Field Notes
San Joaquin County
August 2014
University of California
Agriculture and Natural Resources | Cooperative Extension

Vegetable Update

Curly top, which was epidemic in many tomato production areas of the state last year, was also seen again this year, albeit at lower levels. As a reminder, the curly top virus is vectored by the beet leafhopper (BLH). The industry funds a state-run program (Curly Top Virus Control Program - CTVCP) to monitor and treat BLH, both in the coast foothills and on the valley floor. During the spring, both the program staff and I looked at roadside weeds and fallow fields in our area. Although it was possible to find a few BLH here and there, we were never able to locate the "smoking gun". Despite the low populations of the vector observed in surveys, there have been some fields significantly affected. Overall, the problem is less than last year, and in most fields the healthy plants have compensated well for missing plants and there is unlikely to be much of an impact on yield. But the situation is still quite worrying, given that we have not traditionally had a curly top problem this far north.

It seems that BLH perhaps may be overwintering on vegetation on the valley floor rather than migrating back and forth from the coast foothills. If that is the case, we may continue to have curly top problems in San Joaquin County tomatoes. Now that I am attuned to it, I see hosts plants everywhere, particularly Russian thistle and bractscale (aka stinking orach, a species of saltbush in the genus *Atriplex*). As a reminder, if weeds in the neighborhood of susceptible crops are to be disked, mowed, or sprayed with an herbicide, they should first be scouted with a sweep net to determine the presence of BLH. If present at significant levels (reliably 8 or more per sweep), then the weeds should be treated with an insecticide before removal. Otherwise, BLH will relocate in search of a new host plant, perhaps infecting crops in the process. The state program can treat non-crop areas if the threshold number of BLH is exceeded in their survey. If you have questions about identifying BLH, please let me know. Photos of the various BLH life stages are online at:
www.cdfa.ca.gov/plant/ipc/curlytopvirus/ctv_hp.htm and

Adult beet leafhopper (BLH)

www.ipm.ucdavis.edu/PMG/r783301011.html
Note that when sweeping weeds, you are most likely to encounter the potato leafhopper (*Empoasca*) which is bright green and lacks the light brown transverse stripes of the beet leafhopper. Potato leafhopper image at:
www.ipm.ucdavis.edu/PMG/E/I-HO-EFAB-AD.003.html

Tomato spotted wilt also was apparent in tomatoes and peppers. As the industry moves towards TWWV-resistant varieties, this virus is becoming less of an issue, but we are still seeing some problems in susceptible varieties. Thrips pressure was very high this spring and there was abundant weed cover along roadsides, field edges, and in vineyards and orchards.

Two Fusarium diseases of tomato, Fusarium wilt race 3 (also called F3) and Fusarium crown & root rot continue to take their toll on San Joaquin County yields (and elsewhere as well). The good news is that I am told that we will soon have improved processing tomato cultivars with F3 resistance. Resistance to crown and root rot is also being incorporated into California processing tomato backgrounds, and I am told that experimental varieties will be available soon. In the meantime, we need to do our best to prevent spread by cleaning equipment of soil and crop debris when moving between infested and clean fields.

Brenna Aegerter, Farm Advisor

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New Irrigation Management Publication: Using the Pressure Chamber for Irrigation Management in Walnut, Almond, and Prune

A team of UC Cooperative Extension Farm Advisors recently developed a new, free guide to using a pressure chamber for irrigation management in walnut, almond, and prune. The new guide, "Using the Pressure Chamber for Irrigation Management in Walnut, Almond, and Prune," includes clear and concise descriptions of every aspect of pressure chamber operation and interpretation including:

- Explanation of tree water use physiology and how a pressure chamber works
- Descriptions of specific features of different pressure chambers commonly used by growers
- Instructions on how to take measurements in young and mature orchards
- Target stem water potential (SWP) values with explanations and data from UC research programs
- An explanation of the SWP "baseline" and a guide to using baseline values and SWP measurements to schedule irrigation
- Effects of over- and under-irrigation on yield, quality, and disease susceptibility

High quality figures and images accompany each set of instructions on how to use a pressure chamber, interpret your results, and schedule irrigation to optimize yield. This invaluable guide is available for download in pdf format **FREE** from UC Agriculture and Natural Resources website. To get your free copy, enter the following link into your web browser anrcatalog.ucdavis.edu/Details.aspx?itemNo=8503.

Joe Grant, Farm Advisor

Salinity, Compaction, and other Alfalfa Questions and Answers

I wanted to highlight a few alfalfa-related questions that I have recently received.

Last month, I made a couple farm calls in the Delta. The first was to an alfalfa field along the Sacramento River, near Rio Vista. The growers had been monitoring the Department of Water Resources salinity data for the river from a station near their intake. The salinity of the water was fluctuating heavily with the tide. The electrical conductivity (EC) was sometimes higher than 5 dS/m, or 3200 ppm, but other times it was lower than 0.5 dS/m, or 320 ppm. The growers use sprinkler irrigation, and they were worried that irrigating with this water would harm the alfalfa crop, or worse, reduce the agricultural longevity of the soil. The soil is a Valdez silt loam and is well-drained. Dan Putnam, alfalfa specialist at UC Davis, Daniele Zaccaria, irrigation specialist at UC Davis, and I visited the field, and I took some soil samples to analyze the salinity. The growers had soil moisture meters in the field that were showing good moisture down to between 1-2 feet but that the soil was quite dry below 2 feet. The soil salinity profile showed good leaching within the top 2 feet but a build-up of salts in the third and fourth foot levels. The plan is for the growers to follow-up with us regarding the amount of water that is being applied with each irrigation and the average EC of the water sprinkled on the field. The jury is still out on this case, but our hunch is that the grower could be applying more water per irrigation, or perhaps irrigating twice per cutting. Since this is a well-drained soil, we suspect that the higher volume of water would still infiltrate well and would help to get more water lower in the profile. This, in turn, would help to leach the salts deeper into the soil profile.

I made a second farm call up to a field in the northwest area of the Delta. The majority of the farm is either Omni silty clay or Sacramento clay. The saturated hydraulic conductivity, or the ease with which water passes through the soil profile, is quite low for both of these soil classifications, and the growers often have to push back spring planting because the fields are not dry enough to work the ground. This is particularly problematic when there is late spring rain and this year they did not get corn planted until late May and into June. The growers, however, were worried that a compaction layer had developed and was contributing to poor drainage. I made a visit with a soil compaction meter, and we sampled several corn and alfalfa fields. The compaction meter measures the reistance of the soil (pounds per square inch, or psi) as the probe is being pushed through the soil profile. We took surface readings (0-6 inches) and sub-

Figure 1. Soil compaction meter. Generally, root growth is not hindered when soil resistance is less than 300 psi.

surface readings (6-18 inches). Generally, readings below 300 psi are considered good, with limited to no root penetration resistance. All of our readings were below 250 psi and most between 100-200 psi, down to 24 inches. While we did not conclusively answer the question of

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what was preventing these fields from drying out in the spring, we at least determined that it was not a compaction layer that was preventing drainage.

The next two questions came by email and phone. An organic alfalfa grower was interested in learning how he could take out his alfalfa but remain organic. Dan Putnam, alfalfa specialist at UC Davis, emphasized that there are no organic herbicides that could help with this and that tillage would be this grower's best tool. Dan wrote, "Depending upon how much time you have, undercutting the crowns in the summer, lifting them, and then making sure the crop dries down are important tools. Chisel plowing or light disking may not work–too many survivors. Rototilling will (sort of) work, but you'll have some volunteers. It may take a few passes, wait a while and repeat. A combination of techniques might be best." He went on to describe the nitrogen benefit that this grower's next crop would receive from the tilled-in alfalfa–at least 100 lbs/acre, depending on the stand.

Finally, a grower called saying that he has not grown alfalfa before but would like to plant a crop this fall. He wondered if the University had any resources that explain the costs associated with alfalfa production. In fact, UC Cooperative Extension personnel develop cost and return studies for various crops grown in California across the various agricultural regions of the state. These short reports explain the costs associated with growing crops. Depending on when the study was written, the actual costs reflected in the report may not be accurate. For example, the costs in a study that was written five years ago will not reflect current fuel prices; nevertheless, the list of operations and costs should be reflective of the crop regardless of the age of the study. The reports are accessible online from this website: cost-studies.ucdavis.edu/. "Current" studies are those written within the last five years, and "archived" studies are those more than five years old.

Thanks for your questions, and keep them coming!

Michelle Leinfelder-Miles, Farm Advisor

Similarity in Symptoms of Salt Burn Injury and Almond Leaf Scorch

Several growers have called me this year concerned that almond leaf scorch, a disease caused by the bacterium *Xylella fastidiosa*, was spreading rapidly through their almond orchards. In most cases, I believe growers are observing salt burn symptoms on the leaves of their almond trees. I recommend that symptomatic leaves be tested for salts, sodium, and chloride first, before sending samples to a laboratory to test for the bacterium. One grower I spoke with this year had trees test positive for both almond leaf scorch and salinity.

Years of drought, irrigation with groundwater, 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 heavier 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, reduced yield, and observed leaf burn.

Salt injury may occur at any time but often worsens as the growing season progresses and is a result of excess salinity in soil or water. Salinity generally affects numerous trees in one concentrated area as opposed to almond leaf scorch which affects individual trees widely scattered throughout an orchard. Salt burn is generally more concentrated at the leaf tips than along margins, and it usually lacks the yellow band between the burned brown and green areas of the leaf that is characteristic of almond leaf scorch (see Figure 1, typical salt burn).

Figure 1, typical salt burn

Affected leaves with almond leaf scorch develop a tan marginal scorch with a characteristic yellow band between the scorched and green portions of the leaf (Figure 2, almond leaf scorch). Almond leaf scorch usually develops slowly over several years, infecting more of the tree with each succeeding year. It may be easily overlooked when only a few leaves on one branch are affected. Almond leaf scorch is known as "Golden Death" because of the striking yellow color of a fully infected tree canopy.

Salt injury, particularly chloride, may be mistaken for almond leaf scorch. Sometimes the two are indistinguishable and leaves with chloride burn can also have a yellow band between the brown burned and the green tissues (Figure 3, chloride burn). If sodium and chloride leaf levels are normal, and salinity has been eliminated

Figure 2, almond leaf scorch

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Figure 3, chloride burn

as a possible cause of the problem, then have the tree tested for almond leaf scorch (the same test as for Pierce's disease of grapevine).

Almond leaf scorch infections should start with one branch or scaffold. If you can detect that first branch or scaffold before the whole tree becomes infected, then I would remove that scaffold as a means of preventing the spread of the bacterium. I previously recommended removing trees after the whole tree becomes infected, but the evidence for tree to tree spread is lacking and I have observed infected trees continue to produce quite well. Cold winters appear to reduce inoculums levels of the bacterium, slowing the advance of the disease. We expect that by the time symptoms engulf the entire tree canopy the tree may have been infected with leaf scorch bacteria for 3 to 5 years.

Brent Holtz, Pomology Farm Advisor and
County Director

Calendar of Events

Rice Field Day
Wednesday, August 27, 2014
8:30am to 12:00 noon (Registration at 7:30am, Lunch at 12 noon)
Location: Rice Experiment Station, 955 Butte City Highway (Hwy. 162), approximately 2.5 miles west of Hwy. 99, north of Biggs. More information: http://www.crrf.org/

USDA Risk Management Agency Listening Session for Developing Crop Insurance for Alfalfa and Forages
Tuesday, September 9, 2014
7:30am-10:00am (Breakfast included)
Location: Norton Hall, UCCE, 70 Cottonwood St., Woodland.
The objective of the listening session is to receive input from producers to assist with the development of either a new or improved crop insurance policy to better meet the risk management needs of forage producers. We need producer and crop insurance staff input to clarify the main issues to focus on in designing this product.
For more information, please contact Nick Young at 703-981-6002 or nyoung@agralytica.com.

Alfalfa and Forage Field Day - See agenda page 7.
Wednesday, September 12, 2014
7:30 – Registration
8:00am to 12:00 noon – Program. Don't be late! Tram for the field tour leaves promptly at 8am.
Location: UC Kearney Agricultural Center, 9240 S. Riverbend Ave., Parlier.

Water Management to Mitigate Blanking in Rice

With the approach of late summer and the possibility for lower nighttime temperatures, this is the time when blanking can occur. Keep in mind how water management helps to mitigate this problem.

Spikelet sterility, sometimes referred to as 'blanking', occurs when the developing pollen grains are exposed to nighttime temperatures at or below 55 degrees F for several hours. Pollen is sensitive to low temperatures about 7 to 10 days after panicle initiation. The pollen is at the temperature sensitive stage when the collar of the flag leaf and collar of the previous leaf are aligned (Figure 1). While there are varietal differences in blanking susceptibility, in normal years, blanking is around 12 percent. Blanking can be detected in the field about 10 days after flowering. The occurrence of translucent hulls when the panicle is held up to the sun identifies unfilled grain.

Figure 1. The low temperature sensitive stage of pollen development occurs when the collar of the flag leaf and the collar of the previous leaf align (center plant in photo). Photo provided by Cass Mutters, Farm Advisor, Butte County.

Proper water management helps to mitigate the occurrence of blanking. About three weeks before heading, the base of the panicle is about 4.5 inches above the ground, and the tip of the panicle is about 10 inches above the ground. Raising the water level above the base of the developing panicle can help to reduce the incidence of blanking because the water acts as a heat

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sink. The minimum nighttime water temperature will be about 3 to 5 degrees F warmer than the minimum nighttime air temperature, depending on water depth. The warmer water temperature will also warm the air temperature immediately above the water level. In a 1980 paper (http://ucce.ucdavis.edu/files/repositoryfiles/ca3411p5-62835.pdf), UC Davis researchers found that shallow water 3 to 4 inches) resulted in 22.2 percent blanking among eight varieties, whereas deeper water (6 to 8 inches) resulted in 17.8 percent blanking among the same eight varieties. Currently, we are recommending a water depth of 6 inches at 7 to 21 days before heading to help reduce blanking. Given drought concerns this year, we suggest that growers allow the flood water to subside naturally rather than drain the fields. In practice, this means that water flow into the field can be stopped well in advance of the drain date. How far in advance will depend on the amount of water already in the field, as well as soil and field properties such as percolation. Therefore, raising the water before heading does not necessarily use more water provided the water is turned off earlier at the end of the season.

Variety and fertility management can also result in varying amounts of blanking. Varieties that tend to have lower levels of blanking have true genetic tolerance to cooler temperatures, and they generally are shorter in stature and mature early. High nitrogen rates may increase blanking by increasing vegetative growth and delaying heading. The increased vegetative growth draws away sugars that the plant would otherwise use to fill the grain. Keep in mind that different varieties and fertility practices could result in neighboring fields reaching the susceptible development stage for blanking at different times. Different varieties and fertility practices could result in neighboring fields that were planted at about the same time being more or less susceptible to low temperature events, therefore, resulting in different levels of blanking.

Unfortunately, blanking is not like thinning fruit trees – it does not result in larger grains where grain forms. A 1972 UC Davis study showed that panicles do not compensate for high blanking by producing larger grains (http://ucce.ucdavis.edu/files/repositoryfiles/ca2604p3-63941.pdf). In fact, the study showed that grains from high-blanking panicles had weights that were 3 percent lower than grain from panicles where blanking was low.

Michelle Leinfelder-Miles, Farm Advisor

Buying or Selling Corn Silage This Summer?

With talk of $75-$95 corn silage this summer, now is a good time to start thinking about your silage goals. Traditionally, corn silage is purchased on a 70/30 basis; that is 70% moisture and 30% DM.

Let's assume we're buying a field for $75/ton. What happens when the corn silage is delivered at 28% DM, is the value still $75/ton? What if it's delivered at 32% DM? Below is an equation that can be used to correct the purchase price for DM:

$$\frac{\textbf{Actual DM \%}}{\textbf{30\% DM}} \times \textbf{\$/ton} = \textbf{\textit{Corrected} \$/ton}$$

Examples:

So, at **28% DM**, the purchase price would be:
28/30 x $75/ton = **$70/ton**

And, at **32% DM**, the purchase price would be:
32/30 x $75/ton = **$80/ton**

Average DM	**23%**		**28%**		**30%**	
Corrected $/ton (assuming $75/ton)	$57.50		$70		$75	
Wet Tons Harvested	1406		673		989	
Acres Harvested	+/- 50		+/- 23		+/- 50	
			$/ton			
	Min	Max	Min	Max	Min	Max
Single Sample	$45	$69	$63	$82	$62	$88
10 Consecutive Samples	$53	$61	$68	$73	$71	$78
Hourly Samples	$55	$59	$67	$74	$72	$76

It's important to remember that as corn matures (DM increases) and starch content increases, fiber quality declines. This trade-off between starch content and digestibility of forage will affect how the silage is incorporated into rations. It's also a prime example of why it's imperative to talk with your nutritionist about your silage goals before making a decision to harvest at a certain DM.

How we sample a field of corn silage for DM adjustment can also have us paying too much or charging too little for corn silage. Sample the field often for the best results. When we followed larger fields of corn silage, ones that took 10 or more hours to harvest, taking an hourly sample was the best way to estimate DM of the entire field. When fields are on the small side, or take less than 10 hours to harvest, sampling more frequently may be warranted. Taking 10 consecutive samples of truckloads dumped at the structure yielded better results on the smaller field (~23 acres). In the table below, you can see three fields of corn silage that we followed, and what the *extreme prices* would be based on sampling method at $75/ton corn silage.

To see more details regarding this work, visit: http://cestanislaus.ucanr.edu/Dairy_Science/UCCE_Silage_Day_2014/

Jennifer Heguy, Dairy Advisor
UCCE Merced, Stanislaus & San Joaquin counties

Seven Points for Effective Labor Management

Labor Management Farm Advisor Gregorio Billikopf retired earlier this summer. Below he shares seven points for effective labor management—what some of the best farm employers are doing—based on his almost 34 years working for the University of California as a farm advisor. We wish Gregorio the best in his retirement!

"Never correct a man privately," explained a specialist. "Make sure the rest of the crew members hear it!" Similarly, a fruit grower at the time suggested that the best way of getting crew members' attention was to splash a worker's defective fruit lug on the ground—hopefully spilling as much red juice from the crushed berries as possible. Both of these examples come from decades ago. We have seen a lot of improved practices in the field of agricultural labor management since then.
I wanted to leave some suggestions for farm employers who want to stay competitive in an increasingly challenging world market, based on the best practices I have seen in my career as a labor management farm advisor.

Employee selection testing. Hiring the right person for each job at your farm operation is one of the most important management decisions you will make. Employers who consistently hire the very best employees test before hiring. Because employees vary widely in abilities, I recommend short practical tests where individuals get to milk, prune, or perform whatever job you need. Make sure to also test farm supervisors and farm managers. **Avoid** hiring based on an interview alone.

Incentive pay. A pay for performance approach rewards productivity *and* quality work. To be sustainable, the pay method should benefit both the farm enterprise and the employees in the long run. Employees need to be rewarded for their efforts, that is, for what they control. The most effective incentives reward individual rather than group effort. **Avoid** perverse incentives, such as the hourly pay plus a piece rate bonus for crew workers. In these mistaken approaches workers get less pay per effort with increased productivity. (For more information on the perverse incentive of hourly plus piece rate bonus see http://www.cnr.berkeley.edu/ucce50/ag-labor/7article/article37.htm)

Quality control. The first step in any quality control effort is calibrating the decisions of those making quality decisions against a standard. Whenever possible, include quality control in the incentive pay reward formula because then supervisors are not at odds with workers. Even when paying by the hour, there needs to be strict quality control measures taken. **Avoid** lack of consistency in quality determination as it demoralizes workers.

Employee discipline and farm supervision. Consistent consequences for the violation of clear rules is needed. Discipline needs to be carried out without giving offense. There is much training that you can provide for supervisors. Remember that when it comes to interpersonal relations—because we are dealing with people rather than machines—we either pay now or pay later. **Avoid** shortcuts in interpersonal relations, as it usually means paying later, with interest.

Negotiated Performance Appraisal (NPA). In this appraisal approach, the supervisor and subordinate separately prepare lists of what the subordinate does well, has improved in recently, and still needs to improve. The subordinate comes to the meeting prepared with suggestions on how to improve weak areas. The NPA helps supervisors and subordinates improve communication and productivity while permitting the subordinate to save face. The approach requires that the supervisor celebrate successes with the subordinate. **Avoid** traditional appraisals that put the supervisor in the position of being a judge—rather than a coach—over the subordinate's performance.

Party-Directed Mediation (PDM). This approach consists of meeting separately with employees involved in a conflict, before ever bringing them together. In separate preliminary meetings employees can vent their frustrations and also be coached on effective ways to respond without defensiveness. During the joint session the mediator sits far away from those involved in the conflict, making it clear that the conversation and the solutions will come from the parties. **Avoid** mediation styles where the mediator takes the role of arbitrator.

Decision-making meetings. Conduct meetings in a way that all participants feel free to give ideas and it is safe to hold differences in opinion. **Avoid** solutions that do not examine extraordinary situations and what to do during those exceptions.

Gregorio Billikopf
Labor Management Farm Advisor Emeritus

University of California
Agriculture and Natural Resources

Alfalfa & Forage Field Day
Friday, September 12, 2014
Kearney Ag Center

7:30 AM Registration

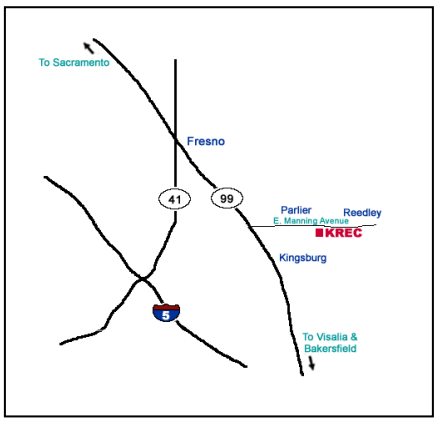
8:00 AM Tram leaves for Field Tour

- Varieties – What are the Pest Management, Yield and Quality Traits of Most Importance?
  - ◊ *Dan Putnam, Alfalfa and Forage Specialist, UC Davis*
- Forage and Grain Sorghum Demonstration Plots
  - ◊ *Jeff Dahlberg, Director, Kearney Agricultural Research and Extension Center*
- Forage and Grain Sorghum Irrigation Management Research
  - ◊ *Bob Hutmacher, Steve Wright, Jeff Dahlberg – UCCE, UCD Plant Sciences, and UC Kearney and West Side Research and Extension Centers*
- Characterizing the Nitrogen Benefit of Alfalfa-Wheat Rotations
  - ◊ *Eric Lin, Graduate Student, Department of Plant Sciences, UC Davis*

9:30 AM Tram returns to the classroom for presentations

- Sharpen and Other Herbicide Options for Weed Control in Alfalfa
  - ◊ *Kurt Hembree, Farm Advisor, UCCE, Fresno County*
- Distribution Uniformity in Surface Irrigation Systems and the Importance of Soil Moisture Monitoring
  - ◊ *Dan Munk, Farm Advisor, UCCE, Fresno County*
- Aphids: Management vs. Control
  - ◊ *Pete Goodell, Cooperative Extension Advisor, UC Statewide IPM Program*
- Small Grain Silage Update
  - ◊ *Steve Wright, Farm Advisor, UCCE, Tulare and Kings Counties*
- Salinity Management in Alfalfa Fields
  - ◊ *Michelle Leinfelder-Miles, Farm Advisor, UCCE, San Joaquin, Contra Costa, Sacramento, Solano, and Yolo Counties*
- The Importance of Non-GE Alfalfa for Export or Organic Production
  - ◊ *Dan Putnam, Alfalfa and Forage Specialist, UC Davis*

12 PM Adjourn



For additional information, contact Shannon Mueller at 559-241-7527 or scmueller@ucanr.edu
PCA and CCA Credit has been requested.

Our programs are open to all potential participants. Please contact the Fresno UCCE office (two weeks before the event) at 559-241-7515 if you have any barriers to participation requiring special accommodations.

University of California Agriculture and Natural Resources

Cooperative Extension
San Joaquin County
2101 E. Earhart Ave., Suite 200
Stockton, CA 95206-3949

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Notes from the Field

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The University of California working in cooperation with San Joaquin County and the USDA.