

SAVE THE DATE!

Healthy Soils and Cover Crops Field Day

March 17, 2020

9am-11am

Registration begins at 8:30am

Meridian, CA

From Hwy 20, turn on Drexler Rd. Follow to stop sign. Turn right at stop sign then take first left onto S. Meridian Rd. Follow UCCE field day signs to meeting location.

If you have any questions, please contact myself or Sarah Light by email or phone.

Amber Vinchesi-Vahl: acvinchesi@ucanr.edu or 530-458-0575

Sarah Light: selight@ucanr.edu or 530-822-7515



2019 Research Progress/Results

Multisite demonstration of conservation management practices for soil health and greenhouse gas emissions reduction

UCCE Agronomy Advisor, Sarah Light, and myself have finished our 2nd year of a 3-year statewide Healthy Soils Demonstration Project supported by CDFA. This project includes a cover crop demonstration and research site on a farm in Sutter County in addition to two other sites statewide (San Joaquin and Merced County). We are evaluating the impact of cover crops to soil health and annual production in the region. Our plots consist of a control (no cover crop), a low seed rate of the vetch, and a high seed rate of the vetch. During the 2018/19 winter, the vetch included a high amount of volunteer wheat, making it a legume/cereal cover crop mix with high biomass. We have continued to take greenhouse gas emission samples around events such as tillage and irrigation. We collected biomass samples before the cover crop was terminated and measured % residue cover after tomatoes were planted in Spring 2019. We also took yield and fruit quality data from the processing tomato crop. Annual soil sampling was completed in September and the second year of the vetch cover crop was planted in November. Sample analysis is ongoing. We held our second field day in November 2019 and included an equipment showcase focused on cover crop planting and termination. The 2017 Healthy Soils Demonstration Project is funded by Greenhouse Gas Reduction Funds and is part of California Climate Investments, a statewide program that puts billions of Cap-and-Trade dollars to work reducing GHG emissions, strengthening the economy, and improving public health and the environment.

From left: 2019 legume and cereal cover crop biomass; first furrow irrigation after tomato transplanting (note the high residue cover); processing tomato crop one week before harvest (first year certified organic).



Evaluation of weed control in tomatoes comparing finger weeders to standard cultivation

Organic growers rely on mechanical cultivators and hand hoeing to dislodge and remove weeds. The finger weeder, a mechanical weeder efficient at removing weeds from the crop row, is gaining popularity in the Central Valley. They can be adapted to and added to existing cultivators and modified for individual grower needs. The system uses interlocking rubber fingers to remove small weeds in the plant row once transplants are established. In 2018, a local organic farmer achieved success with a finger weeder (KULT Kress) compared to a double disc opener in tomatoes, corn and beans. In 2019, I measured % weed cover before and after a pass with the finger weeder. Percent cover ratings for bare soil, broadleaf weeds, grass weeds, residue, tomato plants, and volunteer vetch (from cover crop) were assessed pre- and post-cultivation. Percent cover ratings were also done pre- and post-hand-hoeing. There was no significance between pre- and post- and weed counts, but it is worth noting that there was very little weed pressure. Cover crop residue was very high due to the wet spring and likely contributed to weed suppression early on. Weed counts remained very low through mid-June. The preference and season-use by the grower collaborator of the finger weeder is an indicator of its ease and efficiency. I would like to thank the California Tomato Research Institute for funding this project and the grower cooperator, Park Farming.

Left: Double-disc opener. Right: Finger weeder attachment (KULT Kress).



Evaluation of Fusarium wilt survival in the Sacramento Valley as influenced by rotational crops of flooded rice and dry-farmed crops

Fusarium wilt, Race 3, *Fusarium oxysporum* f. sp. *lycopersici*, is a soilborne fungal pathogen damaging to tomato crops in the Sacramento Valley. In 2018, over half of the farm calls in Colusa and Sutter counties involved Fusarium wilt of tomato. The Sacramento Valley, especially the Sutter Basin, provides a unique opportunity to evaluate Fusarium wilt



survival in rotations with flooded rice and dryland crops such as wheat and non-irrigated melons. Though this project was meant to be long-term, in 2019 we tested the concept of placing inoculum bags filled with Fusarium wilt infected tomato plant tissue in fields to monitor the pathogen over time under flooded conditions. We placed inoculum bags (pictured on left) in a rice field previously planted to tomato, and in a tomato field to serve as a positive control. All fields had a history of Fusarium wilt, Race 3.

No spore development was observed from any of the 24 bags that were buried in the rice field. The 6 bags buried in the tomato field ranged from 150-3,750 colony-forming-units (CFU) per gram of Fusarium wilt tissue. Though no spore development is promising, this does not necessarily mean the disease will not develop once tomatoes are planted in the field again. The Sutter Basin has continued to see Fusarium wilt in tomatoes and they have been rotating with rice for years. We hope to continue placing inoculum bags in these same fields over the years to obtain a picture of what happens to Fusarium wilt under many different conditions, especially when the field goes back into tomato after several years of rotation.

This project was funded by the California Tomato Research Institute. Cassandra Swett-Field and Vegetable Crop Pathology Extension Specialist, Whitney Brim-DeForest-Rice Advisor, and Gene Miyao-Retired Farm Advisor, were my collaborators in this project. We would like to thank Dr. Kelley Paugh for her hard work conducting the lab assays and our grower cooperators, for allowing us to conduct this research in their fields.

Pest Management Strategic Plan for Processing Tomatoes

A Pest Management Strategic Plan (PMSP) is a planning document that details the critical needs for pest-management issues and management practices in a particular crop. Currently, there is no PMSP for processing tomatoes. PMSPs are developed through stakeholder input and document critical needs and priorities to help justify research funding and regulatory needs. Processing tomato growers from across California, along with commodity boards and UCCE Advisors and Specialists, gathered to discuss the priority research, regulatory, and education needs for California processing tomato and workgroups were held in the northern and southern regions in 2019. The final document is currently being reviewed and will likely be published Spring 2020. Principal investigators on this project include myself, Cassandra Swett-Field and Vegetable Crop Pathology Extension Specialist, and Tunyalee Martin-UC-IPM Associate Director for Communications. This project is funded by the Western Integrated Pest Management Center.

Management of spotted and striped cucumber beetle in melon production

We evaluated 12 different insecticides for their efficacy against cucumber beetles (both spotted and striped) on a research farm at UC-Davis. We based treatments on what is commonly used commercially plus newer insecticides untested in melons on cucumber beetles, including a seed treatment. The seed treatment was not effective at reducing beetle numbers in the later season and because of low beetle pressure in the early season, we cannot comment on its efficacy. We plan to test this treatment again in 2020. The standard insecticides, Assail® and Capture® (same active ingredient as Bifenture®) resulted in the lowest beetle numbers post-application. One of the new treatments we tested, a neonicotinoid and diamide mix, showed promise and will be tested again in 2020.

Additionally, we tested 3 different trap designs (all with a floral-lure attached) to find one that works best for catching cucumber beetles. Traps included sticky cards on top of a large yellow board to act as a visual stimulus, a Japanese beetle trap, and sticky cards alone (pictured below from left to right).



Across sites, there were no significant differences between the traps that included yellow sticky cards. The Japanese beetle traps were unsuccessful at all sites. This trapping does not seem to affect beetle pressure in the field and could not serve as an attract-and-kill strategy. It does provide us information on the effectiveness of the floral lure and we will continue to use sticky card traps in our future studies to monitor for beetles. Ian Grettenberger, Field and Vegetable Crops Entomology Extension Specialist was a principal investigator on this project. UC Davis Masters student Jasmin Ramirez Bonilla is very involved with both aspects of this project. Rachael Long-Field Crops and Pest Management Farm Advisor, and Margaret Lloyd-Small Farms Advisor were collaborators. This research was funded by the California Melon Research Board.

2020 Research Plans

- *Multisite demonstration of conservation management practices for soil health and greenhouse gas emissions reduction*
 - Year 3 of CDFA Healthy Soils Demonstration Project
 - Field Day **March 17, 2020**
- *Weed control and cost-benefit analysis of automated cultivators to control within-row weeds in processing tomatoes*
 - One site in Colusa/Sutter, one in Merced managed by UCCE Advisor Scott Stoddard
 - Funded by California Tomato Research Institute
- *Management of western spotted and striped cucumber beetle in melon production*
 - Overwintering studies, pheromone studies, insecticide evaluation
 - Funded by California Melon Research Board
 - Working with UCCE Entomology Specialist Ian Grettenberger, and UCCE Advisors Rachael Long and Margaret Lloyd

Please feel free to contact me with any vegetable crop issues in the field, questions or comments, or to subscribe to this newsletter electronically. **In 2020, crown rots, southern blight, root-knot nematodes, tomato spotted wilt virus, and alfalfa mosaic virus plant samples are of special interest.**

Amber can be contacted at the Colusa UCCE office at 530-458-0575, by cell phone at 508-254-4490, or at acvinchesi@ucanr.edu.