Field Notes

San Joaquin County

May 2014

University of California
Agriculture and Natural Resources | Cooperative Extension

100 Years of Cooperative Extension: The Smith-Lever Act Centennial

UC Farm Advisor at Silage corn trial, 1929. San Joaquin County Historical Society, Lodi.

May 2014 marks the 100th anniversary of the Smith-Lever Act, legislation that created Cooperative Extension, a nationwide system of community-based education, established as part of each state's land grant university. Cooperative Extension was started to help farmers, homemakers, and youth use the latest university research to improve their lives. At first geared towards strengthening rural areas, Cooperative Extension became integral to urban and suburban communities as well. A century later, Cooperative Extension continues to provide a vital link between public universities and communities.

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100 Years of Cooperative Extension: The Smith-Lever Act Centennial

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When the Smith-Lever Act was signed, efforts were already underway in California to create an agricultural extension system, building on the success of the state's land grant, the University of California. The first UC campus, at Berkeley, had agriculture as an important early focus, and in 1907, a university research farm was opened in Davisville, a site that grew into a new campus, UC Davis. The same year, UC established the Citrus Experiment Station in Riverside, the foundation for the UC Riverside campus. New knowledge and technologies developed by UC scientists were critical to the growth of farming and allied industries around the state. By the time the Smith-Lever Act became law, UC agriculture faculty were already offering short courses and institutes for farmers around the state, but farmers were clamoring for more. Many California farmers were excited about the possibility of having a Cooperative Extension educator, known as a "farm advisor," assigned to their community.

Anticipating strong demand, University of California officials required each county government that wanted to participate in the Cooperative Extension partnership to allocate funding to help support extension work in that community. Additionally, it was required that a group of farmers in participating counties organize into a "farm bureau" to help guide the farm advisor on the issues of local agriculture. (These grassroots groups later evolved into the California Farm Bureau Federation). The first California county to sign up, Humboldt County, had their farm advisor in place by July 1913, anticipating passage of federal legislation. Seven more counties, including San Joaquin, came on board in 1914 and many soon followed, with 41 of 58 California counties securing Cooperative Extension farm advisors by 1922. Other counties joined the partnership in subsequent years. A century after the inception of this collaboration between UC and counties, county government continues to be a key partner in local delivery of Cooperative Extension.

In its first years, Cooperative Extension played a critical role on the home front during World War I, helping farmers to grow enough wheat and other crops to meet expanded war-time needs. Extension's value was quickly established as farmers came to rely on having an expert close at hand who was familiar with local conditions and crops. In addition to addressing the needs of farmers, Cooperative Extension soon expanded to provide educational opportunities for their families, including programs for rural women and activities for local youth. Nutrition, food preservation, and a variety of skills were taught by "home demonstration agents" working with rural women. Thousands of young people would learn about food production, cooking, science and more through participation in 4-H clubs.

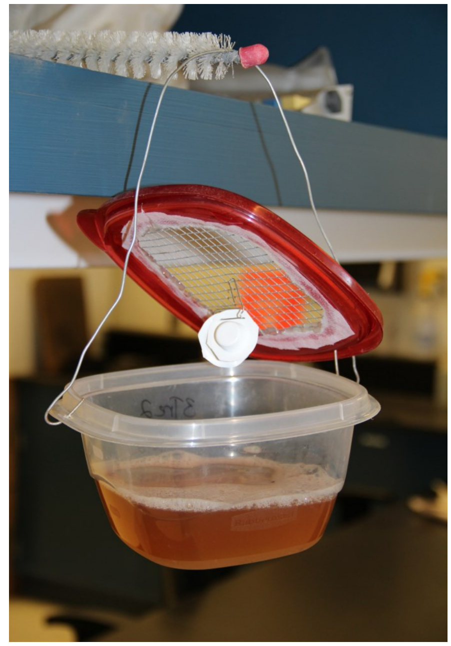
UCCE San Joaquin County Onion trial, 1957.

Today, UC Cooperative Extension continues to serve communities throughout California as part of the University of California's Division of Agriculture and Natural Resources (UC ANR), with 200 locally based Cooperative Extension advisors, 130 campus-based Cooperative Extension specialists, 57 county offices throughout the state, and nine research and extension centers. Over a century of service, Cooperative Extension has continued to connect communities with the land grant campus, bringing practical, trusted, science-based solutions to Californians.

Field Evaluations of PHEROCON® SWD Lures for Monitoring Spotted Wing Drosophila

For the past few years researchers have been developing methods for monitoring adult spotted wing drosophila (SWD). The most effective systems use bucket-style traps that contain a fermenting liquid as both the attractant and drowning solution. The two most common liquid baits are a) apple cider vinegar or b) a fermenting concoction that contains 12 fl oz of water, 0.25 oz of baker's yeast (e.g., Fleischmann's), and 4 teaspoons of sugar. Apple cider vinegar has the advantage that it is relatively clear which makes it easy to evaluate. Yeast has the advantage that it often captures more flies, but is harder to evaluate due to the white milky color. Researchers have also tried concoctions of other fermenting liquids, some of which have resulted in nominal increases in fly catches, but that are typically more expensive and/or have logistical issues when transporting open bottles in vehicles.

Over the past few years USDA researchers in Wapato, WA have been doing research to identify which volatiles from fermenting fruit are attractive to SWD. Research papers led by Dr. Landolt and Dr. Cha have led to the identification of four volatiles that can be used in combination to make a synthetic lure for SWD. These include acetic acid, ethanol, acetoin and methionol. Several private companies are using this information to develop commercial lures that can be used by farmers.



During 2013 and 2014 we cooperated with Trécé to conduct five field experiments to evaluate the effectiveness of lures with different combinations of the four components. At the end of the trials the most effective lure combination was named and is now being sold as PHEROCON® SWD. This product consists of two lures, each of which contains two of the four components, which are hung jointly by a paper clip from the lid of a bucket trap. Throughout each study, traps that contained the lure over the top of a non-attractive liquid (antifreeze) captured approximately the same number of flies that were captured in the industry-standard apple cider vinegar trap (Fig. 1). When the lures were used in combination with apple cider vinegar they captured approximately two to three times more SWD than when either attractant was used individually.

These studies were repeated in Oregon caneberries, Oregon blueberries, Washington cherries, and North Carolina mixed berries by Drs. Jana Lee, Vaughn Walton, Betsy Beers and Hannah Burrack, respectively. In each of these locations very similar relationships were found in the results despite the differences in crops, climates, time of year, pest pressure and style of bucket trap. This means that the lure in combination with apple cider vinegar has the potential for use across a large range of situations where maximum SWD captures are desired.

The lure also presents an opportunity for growers that aren't interested in maximum captures, but are instead interested in making traps easier to evaluate. Throughout our studies traps using the synthetic lure without apple cider vinegar caught a higher percentage of SWD compared to other drosophilans (Fig. 2).

During 2014 we also conducted a study to test the longevity of PHEROCON® SWD lures. We found that aged

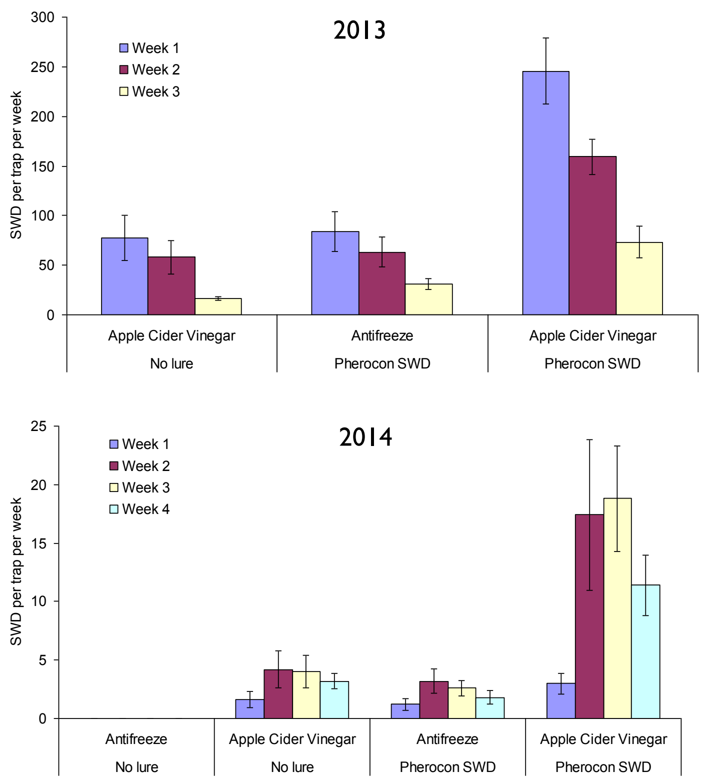


Fig. 1. Captures of SWD using apple cider vinegar, PHEROCON® SWD, or both. Kern Co., CA, 2013-2014

(Continued from page 3)

lures captured similar numbers of SWD as new lures for a period of approximately four weeks. Lures that were five weeks old captured approximately 50% as many SWD as new lures with the percentage tapering off thereafter. For that reason, we suggest lures be changed every four weeks.

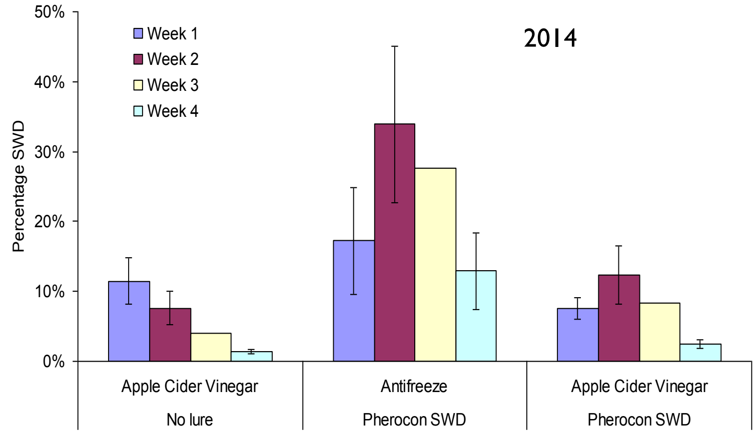


Fig. 2. Percentage of drosophilans in traps that are SWD, Kern Co., CA, 2014

Conclusions

Monitoring for spotted wing drosophila can be an essential part of an IPM program. Trap captures can allow early warning systems for flies, can help compare fly densities from one field to another or one season to the next, can help determine if spray programs are effective, and can help define the needed spray intervals in crops like California raspberries with multi-month harvest seasons. Our studies showed that traditional trapping with apple cider vinegar or yeast-based traps can help provide those benefits. They also showed that the use of lure-based traps, such as PHEROCON® SWD, can help improve the effectiveness of those trapping programs.

David Haviland, Entomology Advisor, Kern Co.

Evaluation of Surface Water Quality on the Soil Leaching Fraction in the Delta

Last February in this newsletter, I introduced a study I am conducting to assess the effect of surface water quality on the soil salinity of alfalfa fields in the south Delta. This article revisits that project and describes what was learned in the first year. The objective of this work is to gain knowledge on the leaching fraction being achieved and how surface water quality and rainfall affect leaching. The knowledge to be gained will assist growers with salinity management.

As a forage crop, the marketed product of alfalfa is the vegetation, or alfalfa hay. Hay yields are directly related to crop water use. As crop water use increases, so does alfalfa yield. Nevertheless, soil and water salinity can constrain the relationship between water use and yield. In general, plants that are stressed by salinity show stunting and reduced yields. To prevent a harmful accumulation of salts, the soil profile must be leached periodically with an amount of water in excess of what is used by the plant. The leaching fraction is the minimum fraction of the total applied water that must pass through the soil root zone to prevent a reduction in crop yield from excess salts. Leaching occurs whenever irrigation and rainfall exceed crop water use.

Two measurements are needed to establish the leaching fraction. One is the average salt concentration of the total applied water, as irrigation and rainfall. The salinity of irrigation water can vary substantially in the Delta based on time of year and location. In the south Delta, the salt concentration of surface water is mandated by the 1978 Delta Plan. The California State Water Resources Control Board established surface water salinity objectives in the Delta Plan, based on the current knowledge of soil types, irrigation practices, and salinity standards of predominant crops. When the 2006 Bay-Delta Plan was adopted, the salinity objectives were not changed due to a lack of scientific information to justify a change. In other words, there have not been any recent studies to evaluate how surface water quality is affecting the crops and soils of the south Delta.

The second measurement needed to establish the leaching fraction is the salinity of the water draining from the root zone. This measurement is made by collecting soil samples from different depths and measuring the electrical conductivity (EC) of the water that drains from the soil when the soil is saturated. Electrical conductivity is the ability of a solution to transmit electrical current because of dissolved solutes. The leaching fraction is calculated from the ECs of the irrigation water and soil-water.

Evaluation of Surface Water Quality on the Soil Leaching Fraction in the Delta

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I am conducting the current study in seven south Delta mature alfalfa fields. The study focuses on alfalfa fields because alfalfa is moderately sensitive to salinity. Fields were selected based on similar soil characteristics but differing irrigation water sources. The fields have a high clay content, which is important because drainage is slower in clay soils, making leaching difficult. Irrigation water is sourced from the San Joaquin River, including Old River, Middle River, and connecting sloughs and canals. Soil is sampled in the spring and fall, in one-foot increments, down to five feet. Groundwater is sampled at the time of soil sampling, and irrigation water is sampled from each irrigation throughout the season. Yield measurements are taken from at least three cuttings during the growing season.

Over the course of the 2013 field season, irrigation water salinity (ECw) ranged from 0.37-1.79 dS/m at the seven sites. Four sites had average ECw below 0.7 dS/m, the irrigation season (April-August) salinity objective set by the State Water Board, but the average salinity at three sites exceeded the State Water Board's standard. Previous research suggests that beyond a water salinity threshold (ECw) of 1.3 dS/m, alfalfa yield reductions are expected; although, the 2013 yield results from this project do not suggest that yields were harmed by salinity. The bottom of the root zone was assumed to be the 1-foot layer of soil above the groundwater table. The achieved leaching fraction was calculated for this layer of soil. Across the seven sites, the lowest leaching fraction was three percent, while the highest was 39 percent. The leaching fraction of five sites was less than 15 percent, which is a general recommendation for leaching. In other words, five of the seven sites did not get enough leaching in 2013. This study is continuing in 2014 and will provide current data for understanding the leaching fraction being achieved in south Delta alfalfa fields, a region that would be further challenged by salinity under conditions of reduced rainfall, reduced water flows, or a higher surface water salinity standard.

Michelle Leinfelder-Miles, Farm Advisor, Delta Crops

Calendar of Events

Cottage Food Operations Workshop Series

This hands-on workshop series is designed especially for farmers of fruits, vegetables, nuts, herbs, and honey interested in making value-added products in home kitchens as Cottage Food Operations (CFOs). The workshops will cover: Cottage food law, food science and sanitation, hands-on demos, packaging and storage, and business operations for CFOs. Workshops take place from 9:00 a.m. to 4:30 p.m. both days. Lunch is provided. Six locations across N. California including:

Fairfield, May 13 & May 20, 2014
Jackson, June 12 & June 16, 2014
Sacramento, July 1 & July 9, 2014

Cost: $25 in advance / $40 at the door, space permitting.

Workshop series is open to everyone.
Register online: http://ucanr.edu/cfoworkshops
contact: Shermain Hardesty (530) 752-0467, shermain@primal.ucdavis.edu

Vegetable Crops Research Update

Tuesday May 27, 2014 8:00- Noon
Vegetable Crops Research Update
West Side Research & Ext. Center, Five Points
More info: http://www.tomatonet.org/static/uploads/UCCEFresnoVegCropsUpdateMeeting27May14.pdf

UC Davis Weed Day 2014

Thursday, July 10, 2014
Buehler Alumni Center, UC Davis
Continuing education credits for California pesticide applicators have been requested from California DPR for this event. To register or for more information, visit the UC WeedRIC website (http://wric.ucdavis.edu) and click on WEED DAY 2014.

Aquatic Weed School 2014

Save the date! Sept. 23-24, 2014 :: UC Davis
Registration and more information will be posted soon at http://wric.ucdavis.edu

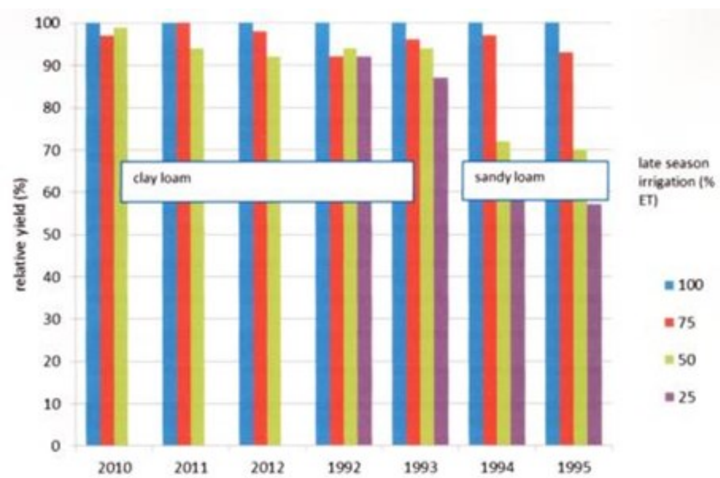
Strategies for Coping with Drought: Processing Tomatoes

Note: for more information on using evapotranspiration (ET) to schedule irrigations, see the full length version of this article at:

http://ucmanagedrought.ucdavis.edu/Agriculture/Crop_Irrigation_Strategies/Processing_Tomatoes/

Strategy 1: Reduce the irrigated acreage to match the water supply. The reduced acreage is fully-irrigated using normal irrigation practices, resulting in maximum yield per acre. The remaining acreage is not irrigated, resulting in no yield. The fully-irrigated acreage must be irrigated as efficiently as possible by reducing surface runoff and deep percolation below the root zone to stretch the limited water supply. If additional water supply reductions occur later in the season, the crop on the planted acreage could be under-irrigated.

Strategy 2: Fully-irrigate during the first part of the crop season followed by little or no irrigation for the remainder of the season. This strategy is a variation of the normal irrigation practice of fully irrigating during the period of canopy development/fruit set, then reducing (cutback approach) or terminating (cutoff approach) irrigation during the latter part of the season. This strategy involves more severe reductions and/or cutoff periods compared to normal irrigation practices and is more appropriate for drip irrigation than for furrow irrigation. It should be noted that the soluble solids increases as the cutoff or cutback amounts of irrigation water decreases.



Thus, the solids yields may be only slightly affected by these strategies.

Using Drip Irrigation: Experiments conducted in seven years evaluated the effect of various levels of late-season irrigation water cutbacks on crop yield and quality of drip-irrigated processing tomatoes in different soils types (clay loam and sandy loam). Cutback irrigation started 60 days before harvest. Results showed that yield was reduced as the amount of applied water decreased. However, for the 50% ET and 75% ET cutback treatments, yields of both exceeded 90% of the 100% ET irrigation water treatment in clay loam. Yields of the 25% ET cutback treatment were at least 85% of the maximum yields for the clay loam soil. For the sandy loam soil, yields of the 75% ET cutback treatment were similar to those in the clay loam, but yields were much smaller for the 50% ET and 25% ET cutback treatments in this soil. These results suggest that during periods of limited irrigation water supplies, irrigation amounts under drip irrigation during the latter part of the crop season may be decreased to smaller values than normally applied with a minimum crop yield effect on clay loam soils. However, yield reductions may be severe in sandy loam soil. The different yield responses between the soil types reflect differences in soil moisture storage capacity of the two soils. Clay loam soils have a higher soil moisture storage capacity compared to sandy loam soils. This strategy assumes that sufficient irrigation water will be available during the canopy development/fruit set growth stages.

Using Furrow Irrigation: The cutback approach is difficult to apply under furrow irrigation because of problems of applying small amounts of water throughout the field at a high uniformity of applied water. Thus, a cutoff approach is recommended where irrigations are terminated prior to harvest. An experiment at the WSREC showed reduced yields of furrow irrigated processing tomatoes on clay loam as the cutoff time increased from 20 days to 80 days before harvest. The yield of the 80-day cutoff time treatment was about 81 percent of that of the 20-day cutoff time treatment.

Early Season Irrigation: Higher yields can occur under both cutback and cutoff strategies if adequate irrigation occurs during the canopy development/fruit set growth stages. Under no-stress conditions during this growth stage, yield was reduced to about 88% of the maximum yield for a 60-day cutoff period on a clay loam soil, whereas water stress during the canopy development period resulted in a yield of 78% of the maximum yield.

Some guidelines for this strategy are:

- Start the irrigation season with a full supply of soil moisture in the root zone.
- Fully irrigate for at least 60 to 80 days after planting until the canopy is fully established. Failure to fully establish the canopy will reduce yields to levels smaller than would occur for an established canopy. The amount of ET needed to reach full canopy coverage may be 6 to 10 inches of water.

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- For the remaining crop season, reduce or cutoff the irrigation water. The effect of these strategies on crop yield may be smaller for clay loam soils compared to sandy loams. At the beginning of the cutback or cutoff period, ensure that the root zone soil moisture is fully replenished.
    - Drip irrigation - cutback or reduce the amount of irrigation water for the rest of the crop season by applying small amounts per irrigation. The amount and timing of the cutback will depend on the amount of available irrigation water.
    - Furrow irrigation – cutoff the irrigation for the remainder of the crop season. The cutoff time will depend on the amount of irrigation water.

Strategy 3: Deficit irrigate the entire crop season by applying seasonal irrigation amounts less than that needed for maximum yield. Deficit irrigates the full acreage by distributing the limited water supply throughout the crop season. This may be accomplished by applying less water per irrigation, reducing the number of irrigations, or some combination thereof. This strategy will reduce the ET and thus the yield since tomato yield is directly related to seasonal ET.

Strategy 4: Replace surface water with groundwater where possible. Using groundwater to replace surface water can help mitigate the effect of limited surface water supplies. One concern with this strategy is the effect of groundwater quality on yield. The groundwater in some areas is higher in salt and boron, the accumulation of which can reduce yield. More leaching may be needed to prevent excessive salt and boron accumulation. The effect may not be too noticeable for the first year of irrigating with the groundwater, but subsequent years of using groundwater may cause excessive soil salinity levels. Soil salinity may have a smaller effect on crop yield under drip irrigation compared to furrow irrigation due to the salt distribution patterns under each irrigation method. Furrow irrigation causes water to flow from the furrow to the middle of the bed, carrying salt with it. Thus, the highest salinity levels are in the middle of the bed and the smallest levels near the furrow. Installing drip lines in the middle of the bed, causes water to flow from the drip line towards the furrow where salts can accumulate. The lowest salinity levels are around the drip line where root density is the highest. However, under subsurface drip irrigation, salt can accumulate above the drip line. Periodic leaching with sprinklers may be needed to control this salt accumulation.

Which Strategy is the Best? The best strategy is the one that provides the highest economic returns to land and management. The returns are the difference between revenue and cost. Revenue depends on yield and crop price. Costs included variable costs due to irrigation, harvest, and cultural costs (land preparation, fertilization, diseases and insect control), and fixed operating costs. Unfortunately, it is difficult to predict the effect of various water management strategies on yield since as applied water decreases, crop ET and yield also decreases. The amount of reduction may be site-specific and not possible to estimate.

Production costs will depend on the strategy to some degree. Variable production costs per acre may be similar for Strategies 1, 2, and 4. But the total production costs per acre may be smaller for Strategy 3 because of reduced irrigations and smaller yields per acre. Strategies 1 and 4 have the smallest risk because they simply involve reducing the irrigated acreage and then irrigating the reduced acreage using normal irrigation practices to obtain maximum yield per acre on the irrigated acres. For Strategy 4, the amount of reduction will depend on the groundwater supply. Strategy 3, commonly recommended by researchers of deficit irrigation, probably has the greatest risk because the effect of deficit irrigation throughout the season on yield is unknown for a given field other than it will be reduced. The risk of Strategy 2 is the cumulative effect of the cutback period and the reduced water applications on yield. This strategy involves normal irrigation practices during the canopy development/ fruit stages (assuming sufficient irrigation water) and then reduced irrigations thereafter. If the reduced irrigations start 60 days before harvest, the research shows relatively small yield effects even for water applications as small as 25% of the normal application. If the cutbacks start earlier than 60 days before harvest, then the cumulative effect of a longer cutback period and reduced water applications on yield is unknown.

Blaine Hanson, UCCE Irrigation and Drainage Specialist, Emeriti
Don May, UCCE Farm Advisor, Fresno County, Emeriti
Thomas Turini, UCCE Farm Advisor, Fresno County
Larry Schwankl, UCCE Irrigation Specialist

Crop Digest: Grapes

The 2014 season started off with Chardonnay budbreak just slightly ahead of average by about 6 days, on March 9th. As in 2013, warm daily maximums, but below average nightly lows have allowed for a below average accumulation in growing degree days (GDD). Drought conditions have continued and intensified from last season. Fortunately significant rain events in February and early March were perfectly timed to alleviate a lot of stress on the vines and partially refill the root zone available water.

It does appear that as the end of rain season approaches we will finish with about 60% of average for total rainfall this season; compared to 85% last year. What is also different this year compared to 2013 is the late winter rains were heavy and very effective at recharging soil moisture this year. Many growers applied one; two or even three winter irrigations and that investment will be appreciated by the vines and should pay off, both short term and long term. The deep soil profile is dry, but still fair, considering how dry it was until the last rains. This is the driest year since 1976, but still second compared to the 1976-77 drought. The problem is there are more acres of grapes, more people and environmental diversions required. Future water supplies will be a concern, unless water can be shipped in by "Bullet Train."

There was no frost this year; as I find no records of area wide frost after May 1st in over 50 years.

There have been some early growth and even dieback problems on young vines planted in the last four years. Several sites have shown delayed budbreak, erratic and non-uniform shoot growth, mostly Cabernet Sauvignon. It appears there is scattered winter cold injury from drought conditions, some sites with a large first time crop and a very cold December with minimum temperatures as low as 18º F.

Unfortunately for young vines damaged by winter cold, some retraining may be required. Older vines should not be significantly affected and grow out of delayed budbreak or erratic early shoot growth, but very old vines (Zins) with virus infections, esca/measles/vine decline problems or other stresses such as nematodes or soil restrictions may show more dead arm and/or dieback symptoms this year.

This spring, the 2013 situation provides growers with the opportunity to control shoot growth; but this year deep soil moisture is much better and vines may tolerate an early hot spell better than last year. But caution should be used with weaker vines, young vines, and blocks expected to produce high yields.

With cover crop present, soil moisture will be severely depleted this year and earlier irrigation start will be important; extra water during hot spells will be even more crucial this year. In a dry year it is a good idea to stay ahead of "normal ET vine demand with drip irrigation, instead of using deep soil moisture early. Irrigate so as to maintain what little deep moisture is available for mid to late summer and into harvest.

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Rainfall Seasonal 2002-14
Lodi inches

	Total	% Avg	OctNovDec	Jan	Feb	Mar	Apr	May	Jun
2002	**16.3**	**92**	9.7	2.0	1.0	2.5	0.2	0.9	0
2003	**15.2**	**86**	8.7	0.6	4.7	1.1	0.1	0.1	0
2004	**15.3**	**87**	9.2	0.6	0.9	0.6	3.6	0.4	0
2005	**23.1**	**131**	10.4	3.2	3.3	3.5	1.4	1.3	0
2006	**23.4**	**132**	7.1	5.4	1.1	5.2	3.8	0.8	0
2007	**12.1**	**68**	4.6	0.3	4.3	0.6	2.3	T	0
2008	**13.7**	**78**	4.5	7.3	1.8	0.1	0	0	0
2009	**15.1**	**85**	4.0	1.9	5.3	1.9	0.7	1.3	0
2010	**19.2**	**109**	6.1	4.5	3.6	1.8	2.9	0.3	0
2011	**26.3**	**149**	12.1	1.4	4.1	5.8	0.2	1.4	1.3
2012	**12.4**	**70**	3.0	2.9	1.3	3.3	1.9	T	0
2013	**15.5**	**89**	11.0	1.2	0.3	2.1	0.5	0.1	0.2
2014	**10.2**	**60**	2.2	0.1	4.7	1.9	1.4		
Average	**17.8**		7.5	2.6	2.6	2.4	1.5	0.7	0.1

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When it comes to powdery mildew, keeping costs down and avoiding resistance development probably requires a program that includes sulfur at some point in the season. Wettable or dusting can be a very effective choice for avoiding potential resistance development. As sulfur cost escalates and threats of regulatory restrictions occur, some of the newer materials can be more cost competitive. Ground coverage is still much slower than with dusting sulfur. Whatever the material of choice; a good powdery mildew program includes: some sulfur, rotation of materials between years, and complete coverage, - each is important. Also, shorten intervals between treatments as disease pressure increases. Below is a general guideline from research and experience (as I understand):

Approximate Interval of Protection - Days			
Material	**Risk** 0-30	40-60	70+
Sulfur Dust	**14**	**10**	**7**
Wettable Sulfur	**18**	**14**	**10**
DMI fungicides	**21**	**17**	**14**

Gophers, voles, squirrels, rabbits and their nemesis, coyotes, have become very active at this point. There seems to be fewer than last year, which is good (also I noticed lots of ladybugs early on, which is also good). Besides the sometimes costly predatory "benefit" of coyotes, owls, hawks ,and snakes (or cats), control measures for the above pests may still be needed - before they reproduce and litters begin to disperse. See the UC IPM guidelines for some ideas in the Home and Garden section (all that I could find, but of some help):

Voles *http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7439.html*
Gophers *http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7433.html*
Rabbits *http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7447.html*
Squirrels *http://ucanr.edu/sites/Ground_Squirrel_BMP/*

Or wide range of vertebrate pests
http://www.ipm.ucdavis.edu/PMG/menu.vertebrate.html#VERTEBRATES

Continue to be on lookout for vine mealybug (VMB) as it spreads. There are options for control, and Movento (spirotetramat) returned last year as a possible choice of several materials. VMB is now becoming active enough to begin looking. Look in areas of bird roosting and watch for high traffic spots of ants that may lead into vines.

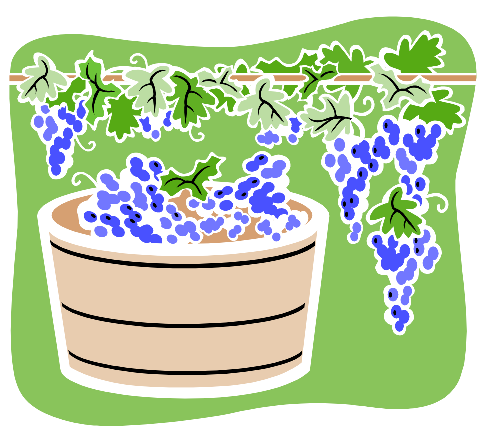
Light brown apple moth (LBAM) is spreading in the Manteca and Tracy areas and unfortunately may begin to be seen near several of the landscape nursery operations around the county. Be on the lookout. It is controllable as is the more traditional pest of omnivorous leafroller. LBAM does unfortunately require quarantine and more paperwork. For more information:
http://www.ipm.ucdavis.edu/EXOTIC/lightbrownapplemoth.html

The "new" problem appears to be identification and recognition of a new grapevine leafroll-associated virus (GLRaV) named red blotch virus. As in the past, order from reputable nurseries, purchase certified, virus-tested vines and/or know the history of any variety selections chosen. It seems to be a somewhat typical GLRaV, but it has become apparent in some many locations across so many varieties and regions that debate and investigation continues on how it might be spread. See *http://www.ucanr.edu/red-blotch-disease-2012* or *http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=9014*

There are big challenges for 2014. As in 2013 these include expanding regulations, labor management, input costs, the "Affordable" Health Care Act and, increasingly, water. Wine sales are still up, and as the mini-boom of replanting old blocks or new site planting slows, there may be some balance in the market. Consumers are learning more about the quality and value of local wines. Lodi remains a good place to grow grapes.

Good luck in the year of the Horse.

Paul Verdegaal, Viticulture Farm Advisor



Drought Irrigation Management of Almonds

Governor Brown has officially declared a drought in California and most almond growers are considering how to best manage a limited water supply in order to have the least impact on their current and future almond production. In past droughts some growers have removed older orchards that were nearing the end of their production. Other growers tried drastic measures on younger trees such as "dehorning" (stumping back to primary scaffolds), severe pruning, and early season crop removal in an attempt to help trees survive that receive little or no irrigation water. Dr. Goldhamer, a retired irrigation specialist from UC Davis, views these drastic measures as short sighted for the following reasons: 1) additional rain may result in additional water deliveries; 2) while stumping can reduce or eliminate tree stress by reducing ETc, it also eliminates yields for at least two seasons; 3) work by Dr. Scott Johnson, another retired specialist from UC Davis, in peach lysimeter trials, showed that crop removal has little, if any, impact on tree water use, while Spanish scientists, working on almond, showed that crop removal can only reduce almond ETc by 10% or less; and 4) Dr. Goldhamer has shown that almond yield does not decline at a one-to-one rate with reduced irrigation, as is the case with most field and row crops, rather yield in almond declines more slowly, allowing growers to still achieve reasonable yields with reduced water supplies. Thus, we believe there is little to be gained and a lot to be lost by severely pruning or stumping your trees and removing crop.

Dr. Goldhamer has shown that a mature almond orchard needs between 6 to 8 inches of water to survive. This does not mean 6 to 8 inches of irrigation water, because stored winter rainfall and carryover of soil water from the previous season can supply some of this requirement. However, the key to facilitating tree survival, and maximizing sustained productivity, is to stretch this water use over as much of the season as possible. For example, Dr. Goldhamer performed an experiment where he applied 16 inches of water all early in the season with the last irrigation in mid-June. The more drought sensitive Carmel variety was killed with this approach. On the other hand, Tim Smith simulated a one-year drought on Westside trees where he applied 16 inches of water in various irrigation regimes, followed by a return to full irrigation for the two following seasons while recording yields. The maximum sustained yields came from the irrigation treatment where the 16 inches of irrigation water was stretched to the end of August, while the worst yield occurred when the irrigation water was applied early and then completely shut off.

Many almond orchards in the San Joaquin Valley benefit from rainfall to leach accumulated salts through soils and past the root zone of our almond trees. Years of drought, ground water pumping, and lower than average rainfalls have allowed salt levels to accumulate, especially in the Southern San Joaquin Valley where drip and micro-sprinklers are commonly used because of heavy soils and the need to maximize water use efficiency. Less leaching of salts has led to gradual increases in sodium and chloride levels observed in leaf petiole and soil analysis. The accumulation of salt can result in poor growth and reduced yield.

Ben Brown, of the Almond Board of Australia, passed on some advice to me after their growers finished two severe drought seasons in a row: no stumping; spread your irrigations over the season; and be prepared for a reduction in yield, even if you can irrigate as much as 70% of normal. Ben and I both believe that growers should become intimately acquainted with their trees leaf stem water potentials (SWP), through the use of pressure chambers (www.pmsinstrument.com), in order to critically follow orchard stress and make the best drought irrigation management decisions.

A pressure chamber is especially useful in early spring to determine tree water status and when irrigation should begin. Dr. Bruce Lampinen, UC Davis, has written a nice article 'Using Midday Stem Water Potential to Refine Irrigation Scheduling in Almond' that can be found at the Fruit and Nut Research and Information Center (http://fruitsandnuts. ucdavis.edu/). Crop evapotranspiration (ET_c) is the sum of transpiration from leaves and evaporation from soil and is referred to as the crop water requirement, or orchard water requirement. In Dr. David Goldhamer's irrigation scheduling chapter in our Almond Production Manual, historical orchard water requirement by month can be looked up in a table. The amount of water stored in the soil depends on rainfall intensity, duration, and soil water holding capacity, but generally it is between 50 to 70% of total winter rainfall. There is obviously much less stored water this year and this should be accounted for.

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Notes from the Field

May 2014