Field Notes
San Joaquin County
August 2019

University of California
Agriculture and Natural Resources

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Meet Our New Advisor

Greetings! My name is Mohamed (Mo) Nouri, I am very happy to be the new UCCE Orchard Systems Advisor serving San Joaquin County, mainly covering walnuts, cherries, olives, and apples. I'm deeply honored and humbled to have this position.

Prior to joining UCCE in San Joaquin County, I was a Postdoctoral Scholar at the University of California, Davis, Kearney Agricultural Research and Extension Center in Parlier from July 1, 2018 to June 30, 2019. There, I performed research on fungal diseases of major fruit and nut crops, including olive, pistachio, sweet cherry, citrus, almond and grape. As a graduate student researcher and Postdoctoral researcher, I oversaw the plant disease diagnostic services for perennial fruit and nut crops in California and management tasks for the laboratory. I worked closely with UC specialists, UCCE farm advisors, pest control advisors and farmers helping them to grow healthier crops.

I obtained my Ph.D in Plant Pathology in March 2018 from Tunis ElManar University, Tunisia. I also obtained a M.S. in Microbiology and Plant Pathology and B.S. in Life and Earth Sciences from Tunis ElManar University. My doctoral research however, was conducted in California and focused on identifying and investigating new and emerging diseases of pistachio, including canker and crown rot diseases, and improving management strategies through pathogen detection and disease diagnosis.

From a young age, I was determined to follow in my father's footsteps and become a farmer. I worked on my family's farm growing olives, almonds and many other tree fruit crops for many years. I'm very excited about the opportunity to work in San Joaquin County serving the growers and the agricultural sector. My goals as Farm Advisor are to develop a strong outreach and research program, and to work collaboratively to achieve positive and effective solutions that will secure a sustainable future for California agriculture, and for everyone who depends on it for a healthy environment and healthy communities, today and especially for future generations

Please contact me either by email (mnouri@ucanr.edu) or at our office: University of California Cooperative Extension San Joaquin County, 2101 E. Earhart Ave., Suite 200, Stockton, CA 95206.

Mohamed Nouri, Orchard Systems Farm Advisor

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Field Crops Update

1.Grain Corn Variety Trial. The 2019 UCCE grain corn variety trial was planted on May 7th, which was two days earlier than it was planted in 2018. The trial is located in the Sacramento County Delta on a Rindge muck soil. There are 14 varieties, including 11 varieties submitted by seed companies and three varieties submitted by the grower (Table 1), replicated three times. Stand counts were made approximately two weeks after planting, and bloom was assessed over the week of July 15th. Across all varieties, the average number of days to bloom was 72, compared to 68 in 2018. This equates to approximately 1750 growing degree days (GDDs), which is a temperature measure of physiological development. Over the remainder of the season, we will also evaluate disease pressure (Fusarium ear rot, head smut, and common smut), lodging, ear height, grain moisture, and yield. Results from previous years are available from my website (http://ucanr.edu/sites/deltacrops/Corn/).

2. Wheat Variety Trial. The UC Davis small grains variety evaluations are annually conducted across the state, including at a site in the Delta. The Delta trial was planted on November 16, 2018 and harvested on July 2, 2019. We evaluated 38 common wheat varieties and 11 triticale varieties in four replicate blocks. The trial was on a Valdez silt loam soil, and over the course of the season, the site received approximately 22 inches of rain. Precipitation data is from the Staten Island CIMIS station, www.cimis.water.ca.gov.) The previous crop in the field was tomato (summer 2018). There was no supplemental irrigation, and no fertilizer was applied because residual soil nitrogen following the tomato crop was assumed adequate for the wheat. Adjacent to the variety evaluation plots, we evaluated nitrogen-rich strips, where we did apply nitrogen fertilizer at different rates and plant development stages. Results from those plots will help inform our guidelines for nitrogen fertility to optimize small grains yield and protein, while being mindful of nitrogen losses from the cropping system. When the 2018-19 results become available, I will make an announcement on my blog (https://ucanr.edu/blogs/sjcfieldcrops/). In the meantime, results from previous years can be viewed at http://smallgrains.ucanr.edu/Variety_Results/2018/. An interactive tool for variety selection is available from http://smallgrainselection.plantsciences.ucdavis.edu/

3. Rice Armyworm Monitoring. UCCE continues efforts, which began in 2015, to monitor armyworm populations in Sacramento Valley and Delta rice fields. In the Delta, we began monitoring fields in early June. We reached the highest trap counts during the week of June 20th, averaging 43 moths per day across three locations (Figure 1). This was earlier than the peak counts observed in the Sacramento Valley, which were during the week of July 1st, where daily counts ranged from 20 to 60 moths per day, depending on location. Trap counts for late-July have been much lower (less than 10 moths per day on average across Delta locations). My colleague in Butte County, and project leader, Luis Espino, posts weekly updates on counts and observations (see http://rice.ucanr.edu/armyworm_traps/). Armyworm larvae will grow to full size and pupate in about 3 to 4 weeks. That said, it is important to continue monitoring fields in case the adult generation seen in late-June reproduces to form a new generation of worms that could be present when panicles have emerged.) UC IPM has these guidelines for monitoring and treatment (http://ipm.ucanr.edu/PMG/r682300411.html).

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Table 1. Varieties planted in the 2019 UCCE field corn variety trial.

Entry Name	Company Name	Supplied by
A 644-32TRCRIB	Agrigold	Agrigold
A 646-12VT2PRO	Agrigold	Agrigold
SX 5543	Baglietto Seeds	Baglietto Seeds
CP 5678SS/RIB	Croplan	Croplan
CP 5814SS	Croplan	Croplan
INT 6284VT2PRIB	Integra	Wilbur-Ellis
INT 6533VT2PRO	Integra	Grower
INT 6588VT2PRIB	Integra	Wilbur-Ellis
LG 7514	LG Seeds	Grower
LG 60C33VT2PRO	LG Seeds	LG Seeds
LG 66C11VT2PRO	LG Seeds	LG Seeds
P 1751AM	Pioneer	Grower
REV 2499AM	REV Brand Seeds	Mycogen
REV 2658AM	REV Brand Seeds	Mycogen

In addition to the product treatments named in the Pest Management Guidelines, the EPA granted an emergency approval of Intrepid 2F (methoxyfenozide) in 2019. Please contact the County Agricultural Commissioner's office for more information.

Figure 1. Pheromone bucket trap with true armyworms. Trap counts were high in late June.

4. Herbicide Evaluation in Drill-Seeded Rice. In cooperation with Corteva Agriscience, I am evaluating the efficacy of a new herbicide in drill-seeded rice fields, which is the typical planting practice in the Delta. The product, called Loyant (florpyrauxifen-benzyl), is already registered in rice growing states in the southern US. Corteva anticipates California rice registration in 2020, with the product being available for use by the 2021 rice season. In previous trials, Loyant has controlled broadleaf weeds (e.g. ducksalad, redstems), smallflower umbrella sedge, and ricefield bulrush well. In the current Delta trial, broadleaf weeds and sedges are not prevalent. The most problematic weeds are *Echinochloa* species (i.e. barnyard grass and watergrass) and sprangletop (Figure 2). Loyant is being evaluated at different rates and in comparison to the grower standard (tank mix of Regiment [bispyribac-sodium], Superwham [propanil], Sandea [halosulfuron], and Prowl [pendimethalin]), and a Prowl-only control treatment. We have been evaluating phytotoxicity and weed control. We observed slight leaf rolling with the Loyant treatments a couple weeks after treatment, but those symptoms were gone by the third week after treatment. We have observed Loyant to have good activity on the *Echinochloa* species but not on sprangletop, which was expected based on previous trials. We will take the trial through harvest, and I will make results available later this year.

Figure 2. Herbicide evaluation in drill-seeded rice. An untreated strip on the levee (left) and on the outside of the plot (line running across the middle of the photo) illustrates the weed pressure that would be present without treatment.

5. I use a blog to extend information about project results, notes from the field, and meetings. What I like about having a blog is that I can post information in a timely manner. Please visit my blog (https://ucanr.edu/blogs/sjcfieldcrops/) and consider subscribing to it by entering your email address in the box in the right-hand column. Subscribing to it means that you will be notified by email when I post something new.

Michelle Leinfelder-Miles, Delta Farm Advisor

Puncturevine Management

Puncturevine, or goathead as many call it, is a weed people have dealt with for years, but with all of the late spring rains this year, landowners have seen more of it and are trying to find ways to control it.

Background: Our UC Integrated Pest Management website has a great Pest Note that can be found here (http://ucanr.edu/puncturevine). Puncturevine is a summer annual, with one big taproot being its key to survival in the dry summer. It is commonly found along roads, buildings, irrigation ditches, ponds, or anywhere there has been disturbance and there is not competition. In irrigated pastures, we tend to see it along the edges rather than established in the middle. Interestingly, I have never seen puncturevine in the middle of any of our local rangelands, even though summer competition can be very minimal. As you drive around the area, it is easy to spot the thick carpet of puncturevine with little yellow flowers (Figure 1). Seeds can remain viable in the soil for up to five years, and large mats of puncturevine can produce up to 5,000 seeds in one growing season.

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Impacts: Puncturevine is known to be toxic to sheep beyond mechanical injury of the mouth, digestive system, and feet. Especially in sheep, it is also known to create photosensitivity and neurological issues. Symptoms include depression, loss of appetite, cracked and necrotic skin lesions, and swelling. The neurological symptoms are gradual and cause the pelvic limbs to weaken, incoordination, and fetlock joints to knuckle over while the hock joints remain flexed. The disease progresses so that an animal will walk in what looks like a squat or will drag their back legs, moving on a diagonal.

Management: Management options can vary, but as with most pests, early detection and control is key. Most control methods work best if done before seed is developed. For cultural and mechanical options, hand pull or hoe. If you have a large area, shallow tilling (no deeper than one inch) can work for seedlings or young plants before seeds are visible, but deep tilling may only bury seeds to create an issue in the future. Mulches have been successful, but they need to be at least three inches deep to prevent seeds from germinating. Mulch will not help with seeds that fall on top of the mulch. Chemical control can be effective in large areas, but chemical control also works best on younger plants. 2,4-D, glyphosate, and dicamba are all effective.

If the puncturevine is mature, has seeds on the plant, and covers a large area, then the preferred method for most people is biological control. The United States Department of Agriculture released weevils starting in 1961, with to my knowledge, the last known release occurring in 1995. There are two types of weevils, which on their own one attacking the seeds (Figures 2 and 3) and the other the stems (Figure 4). While both are effective, control is best if they are both present. Currently, there are no active release programs, but there may be opportunities to collect weevils locally and release them on your site. It is important to find local weevils since commercially-purchased weevils may not survive local conditions. (For example, weevils from southern California will not be able to tolerate northern California winter temperatures).

Figure 1. Mature puncturevine. (Photo courtesy UC IPM)

Figure 2. Adult seed weevil on an immature puncturevine seed capsule. (Photo courtesy of UC IPM)

Figure 3. Emergence hole of the seed weevil in a puncturevine seed capsule. (Photo courtesy of UC IPM.)

Figure 4. Adult stem weevil on a puncturevine stem. (Photo courtesy of UC IPM.)

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If you have a large puncturevine problem this year, you should probably plan to have some sort of control method in place for at least the next two years, and potentially up to five years since seeds can survive in the soil that long.

Reference:
Burrows, G.E and R.J. Tyrl, 2001. Toxic Plants of North America. Iowa State University Press.
Wilen, C.A, 2006.
Puncturevine Pest Note. UC Statewide Integrated Pest Management Program, UC Davis.

Theresa Becchetti, Livestock and Natural Resources Advisor, San Joaquin and Stanislaus counties

ABCs of Forage Analyses: Wet Chemistry vs. NIR

You've sampled your forage and are ready to send it to the lab. You have two choices: wet chemistry or NIR analyses. Looking at the price tag, you're probably asking:

If NIR is faster and cheaper, why bother with wet chemistry? NIR doesn't work well for all feeds. NIR works well for single source common feedstuffs that are chemically consistent over time. A large data base of wet chemistry values is needed and must be available to calibrate NIR equipment. NIR should not be used for variable and uncommon feedstuffs. For example, bakery waste can contain bread, crackers, donuts, potato chips, etc. The specific ingredients and the corresponding amounts are variable. This will affect the nutrient composition, making calibration of NIR equipment difficult. NIR doesn't work well for TMR samples (because they're mixed) or samples of forages not previously analyzed by wet chemistry. Forages harvested at different stages of maturity may also not lend well to NIR analyses.

Let's step back and define these terms. Wet chemistry is slang for chemistry based analytical methods used to measure chemical compounds in plant material. Think lab coat, goggles, and chemical reagents! Methods are published in a reference book (AOAC International – Official Methods of Analysis). A technician follows the book's "recipe." This standardizes the method so all labs performing the same method, in theory, will give similar results. Wet chemistry can be expensive due to the labor involved and costs associated with chemicals, safety programs, and waste disposal. Near Infrared Reflectance Spectroscopy, or NIR, measures light energy that is reflected by the feed sample to determine the chemical composition of forages.

It is a rapid, AOAC approved method requiring no chemical reagents. The amount of light energy reflected is compared to a known set of values (from that big data base of wet chemistry numbers) to determine composition. This is why NIR is not appropriate for all feedstuffs. More about that below.

Wet chemistry and NIR are linked. Wet chemistry data are used to calibrate NIR equipment. The NIR equipment does not know how much NDF is in the sample. That is where wet chemistry plays a critical role. The more wet chemistry values are available for a feedstuff, the better the calibration of NIR methods for that feed. The quantity of NDF that was determined by wet chemistry for a given forage sample is linked to the NIR spectral pattern (from the reflected light) for that same forage. To put it simply, wet chemistry values are used to develop the "curve" for NIR. Samples are analyzed with wet chemistry. Then, they are evaluated at a specific wavelength with NIR. The light energy reflected is determined and assigned the concentration amount based on wet chemistry.

Take home message. Wet chemistry is, and NIR may be, an accurate method for forage analysis. Wet chemistry takes longer and is appropriate for forages and other feedstuffs where there are limited data. NIR is quick and so are the reports. NIR works best for common feedstuffs as long as it can be calibrated with good wet chemistry information.
Previous ABCs of Forage Analyses Articles (reading forage reports, fiber & digestibility, carbohydrates) can be found here: http://cestanislaus.ucanr.edu/Agriculture/Dairy_Science/.

Ed DePeters, UC Davis
Jennifer Heguy, Dairy Advisor, San Joaquin, Stanislaus, and Merced counties
Michael Wolf, IEH-JL Analytical

Hemp Production Begins in Stanislaus

(Note: please check with your local Agricultural Commissioner's Office on whether hemp has been approved in your county. If approved, restrictions may apply and vary by county. Approximately 27 counties currently have a moratorium on growing hemp, including San Joaquin County.)

The saying, "everything old is new again," seems to perfectly describe the excitement around growing this "new crop." Hemp, also known as industrial hemp, was grown early in this country's history and was thought to be the next boon for America's agricultural economy in the 1930s. However, mounting social pressure led to the passage of a strict federal tax in 1937, effectively halting the production of hemp.

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It was not until 2014 that interest in hemp production began to rebound with federal approval of state-regulated research programs. Recently, the 2018 Farm Bill opened up the potential for hemp to be grown for commercial purposes across the country.
California is required under federal guidelines to have a regulatory plan in place to register commercial hemp growers. The registration forms found on the California Department of Food and Agriculture website (https://www.cdfa.ca.gov/plant/industrialhemp/) are sent to the county where hemp is to be grown and processed by the Agricultural Commissioner's Office. Growers can only register to plant approved hemp cultivars and must include a $900 annual fee per application at the time of registration.

Hemp in Stanislaus County

While not yet approved in San Joaquin County, Stanislaus County will issue a license to all registered growers to ensure the legal requirements of producing hemp have been met. The licensing program will be used to recover plant sampling, analysis, evaluation, and disposal costs. This licensing program will also help document county-level compliance with hemp production practices. The Agricultural Commissioner's Office will authorize one license per person or business to parcels of at least 10 acres within the A-2 zoning district, but outside the sphere-of-influence and/or urban transition designation. The current license under the "pilot" phase restricts hemp production in Stanislaus County to a maximum of 12 cultivated acres. The initial "pilot" phase of hemp cultivation allows production to begin this year and should give county-level program administrators a better understanding of the financial impact of hemp regulations in Stanislaus County.

Growers interested in participating in the "pilot" phase of hemp production in Stanislaus County had until the July 18th deadline to complete the license and registration process. As of the writing of this article (July 15th), the Stanislaus County Agricultural Commissioner's Office received 83 calls about hemp production. A total of 20 growers completed the registration process, and 17 of these growers also completed the licensing process. These 17 growers will be ready to plant hemp this year. This means approximately 168 acres of hemp can be grown for the "pilot" phase of production in Stanislaus County in 2019.

Hemp Agronomics

Hemp is a type of cannabis that has low THC content (less than 0.3%) and is used to produce different agricultural commodities (fiber, seed, or oil). The agronomics of hemp have historically been limited to small-scale production information obtained from established agricultural research institutions (https://hemp.ca.uky.edu/). to get started with hemp production.

While limited in size and relevance to California's cropping systems, these general recommendations provide a way for beginning growers to get started with hemp production.

The lessons learned from these initial years can then be used as the basis for improving and fine-tuning management practices based on local growing conditions.

The type of production system used to grow hemp will depend on whether the crop is harvested for fiber, seed, or oil. Hemp can be drill-seeded, broadcast-seeded, or transplanted and grown for a wide variety of products and end-uses. Hemp grown for fiber can be used to produce cloth, rope, or animal bedding, while hemp grown for seed can be consumed as an added source of protein in various food products. The biggest market potential appears to be for oil, specifically cannabidiol oil (CBD oil), a product that has recently been approved for medicinal purposes.

Hemp grown for fiber is often planted in narrow rows to discourage branching and encourage growth of the fibrous stems that can reach a height of 13 feet. When grown for seed, shorter plants are preferred, (6 to 10 feet) which facilitates harvest operations. When grown for CBD oil, wider spaced plantings of only female plants are preferred to encourage branching and flower production. Hemp grown for CBD oil should be isolated from pollen drift to avoid flower pollination and seed production.

The Hemp Learning Curve

While there are general guidelines available to help get hemp production started, future success and increased productivity will require identifying practices that make sense for local areas. This year, Stanislaus County growers in the "pilot" phase can begin building networks and learning from one another about how to optimize hemp production. Bringing new acres into production will require learning from growers with more experience. Our ability to support and sustain this "new crop" will improve as growers, the industry, and researchers build on lessons learned from these initial years of production.

Anthony Fulford, Nutrient Management and Soil Quality Advisor, San Joaquin, Stanislaus, and Merced counties

Announcements / Calendar of Events

Brown Marmorated Stink Bug (BMSB) Field Meeting
Tuesday, August 13, 2019
9:00am-11:00am
4606 W. Simmons Road, Turlock, CA 95380
Contact: Jhalendra Rijal, 209-525-6800

UC Davis Dry Bean Field Day
Friday, August 16, 2019
10:00am-12:00pm
UC Davis Agronomy Farm: From Hwy 113 in Davis, exit on Hutchison Drive. Go west, and head straight through the first roundabout, then turn left at Campbell Road. The gate to the bean fields will be on your right, about 1,300 feet down Campbell Drive, just before you come to the reservoir on the left side of the road and the intersection with Garrod Drive.
Contact: Michelle Leinfelder-Miles, 209-953-6100

Rice Experiment Station Annual Field Day
Wednesday, August 28, 2019
7:30am-12:00pm (lunch included)
Rice Experiment Station, 955 Butte City Hwy., Biggs, CA 95917
For more information, visit http://www.crrf.org/.

Soil Health and Cover Crop Field Meeting
Wednesday, September 4, 2019
10:00am-12:00pm
Grain Elevators, N. Staten Island Road, San Joaquin County
Contact: Michelle Leinfelder-Miles, 209-953-6100

Alfalfa and Forage Field Day
Thursday, September 19, 2019
7:30am-12:30pm (lunch included)
Kearney Agricultural Research and Extension Center, 9240 S. Riverbend Ave., Parlier, CA 93648
Contact: Michelle Leinfelder-Miles, 209-953-6100

Delta Corn Field Meeting
In October, specific date TBA
See https://ucanr.edu/blogs/sjcfieldcrops/ for a future announcement.
Contact: Michelle Leinfelder-Miles, 209-953-6100

Almond Short Course
November 5-7, 2019
Visalia Convention Center, 303 E Acequia Ave., Visalia, CA 93291
For more information, please visit: https://ucanr.edu/sites/almondshortcourse/.

California Alfalfa and Forage Symposium
November 19-21, 2019
Reno, NV
For more information, please visit: http://calhay.org/symposium/.

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Notes from the Field

August 2019

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