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Fall 2018 Agronomy and Weed Science Newsletter

Merced and Madera Counties

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Research Update:

For those of you who don't know me, my name is Lynn Sosnoskie and I recently (March 2018) joined the University of California Cooperative Extension (UCCE) team as the Agronomy and Weed Science Advisor for Merced and Madera Counties (based out of the Merced office). I graduated with a BSc. in Biology from Lebanon Valley College, went on to obtain a MSc. in Plant Pathology at the University of Delaware, and then a PhD. in Weed Science from Ohio State. After graduation, I was a post-doc at the University of Wisconsin – Madison (1 year), a research scientist at the University of Georgia – Tifton (5 years), a project scientist at the University of California – Davis (5 years), and research faculty at the Washington State University Tree Fruit Research and Extension Center – Wenatchee (1 year).

My research experiences have been varied. While doing my PhD, I studied how crop rotations and tillage systems impacted weed community composition in the soil seedbank. At Georgia, I evaluated the efficacy of methyl bromide alternatives for use in fresh market vegetable production systems. I also spent a significant amount of my time studying the biology, ecology, and management of glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*) in cotton including: pollen movement, seed longevity in the soil, plant regrowth and seed production following failed hand-weeding, and the use of rolled rye cover crops to suppress seedling emergence. While in California, I worked with Brad Hanson to describe the growth and development of glyphosate-resistant junglerice (*Echinochloa colona*) and hairy flea-bane (*Conyza bonariensis*), research the management of field bindweed (*Convolvulus arvensis*) in processing tomatoes, and explore the use of pre-emergence herbicides for use in melon production. I only spent a year in Washington, but that time was heavily focused on increasing the presence of the WSU weed science team in the Columbia Basin through extension outreach.



Lynn Sosnoskie is the new Agronomy and Weed Science Advisor for Merced and Madera Counties

During my first six months as a UCCE advisor, I have engaged in a few small research projects to 1) look at Palmer amaranth tolerance to salinity, 2) evaluate fallow-bed control for the management of field bindweed (*Convolvulus arvensis*), and 3) describe how the timing and intensity of defoliation affects soft rush (*Juncus effuses*) regrowth potential .

2019 will be an even more active year with respect to research; projects will include: 1) conducting small grain variety trials in Merced County, 2) evaluating novel strategies to control of field bindweed in annual cropping systems, 3) screening herbicides for efficacy and crop safety in seedling and established alfalfa, and 4) evaluating nitrogen uptake in cotton.

Please feel free to call the office (209-385-7403) or e-mail me (lmsosnoskie@ucanr.edu) at any time with any thoughts that you want to pass on or questions that you would like an answer to. I have also developed an extension website (<http://ucanr.edu/sites/AgronomyWeedScience/>) and a blog (<http://ucanr.edu/blogs/SJVAgronomyWeedScienceBlog/index.cfm>) to address agronomy and weed science issues in the SJV; be sure to check them out.

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Drought monitoring — Useful websites:

The United States Geological Survey (USGS) defines drought as a 'period of drier than normal conditions that results in water-related problems.' California has experienced drought events in the past (most recently: 1976-1977, 1986-1992, 2007-2009, and 2011-2017) and is expected to experience many more in the future. Below are some useful web page links for predicting and monitoring drought and drought-related conditions at both the state and federal levels.

The **California Department of Water Resources (DWR)** (<https://water.ca.gov/>) was established in 1956 and, according to their website, it 'is responsible for managing and protecting California's water resources. DWR works with other agencies to benefit the State's people and to protect, restore, and enhance the natural and human environments.'

The DWR manages a significant portion of the state's water supply including the State Water Project. The department's website also provides information about the California Water Plan, flood management, dam safety, and groundwater protection, among other topics.

Housed within the DWR website is the California Irrigation Management Information System (CIMIS), which is a program unit of the Water Use and Efficiency Branch that manages over 145 weather stations throughout the state. These stations collect publicly available data about soil and air temperature, relative humidity, precipitation, and evapotranspiration.

The California Data Exchange Center (CDEC), which maintains an extensive collection of hydrologic data including: current river conditions, snow reports, and reservoir storage.

For more information please see:

<https://water.ca.gov/>
<https://cimis.water.ca.gov/>
<https://cdec.water.ca.gov/>

Drought.gov (<https://www.drought.gov/drought/>) houses the United States Drought Monitor, a map that shows the current location and intensity of drought conditions across the country. The site also provides drought forecasts for several months in advance. The data is updated each Tuesday and released on Thursday. Additional links provide information regarding the seasonal wildfire outlook and about agricultural impacts and reports.

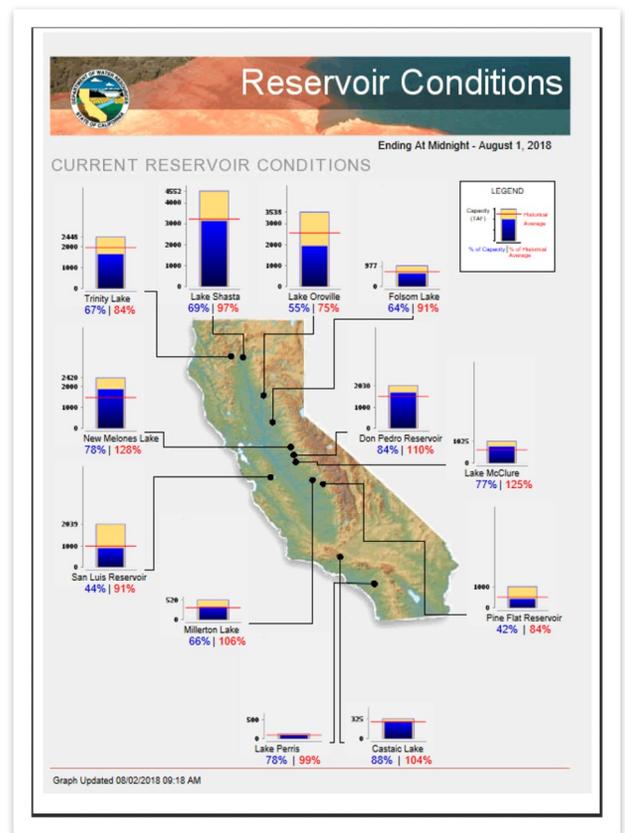
For more information please see:

<https://www.drought.gov/drought/>
<http://droughtmonitor.unl.edu/>

The **National Weather Service Climate Prediction Center** (<http://www.cpc.ncep.noaa.gov/>) provides operational predictions of climate variability over time scales ranging from a week to an entire season in advance (as is technically feasible).

For more information please see:

http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.php
<http://www.cpc.ncep.noaa.gov/products/predictions/90day/>



Current CA reservoir conditions can be accessed through the California Data Exchange Center website <https://cdec.water.ca.gov/>

Frost injury, nutrient deficiencies, or herbicide carryover in small grains?

Last year, farm advisors in the Central Valley received a number of calls regarding injury to small grains (wheat, oats, triticale, etc...) that were later determined to be the result of cold injury. To address this issue, Dr. Michelle Linefelder-Miles, a Farm Advisor for Delta Crops, authored a really good blog post describing the situations that she experienced. Her post can be accessed at: <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=26545>.

Frost injury in small grains can present as tip burn or leaf chlorosis...but so can other types of injuries, deficiencies, diseases and disorders. Other potential reasons for yellowing include nitrogen deficiency, sulfur deficiency, and injury resulting from herbicide carryover from a preceding crop. To distinguish between potential scenarios, think about the following questions:



Injury in small grains (March 2018) near Turlock

What do other small grain fields in the region look like? Are the symptoms wide-spread or isolated. Are early- and late-planted fields differentially affected? Was there a significant cold spell that occurred prior to the observation of injury? You can access local weather data, online, using the CIMIS network <https://cimis.water.ca.gov/Stations.aspx>

What parts of the plant are affected? Is the yellowing seen on older or newer leaves? For example, nitrogen deficiencies are worse on older leaves and sulfur deficiencies on younger tissue.

What is the soil texture like? Did a significant rainfall occur? Could denitrification or leaching account for the observed symptoms? Was the field fertilized properly? What were the results from your most recent soil test? Is the soil excessively wet and are the roots stunted and unhealthy looking?

Within a field, are you observing any patterns that could suggest the movement of a pest or pathogen? Are there patterns to suggest that fertilizer applications were not made uniformly? What crop preceded small grain planting and could herbicide carryover injury account for the observed symptoms?

Interested in this topic? For more information about yellowing in small grains, please see the following websites:

<http://blog-crop-news.extension.umn.edu/2014/05/early-seasoning-yellowing-of-wheat.html>

<https://cropwatch.unl.edu/soils/nutrient-deficiency-wheat>

New Nutrient Management and Soil Quality Advisor:

My name is Anthony Fulford and I am a newly appointed Nutrient Management and Soil Quality Advisor serving Stanislaus, San Joaquin and Merced Counties. Currently, I am developing the direction of my research and extension program and welcome your feedback on knowledge gaps and research priorities for nutrient management and soil quality. I will be attempting to meet with many of you in the coming months, but until then I wanted to tell you who I am, where I have been, and how I found myself in California.



Anthony Fulford is the new Nutrient Management and Soil Quality Advisor serving Merced County

I grew up in Illinois with a desire to understand the interconnectedness of natural ecosystems. Ultimately, my passion led me west to Colorado where I studied forestry at Colorado State University. My experience in Colorado convinced me to enroll in graduate school where I studied soil remediation and reclamation of urban soils in Illinois and soil fertility of rice cropping systems in Arkansas. It was during graduate school that I realized I wanted to understand how nutrient management could sustain and improve ecosystem services. I continued on with postgraduate research where I focused on soil health testing and nutrient management practices for corn, soybeans, and wheat in Ohio.

My interest in soil health and nutrient management continues to be guided by my experience in graduate school where I had an opportunity to address research questions that directly impacted the farmers of Arkansas and Ohio. One of the questions we wanted to address in Arkansas was, can we identify a soil nitrogen test capable of accurately predicting the yield-maximizing fertilizer nitrogen rate for rice at the beginning of the growing season. This project led us to discover that by quantifying soil nitrogen from a 0 to 12 inch sampling depth, we could improve our prediction of mineralizable nitrogen and ultimately the accuracy of our recommended fertilizer nitrogen rate. The question we wanted to ask in Ohio was, can nutrient removal-based phosphorus and potassium fertilizer rates for corn and soybean maintain the long-term (9 years) soil test levels of these nutrients. The main result of this project was that we were unable to maintain initial soil test phosphorus and potassium levels using nutrient removal-based fertilizer rates. In fact, our results highlighted an inability to adequately manage phosphorus and potassium fertilizer according to the “build-and-maintain” philosophy of nutrient management. These unexpected results are leading us to rethink our long-term nutrient management objectives and will likely be reflected in revised fertilizer recommendations for the state of Ohio.

Throughout my academic career I have worked closely with farmers to conduct on-farm nutrient management and soil health research. In my new role with UCCE I will be evaluating soil health and nutrient use efficiency under best management practices. There is a good deal of interest in establishing practices at the farm level that will improve soil health and nutrient management while simultaneously maintaining productivity and profitability. I hope to build on this interest and ask that you join me in addressing some of the emerging questions surrounding soil health and nutrient management in California.

Anthony Fulford

Nutrient Management and Soil Quality Advisor

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Soil health survey:

While soil health is currently a big buzzword in CA agriculture, UC Davis researchers want to dig into how managing CA soils to build soil health indicators impacts a grower's crop management decisions, productivity, and economic bottom line.

To further investigate these issues, UC Davis soil scientists are looking for processing tomato growers interested in participating in a soil health survey in summer 2019. The research will provide insight into the relationship between soil health indicators (which include soil chemical, biological, and structural/physical factors) and crop management, including how certain aspects of soil health impact fertility management and tomato yields.

To do this, researchers will ask participating growers to choose 2-3 fields for researchers to survey, including what they view as their "best" and "worst" fields, in either subsurface drip or furrow irrigation. Growers will also be asked to provide information on the history of the fields sampled, including crop rotation, duration in drip irrigation (if applicable), a general description of inputs management, as well as their own perspectives on soil management. Soil collected from growers' fields will be analyzed for soil texture, N, P, K, Ca, Mg, Na, pH, organic matter, cation exchange capacity, electrical conductivity, and aggregate stability. Soil microbiological factors will also be measured, including bacterial and fungal biomass, mycorrhizal biomass, and microbial carbon and nitrogen pools.

Each participant will receive a detailed report on test results of their fields and overall findings from the study, though all results from individual fields and farms will be anonymized with all identifying information removed when being shared with anyone other than the grower.

UC Davis researchers hope that this study will contribute to knowledge of how soil health status impacts management decisions for annual vegetable growers on the ground, including how soil health can contribute to agroecosystem productivity, prosperity, and sustainability for California farms.

Please contact Nicole Tautges, UCD crop scientist, for more information or to request sampling on your farm.



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Extension works best when we work together!

Please feel free to let Lynn (209-385-7403, Imsosnoskie@ucanr.edu) know what issues are of a significant concern in your production systems. Additionally, Lynn is always on the lookout for research sites; in 2019 she is especially interested in partnering with grower-cooperators who are battling glyphosate-resistant junglerice or Palmer amaranth, field bindweed, glyphosate-resistant hairy fleabane and horseweed (in non-crop areas), and purslane (in alfalfa).

Upcoming Meetings

California Alfalfa and Forage Symposium

Tuesday-Thursday, November 27-29, 2018
Grand Sierra Resort
Reno, NV

For the schedule of events and registration please visit:
<http://calhay.org/symposium/>

California Weed Science Society Meeting

Wednesday-Friday, January 23-25, 2019
Hyatt Regency-Sacramento
Sacramento, CA

For the schedule of events and registration please visit:
<http://www.cwss.org/>

California Plant and Soil Conference

Tuesday-Wednesday, February 5-6, 2019
Doubletree Hotel and Convention Center
Fresno CA

For the schedule of events and registration please visit:
<http://calasa.ucdavis.edu/>

A full-color copy of this newsletter (with active hyperlinks) is available at:

<https://ucanr.edu/sites/AgronomyWeedScience/files/293985.pdf>