). Dr. Adaskaveg has outlined a three-spray strategy for Scab control that includes dormant applications of copper-oil, a two-week after petal fall spray that includes chlorothalonil (Echo, Bravo), and a 5 week after petal fall spray that includes Maneb, mancozeb, or Captan. These are all multi-site mode of action fungicides with little chance of developing resistance. *Cladosporium* causes greasy black spots on fruit, leaves, and green shoots. The shoot lesions are the overwintering sites for the fungus and the source of new spores in the spring. No apparent damage is done to the fruit, but the leaves fall. Scab can completely defoliate a tree in a short time. All cultivars appear susceptible, but Carmel and Sonora seem especially vulnerable.

Rust (*Tranzschelia discolor f. sp. dulcis*) can also cause defoliation. Both rust and scab are favored by high humidity and usually are worse in years when late spring rains occur. Orchard culture that produces humid conditions for long periods is ideal for both diseases. Like scab, rust usually appears in late spring or early summer. The fungus attacks leaves but not fruit. On leaves, it produces small, bright yellow dots on the upper leaf surface, and reddish orange pustules on the lower leaf surface. The first fungicide applications for rust control should take place as soon as disease symptoms are first observed in the spring or early summer. Treatments could be integrated with an *Alternaria* control program. In orchards with a history of rust, applications should be made before symptoms are observed, sulfur can be applied 5 weeks after petal fall and followed up again with another fungicide at 10 weeks after petal fall (<http://www.ipm.ucdavis.edu>). Zinc sulfate (20-40 lb/acre) applied in late October to early November will hasten leaf fall and prevent rust inoculum from increasing.

An extremely damaging fungal disease, **Anthracnose** (*Colletotrichum gloeosporioides*) can be severe in wet springs. With the drought, we have seen little Anthracnose in the San Joaquin Valley, but wait for that El Nino spring. On fruit, Anthracnose can cause deep crater-like lesions; the affected area turns a rusty-reddish brown, and older fruit often gum profusely, and the nut meat is usually destroyed. The fungus is reported to invade the wood, and the branches upon which infected fruit reside weaken and die. Thus, in addition to destroying the

crop, long term damage and weakening of the tree may occur. Varietal differences in susceptibility occur. A good scab control program will usually control or reduce Anthracnose. Orchards that have a history of anthracnose should be treated during bloom, starting even at pink bud (your brown rot spray to protect blossoms), to help reduce inoculum build-up. Ideal conditions for disease are warm rains, and protecting trees before every rain is necessary for ideal control. All cultivars appear to be susceptible to anthracnose; Thompson, Merced, Price, Peerless, Winters, Monterey, Fritz, and Butte appear quite susceptible; while Harvey, Carmel, NePlus Ultra, Padre, and Mission are moderately susceptible. Nonpareil is considered to be less susceptible. In orchards that have a history of Anthracnose, apply fungicide sprays every 10 to 14 days if rains persist after bloom. Late spring rains may necessitate additional applications into May. Alternate fungicides as we have discussed using FRAC numbers (3, 7/11, 11, M3, M4) rotating materials starting at pink bud using either azoxystrobin (Abound) or myclobutanil (Rally), followed by pyraclostrobin/boscalid (Pristine) or pyrimethanil/trifloxystrobin (Distinguish), followed by a tank mix of captan or maneb with iprodione (Rovral) or thiophanate-methyl (Topsin). Pruning out dead, infected wood reduces inoculum. If sprinkler irrigation is practiced, use low angle nozzles to prevent the tree canopy from being wetted by sprinklers. Fortunately, we have a number of new fungicides going through the registration process that will be available soon that will help with fungicide resistance management.

More, timely **IPM** notes: The mummy nuts removed by poling or winter weather may still provide harborage for navel orangeworm (NOW), even sitting on the orchard floor. If possible, blow these off the herbicide strips and mow them up by March 15. If wet weather or budget cuts do not permit this then take some comfort in knowing that wet weather may decrease the survival rate of overwintering NOW in mummy nuts. Place Oriental fruit moth (OFM) traps out this month in orchards with a history of OFM damage. San Jose scale (SJS) traps can be hung later this month. These traps catch the flying male SJS as well as some cool predaceous beetles and parasitic wasps. A 7X Hastings Triplet hand lens works well for viewing these tiny insects and, later in the season, mites and NOW eggs. This may just become your favorite tool.

Brent Holtz
County Director, Farm Advisor

Dan Rivers
Staff Research Associate

Crops Digest - Grapes - 2010 Jan/Feb: Rainfall, Weeds & Spring

The 2009 year ended with a fairly normal rainfall total for the months of October, November, and December; around 6.1 inches for the north county and at slightly below average levels around 3.8 total inches for the south county. As of the first week in February the north county is well above average at 12.2 inches and the south county is just about on an average pace at 8.2 inches. Last year at this time there was a total of 5.9 inches of rain in the Lodi area. Chilling hours have been about average and fog has been a more common occurrence as in the "Good Old" days when the sun often disappeared for three to four weeks at a time.

Rainfall San Joaquin County Lodi

	Total	Oct Nov Dec Jan	Feb	Mar	Apr	May	
2005	24.7	10.4	3.2	3.3	3.5	1.4	1.3
2006	23.7	7.1	5.4	1.1	5.2	3.8	0.8
2007	12.1	4.6	0.3	4.3	0.6	2.3	T
2008	13.6	4.5	7.3	1.8	0.1	0	0
2009	15.1	4.0	1.9	5.3	1.9	0.7	1.3
2010	?	6.1*	4.5				
Avg	17.8						

*2.9 inches on October 13th

Chilling hours (hours below 45 F) have totaled slightly less than the long term average at 672 hours for 2009-10 compared to about 752 hours for the 14-year average. Evapotranspiration (ET) of winter cover and weeds has been low, somewhat mitigating the last three years of drought. But I had better not say nay more at this point. While it may not be necessary to think too seriously about a late-winter irrigation, checking out irrigation systems soon is neither a bad idea nor a waste of time.

Spring of 2008 was the first year since 1972 that frost occurred statewide. There were some scattered frost events last year and more of a problem in almonds than grapes, but it is best to be prepared. Just to review some old, but good information on soil conditions and cold during the early spring from work done by past Farm Advisors, Jim Kissler and Don Rough:

- * Firm bare ground, that is wet +2° F
- * Firm bare ground, that is dry ---
- * Freshly disked soil -2° degrees colder
- * High cover crop (24 to 30 inches) -2° to 4° (possibly 6 to 8° colder)
- * Low cover crop (less than 24 inches) -1° to 3° degrees colder
- * Mowed cover crop -½° F

Weed growth is more than last year as temperatures have been more normal and rainfall abundant, but the fall and early winter were dry enough to slow general weed development. Good control should be achievable with some normal rainfall patterns. There are some newer materials available and rotation or selection for particular weed species should be considered. If you missed the 58th Lodi Grape Day you can check out some of the slides from weed presentations by UC Farm Advisors, Kurt Hembree (Fresno County) and John Roncoroni (Napa County) on our website at cesanjoaquin.ucdavis.edu. And if you have related weed control questions, check in at ipm.ucdavis.edu or wric.ucdavis.edu.

This article is the short version; space restrictions and some enthusiasm on my part have encouraged me to send out a more detailed discussion for a mailing of *Along the Grapevine*. If you received this copy of *Field Notes*, you should also be receiving a grape newsletter with more details on the above topics.

A thought to end on looking ahead as the new season unfolds:

"I know of no pursuit in which more real and important services can be rendered to any country than by improving its agriculture, its breed of useful animals, and other branches of a husbandman's cares."
George Washington

Paul S. Verdegaal
Farm Advisor



Comparing ReTain® and HOLD™ for Reducing PFA in “Serr” Walnuts

Over many years of testing, ReTain® (Valent BioSciences Corp.) has been shown to effectively reduce pistillate flower abortion (PFA) and increase yield in “Serr” and some other walnut cultivars. More recently, bloom treatments of HOLD™ (StollerUSA), a combination of two StollerUSA nutrient supplements (ReZist™ and Calcium 5S), have been shown in some studies to increase walnut set and yield, though not as consistently or effectively as ReTain®. At rates recommended for walnuts, HOLD™ is less expensive than ReTain®, but its efficacy has not been well documented, especially in “side-by-side” comparisons with ReTain®. Trials were conducted in 2009 to further evaluate HOLD™ for its ability to improve set and yield in “Serr” blocks around the state.

Two trials were conducted in mature commercial “Serr” orchards: one under my supervision in San Joaquin County and one supervised by Farm Advisor Janine Hasey in Sutter County. Experimental design, spray applications, and data gathering methods varied slightly between the two sites (Table 1) but they shared the same three treatments:

1. ReTain®, 1 pouch (333 grams) per acre
2. HOLD™, (ReZist, 2 qt/a plus Calcium 5S, 2 qt/a)
3. Untreated

We measured nut set by tagging 20 or 30 mid-canopy receptive “doubles” (double-flowered spurs) during bloom on each of two trees in treated and untreated blocks. Tagging was done within one or two days before or after spray applications at each site. The number of nutlets per tagged spur was determined three to four weeks after treatment to assess PFA and again eight to nine weeks after treatment to assess nut drop from non-pollination and other post-PFA causes. Yield measurements were made in the test plots at harvest. Sub-samples of field-harvested nuts were collected, hulled and dehydrated to determine yield on a dry in-shell weight basis from field harvest weights.

At both sites, there was considerable overlap between Serr pistillate bloom and pollen shedding (data not shown); thus the potential was great for a heavy pollen load and PFA.

ReTain® significantly reduced PFA at both sites, as measured by four-week post-treatment set counts (Figure 1). HOLD™ treatments did not significantly increase nut set at either site. There was very little nut drop between the first and second set counts at both sites. This later drop is assumed to be due to non-pollination or other causes. Thus, most of the drop at both sites was caused by PFA. ReTain® also significantly increased yield at both sites. HOLD™ treatment yields did not significantly differ from the untreated trees.

At the Sutter County site, nut quality grading by Diamond Foods, Inc. showed no significant differences in nut size or internal quality among treatments (data not shown). Nut size and quality were not evaluated at the Lockeford site.

We would like to thank and recognize growers John Taresh and Don Luccesi for hosting these trials, and Lance Beem (StollerUSA) and Tino Lopez (Valent BioSciences Corp.) for technical and financial assistance.

Table 1. Orchard characteristics, experimental design, spray application, and data collection methods for Rio Oso and Lockeford experimental sites.

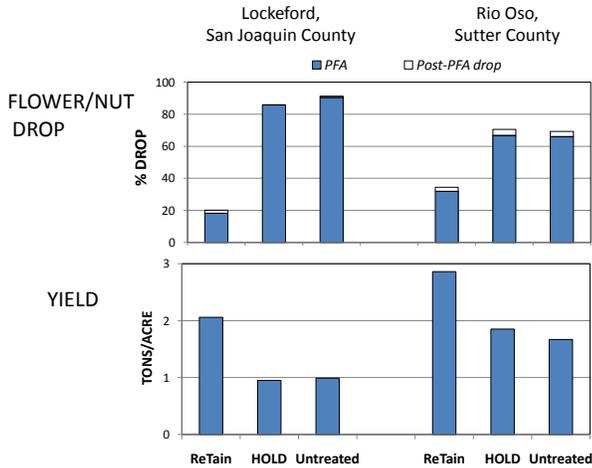
	Lockeford (San Joaquin County)	Rio Oso (Sutter County)
Orchard	30' x 30' mature Serr (48.4 trees/a) ; 40'-45' canopy height; Tehama pollenizers (% unknown)	30' x 30' mature Serr (48.4 trees/a), 40'-45' canopy height; Tehama, Vina and unknown pollenizers (11%)
Experimental design	RCBD, 4 replications; plots 3 rows X 8 trees (0.5 acre); 1 to 3 untreated “buffer” rows (or trees where plots in same row) between plots	RCBD, 4 replications, plots 3 rows X 4 trees (0.25 acre); 2 or 3 untreated “buffer” rows between plots.
Spray applications	Conventional airblast sprayer, 2 mph; 200 gal/a; all spray treatments on 2 April, 2009 (30% pistillate bloom)	Conventional airblast sprayer, 2 mph; 50 gal/a; all spray treatments on 31 March, 2009 (25% pistillate bloom)
Set counts	20 receptive double-flower pistillate inflorescences/tree on center 2 trees in each plot; first set count 23 April, second count 20 May	30 receptive double-flower pistillate inflorescences/tree on center 2 trees in each plot; first set count 29 April, second count 2 June
Yield measurement	2 center middles each (3-row) plot on 29 September, 2009	2 center trees each plot on 22 September, 2009

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Figure 1. Effect of ReTain® and HOLD™ treatments on nut set and yield at San Joaquin and Sutter County sites. (Columns with the same letter are not statistically different, P=.05, Student-Newmann-Keuls at Rio Oso site, Fisher's Protected LSD at Lockeford Site),



Joe Grant
Farm Advisor

Update of Research on Tomato Powdery Mildew Control Programs

This past season, I was part of a group of researchers funded by the California Tomato Research Institute to evaluate control programs for tomato powdery mildew. Our team of UC Farm Advisors included myself, Scott Stoddard, Gene Miyao, Michelle Le Strange, and Tom Turini with significant contributions from our cooperating growers, PCAs, and the staff of UC's West Side Research and Extension Center. In addition to some of our own individual trials, our group conducted four uniform powdery mildew trials in processing tomatoes which I will summarize here. Three trials were located within commercial fields (north Dos Palos-area, Tracy-area, and Dixon/Davis-area), while a fourth was conducted on-station in the Five Points-area. Trials were established in fields transplanted in mid-May, three were in fields of the variety SUN 6368, while the Davis/Dixon-area trial was in a field of AB2. At each location, a minimum of six treatments/control programs were evaluated.

- Quadris alternated with Rally – 7 day interval (late June through late August)
- Quadris alt. Rally – as above but 14 day interval
- Quadris alt. Rally – 7 day - late start at ~6 weeks before harvest (August)
- Quadris alt. Rally – 7 day – early start but ending about 6 weeks before harvest (July)

- Sulfur dust – 7 day – for 6 to 10 weeks midseason (July- August)
- Non-treated control – no mildew fungicides

The performance of the control programs varied with the trial location, but in general our observations mirror what we've been hearing from growers and PCAs these past three years - this mildew is very difficult to control. Even under our most intensive program of weekly fungicide applications, we still saw significant mildew development. At the San Joaquin and Yolo locations, the mildew came in late in the season and although the foliage suffered significant necrosis by the end of the season, yields were not impacted by the mildew. However at the Westside/Fresno location, mildew got started in late July, two months prior to harvest, and intensified quickly. Under that high disease pressure, programs that included early applications (end of June, six weeks after transplanting) resulted in significantly higher yield compared to nontreated plots. So out of the four trial locations, three sites suffered mildew and of these one had a significant yield reduction. Fruit quality was sometimes also reduced by the mildew; plots without mildew fungicides had more sunburned fruit at one site (Yolo), poorer fruit color at one site (Fresno), lower Brix at three sites, and higher pH at two sites (Fresno and San Joaquin). The best program at all three sites was sulfur dust applied throughout July and August; next were Quadris/Rally rotation programs which started early (end of June) (see Figure 1).



Admittedly, some of the programs we evaluated included a far larger number of dust or fungicide applications than a grower would be interested in putting out. We are not recommending such intensive programs, as we recognize that they may not often be economically justified (in other words, the cost of control may not be repaid with yield increases under most circumstances). However, we did document that this mildew has the potential, under some circumstances, to severely reduce yield. Several of the intensive programs would have repaid themselves at the Westside location due to the impact of mildew at that site. With the start of this project this past year, though, we were interested in seeing just what was required to gain good control of this disease. While we do not yet have a solid set of management recommendations for this disease, our group is committed to identifying economical control programs for growers and answering questions such as, which are the best materials to apply, when applications should begin, how long prior to har-

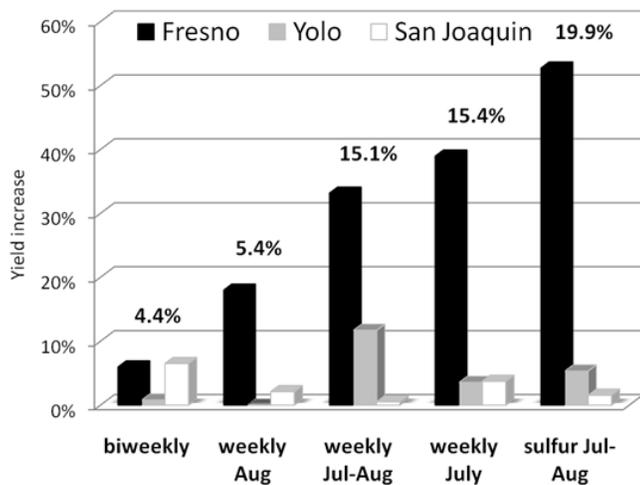
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vest they can end, and how long we can extend application intervals. Our group's work will carry on in 2010 with continued funding from CTRI.

Brenna Aegerter
Farm Advisor

Figure 1. Effect of mildew control programs on yield of processing tomatoes. The height of the bars indicates the percent yield was increased compared to a non-treated control (no mildew fungicides). The percentages listed over the bars are the average yield increases over the three sites with mildew.



Calendar of Events

Fresh Market Tomato and Pepper Production Meeting

Tuesday, March 2, 2010. (8:00 AM to 12:00 noon)

Robert J. Cabral Agricultural Center

2101 E. Earhart Ave., Stockton, CA 95206

Please RSVP for lunch by calling 209-953-6100 by February 26.

Info: Brenna Aegerter, bjaegerter@ucdavis.edu or call 209-953-6114

58th Annual Oakdale Livestock Forum

March 2, 2010

Oakdale Community Ctr., 110 S. Second St., Oakdale

Info/Registration: Theresa Becchetti, Livestock Advisor

tabecchetti@ucdavis.edu or call 209-525-6800

Gopher and Vole/Mice Control Workshop

Friday, March 5, 2010, Time: TBA

Woodland UCCE office, 70 Cottonwood St., Woodland, CA 95695

Info: Gene Miyao, emmiyao@ucdavis.edu or call 530-666-8732

Dairy Herdsman Short Course

April 27-29, 2010

UCD Veterinary Medicine Teaching and Research Center, 18830 Rd. 112, Tulare, CA

To register on-line and pay by credit card:

<http://cefresno.ucdavis.edu/Dairy/>

[Dairy_Herdsman_Short_Course.htm](http://cefresno.ucdavis.edu/Dairy/Dairy_Herdsman_Short_Course.htm)

Info: Gerald Higginbotham, UCCE Dairy Advisor 559-456-7558

2010 California Grazing Academy

Friday-Sunday, April 30-May 2, 2010

Sierra Research and Extension Center

8279 Scott Forbes Rd., Browns Valley, CA 95918

Info: Roger Ingram, rsingram@ucdavis.edu or call 530-889-7385

Register Online: <http://ucce.ucdavis.edu/survey/survey.cfm?surveynumber=4269&back=none>

Mail in registration: <http://ceplacer.ucdavis.edu/files/73304.pdf>

Walnut Dehydrator Workshop

June 29, 2010

Stanislaus County Ag Center

3800 Cornucopia Way, Modesto, CA 95358

Practical and comprehensive one-day workshop on efficient dehydrator design and operation, reducing energy and capital costs of drying, pre- and post-hulling sorting, and other topics. Detailed program and registration information forthcoming.



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