University of California - UC
Agriculture and Natural Resources - ANR
Desert Research and Extension Center – DREC

Updates on Research Projects and Educational Programs

Dear Stakeholders,

In our current fiscal year 2019-2020 we conduct 42 projects in the following areas: Plant Breeding and Variety Trials (13), Irrigation and Fertilizer Management (8), Forage and Agronomic Crops (6), Vegetable Disease Management (3), Environmental Studies (2), Food Safety (1), Weed Management (1), Livestock (1), and Outreach and Educational Programs (7). Lead academics are from the University of California system (ANR, Davis campus, and Riverside campus), the US Department of Agriculture, and Canada. Research at the center tackles current diverse issues in the top 10 agricultural and livestock commodities in the Imperial County.

Our Farm Smart outreach and educational programs are focused on major issues occurring in our local communities including access to high quality education and food, healthy habits, and pathways to higher education. Out of the 13,839 participants that Farm Smart reached in the 2018-2019 period, 6,589 came to DREC for field trips, career workshops, senior u-pick days, and other events. Farm Smart engaged 7,253 participants in community activities and presentations. DREC hosts extension field days, commodity board meetings, and workshops where growers, ranchers, industry, and academics discuss and share knowledge about current research activities at the center and within the California low desert region.

In the next pages you will find a complete list of our current projects, goals, and contact info of lead academics. Feel free to contact lead academics for specific questions you may have. I am happy to help connect with them as well.

Sincerely,

Jairo Diaz

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Plant Breeding and Variety Trials

Project/Goal	Researcher
Alfalfa breeding nursery. We will be evaluating individual plants from a number of experimental populations in order to select persistent, disease and insect resistant, and high yielding plants to develop populations that will be evaluated for potential cultivar release.	Charles Brummer, UC Davis – Plant Sciences, 530-574-6133, ecbrummer@ucdavis.edu
Alfalfa germplasm evaluation. To evaluate new sources of alfalfa germplasm for productivity and persistence under heat, limited water, and salinity using subsurface drip irrigation.	Charles Brummer, UC Davis – Plant Sciences, 530-574-6133, ecbrummer@ucdavis.edu
Heritage seed variety trial. This trial will compare several experimental varieties to CUF101 and other checks using standard alfalfa variety trial plots.	Charles Brummer, UC Davis – Plant Sciences, 530-574-6133, ecbrummer@ucdavis.edu
Summer dormant tall fescue. This experiment will test a range of germplasm in order to identify a series of "check" cultivars that can be used to assign dormancy to new breeding germplasm and help develop productive, summer dormant populations.	Charles Brummer, UC Davis – Plant Sciences, 530-574-6133, ecbrummer@ucdavis.edu
Alfalfa yield trials. To evaluate certified cultivar differences in alfalfa forage yield, quality, and persistence, and to communicate these results to clientele. To develop and provide forage yield and performance data on alfalfa experimental germplasm to public and private alfalfa scientists.	Daniel Putnam, UC ANR Specialist, 530-752-8982, dhputnam@ucdavis.edu
Winter nursery for new cereal varieties. To evaluate genetic lines of barley, wheat, and triticale that have potential for genetics and commercial applications.	Mike Oro, Field Crop Development Center, Alberta Agriculture and Forestry - Canada, 403-782-8039, michael.oro@gov.ab.ca
Wheat breeding for the Imperial Valley. The overall goal of this project will continue to be the production and evaluation of new durum varieties and improved germplasm to be distributed to growers, breeders, and other researchers.	Jorge Dubcovsky, UC Davis – Plant Sciences, 530-752-5159, jdubcovsky@ucdavis.edu
Quinoa variety trial under the low desert conditions. Twenty-one (21) replicated and 14 non-replicated varieties of Quinoa will be tested for adaptability and grain yield of various entries of quinoa under California's low desert ecosystem.	Oli Bachie, UCCE Imperial County, 442-265-7700, obachie@ucanr.edu
Organic carrot trials. This project evaluates experimental breeding stocks to address needs of the organic carrot crop production industry.	Jaspreet Sidhu, UCCE Kern County, 661-868-6222, jaksidhu@ucdavis.edu
Carrot germplasm. The objectives of the project are to establish a winter carrot nursery and to have commercial carrot varieties from various seed companies planted in side by side comparisons for a carrot field day.	Jaspreet Sidhu, UCCE Kern County, 661-868-6222, jaksidhu@ucdavis.edu
Breeding baby leaf spinach for California growers. To screen and evaluate breeding populations in conventional and organic fields in the Salinas Valley (spring-fall) and Imperial Valley (DREC in winter),	Charles Brummer, UC Davis – Plant Sciences, 530-574-6133, ecbrummer@ucdavis.edu

and continue to develop the breeding program pipeline for cultivar delivery.	
Melon host plant resistance to CYSDV and SPWF. Various types of melons and melon breeding lines will be planted at UC DREC and rated for resistance to CYSDV and resistance to sweetpotato whitefly.	Jim McCreight, USDA ARS – Salinas, 831-755-2864, jim.mccreight@ars.usda.gov
QTL mapping of Lettuce Photoperiod Sensitivity: Short Day Trial. To determine the genetics of flowering in lettuce under short-day conditions.	Richard Michelmore, UC Davis, 530-752-1729, rwmichelmore@ucdavis.edu

Irrigation and Fertilizer Management

Project/Goal	Researcher
Evaluation of drip irrigation in organic spinach production and downy mildew management. This project aims to evaluate the viability of adapting drip irrigation for organic spinach production compared with sprinkler irrigation, and to assess the impact of drip irrigation on the management of spinach downy mildew in the Imperial Valley.	Aliasghar Montazar, UCCE Imperial County, 442-265-7707, amontazar@ucanr.edu
Improving water use efficiency in alfalfa forage production through sub-surface drip irrigation and optimal irrigation water management practices. This study aims to initiate a field experiment at UC Desert Research and Extension Center to improve the efficiency of water-use in alfalfa systems via sub-surface drip irrigation (SDI), and to identify and evaluate the technical and economic viability of deficit irrigation management practices that can optimize alfalfa forage production while conserving water in the Imperial Valley.	Aliasghar Montazar, UCCE Imperial County, 442-265-7707, amontazar@ucanr.edu
Evaluation of water management techniques and fertilizer rates in onion production in California low desert areas. The main goal of this project is to evaluate different water management techniques and fertilizer rates in onion production in arid regions.	Jairo Diaz, UC ANR DREC, 760-791-0521, jdiazr@ucanr.edu
Automation of surface irrigation systems in the Imperial Valley. This project will demonstrate the potential use of innovative automation technology in water conservation to increase irrigation efficiency and demonstrate the use of this technology to growers in the Imperial Valley.	Khaled Bali, UC ANR Specialist, 559-646-6541, kmbali@ucanr.edu
Automation of surface irrigation for sugarbeets in the imperial valley. Quantify the performance of automated surface irrigation systems on irrigation water use efficiency, surface irrigation efficiency, and sugarbeet performance.	Stephen Kaffka, UC ANR Specialist, 530-752-8108, srkaffka@ucdavis.edu
Olive production practices in the Imperial Valley. The objective of this research is to study the efficiency and the economic feasibility of various olive production practices in the Imperial Valley with emphases on water use efficiency and the possibility of the reuse of surface and subsurface drainage waters to supplement crop water needs.	Khaled Bali, UC ANR Specialist, 559-646-6541, kmbali@ucanr.edu

Best Nitrogen and Irrigation Management Practices in California Low Desert Carrots. The project aims to develop knowledge and information on improving and promoting adaptation of management practices that optimize N and irrigation water use efficiency in California low desert carrots	Aliasghar Montazar, UCCE Imperial County, 442-265-7707, amontazar@ucanr.edu
Improved Irrigation Strategies for Alfalfa Production in California. Develop and improve irrigation strategies to increase water use efficiency in alfalfa production in California across different soil and climatic conditions.	Khaled Bali, UC ANR Specialist, 559-646-6541, kmbali@ucanr.edu

Forage and Agronomic Crops

Project/Goal	Researcher
Various industry products for durum wheat growth. To investigate the response of durum wheat (grain yield and quality) to a new product said to enhance and retain wheat nutrient uptake and moisture around the crop's root system.	Oli Bachie, UCCE Imperial County, 442-265-7700, obachie@ucanr.edu
Evolutionary genomics of abiotic stress resistance in wild and cultivated sunflowers. This work will involve the field-based evaluation of drought resistance and related traits in a large number of sunflower lines, association mapping to identify genes/genomic regions conferring drought resistance, and detailed physiological analyses aimed at understanding the mechanistic basis of drought resistance.	Khaled Bali, UC ANR Specialist, 559-646-6541, kmbali@ucanr.edu
Sugarbeet Powdery Mildew Resistance Variety Trial (Imperial Valley). Evaluate onset, rate and degree of mildew occurrence on commercial and near commercial sugarbeet varieties proposed for sale in the Imperial Valley and elsewhere. Rank and compare tested varieties for resistance to sugarbeet powedery mildew.	Stephen Kaffka, UC ANR Specialist, 530-752-8108, srkaffka@ucdavis.edu
Sugar beet Alternative Insect Pest management Options for the Imperial Valley. This project will focus on managing major insect pests of sugar beet, such as flea beetle and armyworm during stand establishment, and leaf hoppers and armyworm in spring.	Oli Bachie, UCCE Imperial County, 442-265-7700, obachie@ucanr.edu
Biomass Productivity and forage quality comparison of new and existing forage crops for the low desert environment. The aim of this study is to quantify the yield of Moringa, Kleingrass, Bermuda grass, Teff, and Rhodes grass grown under the same agricultural practices.	Oli Bachie, UCCE Imperial County, 442-265-7700, obachie@ucanr.edu
Comparative Evaluation of Various Gibberellic Acid Inhibitors and Stress Reduction Products to Increase Alfalfa Bloom and Seed Set. This project examines anti-stress and anti-gibberellic acid (GA) products for their efficacy to increase alfalfa seed production.	Michael D. Rethwisch, UCCE Riverside - Palo Verde Valley Office, 760- 921-5064, mdrethwisch@ucanr.edu

Vegetable Disease Management

Project/Goal	Researcher
Evaluation of weather-based models for management of onion downy mildew. The objective of this project is to evaluate the utility of five epidemiological models of onion downy mildew as fungicide application advisory tools.	Alexander Putman, UC ANR Specialist, 951-827-4212, alexander.putman@ucr.edu
Lettuce downy mildew trap nursery. To monitor the current population of Bremia lactucae for the ability to overcome resistant lettuce lines.	Richard Michelmore, UC Davis, 530-752-1729, rwmichelmore@ucdavis.edu
Evaluation of Additives for Management of Spinach Downy Mildew with a Biofungicide. The objective of this project is to evaluate several adjuvants for improving efficacy of a biofungicide for management of spinach downy mildew.	Alexander Putman, UC ANR Specialist, 951-827-4212, alexander.putman@ucr.edu

Environmental Studies

Project/Goal	Researcher
Catalyzing Negative Carbon Emissions. Examine effects of single additions and combinations of soil amendment technologies across a variety of crops (corn, alfalfa) on C sequestration, yield, crop health, soil health, water use efficiency, nitrogen fertilizer efficiency, and N2O and CH4 reductions.	Ben Houlton, UC Davis, 530-752-2210, bzhoulton@ucdavis.edu
Reducing gaseous nitrogen losses from high temperature agricultural systems. Evaluate fertilization and irrigation practices that limit gaseous losses of reactive N from dominant crop types in the high temperature San Joaquin and Imperial Valleys of California. Acquire field data that can be used to improve regional scale models of N cycling and develop a GHG offset methodology.	Darrel Jenerette, UC Riverside – Botany and Plant Sciences, 951-827-7113, darrel.jenerette@ucr.edu

Food Safety

Project/Goal	Researcher
Understanding and Enhancing the Safe Use of Biological Soil Amendments in Fresh Produce Production. Through this work, we anticipate the discovery of new strategies to reduce introduction of microbial hazards into leafy green fields during pre-harvest production, which will benefit industry stakeholders and protect consumers.	Michele Jay-Russell, UC Davis, Western Institute for Food Safety & Security, 530-219-4628, mjay@ucdavis.edu

Weed Management

Project/Goal	Researcher
Evaluating preplant and post plant herbicide programs for weed management in transplanted LSL melons. The primary objective of this trial is to evaluate the use of several common pre and post-	Travis Bean, UC ANR Specialist, 951-827-5130, travis.bean@ucr.edu

emergent herbicides on 1) weed control and 2) crop safety and yield in Harper-type LSL transplanted melons.

Livestock

Project/Goal	Researcher
Cattle nutrition and management. The objective of the present study is to further evaluate the influence VM supplementation on overall performance of calf-fed Holstein steers, and its protein sparing effects in balancing diet formulations to meet amino acid requirements during the initial 112 d on growth performance, efficiency of energy utilization and characteristics of digestion.	Richard Zinn, UC Davis – Animal Sciences, 760-356-3068, razinn@ucdavis.edu

Outreach and Educational Programs

Project/Goal	Leader
Farm Smart educational programs. The program strives to raise awareness, educate the public, and provide outreach on several issues such as healthy eating and lifestyles, natural resources conservation, cultural and intergenerational connections, sustainable agriculture, environmental education and career opportunities in food, agriculture and sciences.	Stacey Amparano, UC ANR DREC, 760-356-3067, scwills@ucanr.edu
Imperial Valley Ag Tours for Teachers. Provide local educators with hands-on learning in food and fiber production, agriculture technologies, and the protection of natural resources so that they are inspired to teach students about how vital agriculture and environmental stewardship are to a healthy society.	Stacey Amparano, UC ANR DREC, 760-356-3067, scwills@ucanr.edu
Carrot Outreach Program. Partner with researchers and extension scientists to develop a consumer outreach component that incorporates agriculture, in particular, an expanded awareness of carrots and carrot diversity.	Stacey Amparano, UC ANR DREC, 760-356-3067, scwills@ucanr.edu
Farm-to-Preschool Festival. The event goals are multi-level and include influencing the eating habits of young children while their preferences are forming; creating healthy lifestyles through dissemination of good nutrition information; experiential opportunities such as gardening, produce harvesting, food preparation and taste testing.	Stacey Amparano, UC ANR DREC, 760-356-3067, scwills@ucanr.edu
Water Resources Experiential Learning for USDA Careers. Host a local underrepresented college student and provide learning opportunities in water resources and/or watershed management.	Jairo Diaz, UC ANR DREC, 760-791-0521, jdiazr@ucanr.edu
Agricultural Demonstration Field in Imperial Community College - ICC. This project is aimed to provide ICC agriculture students with hands-on experience on propagation and maintenance of various vegetable crops. The project will be used as experiment area where various vegetable crop plants will be cultivated in separate plots.	Jairo Diaz, UC ANR DREC, 760-791-0521, jdiazr@ucanr.edu

Develop Laboratory and Field Manuals for Agricultural Courses at Imperial Community College - ICC. In close collaboration with ICC faculty help develop laboratory and field manuals for agriculture courses (soil science, plant, irrigation and entomology).	Jairo Diaz, UC ANR DREC, 760-791-0521, jdiazr@ucanr.edu

Recently Completed Projects

Project/Goal	Researcher
Comparison of sprinkler vs drip irrigation for enhancing control of hard to kill weeds by soil-solarization. The overall objective of this trial is to compare the current soil-solarization practice (sprinkler irrigation) adopted by growers to the new solarization technique (drip-irrigation) for improving control of hard to kill weed such as little mallow, purslane, and goosefoot.	Oli Bachie, UCCE Imperial County, 442-265-7700, obachie@ucanr.edu
Evaluation of summer application of saflufenacil herbicide in low desert alfalfa. 1) To evaluate the alfalfa injury from sharpen herbicide application, 2) to evaluate the alfalfa yield after Sharpen herbicide application, and 3) to extend the information from this trial to the local clienteles.	Oli Bachie, UCCE Imperial County, 442-265-7700, obachie@ucanr.edu
Determine Crop Safety to Broccoli and Celery. The overall objective of this trial is to evaluate the effect of Prefer herbicide on broccoli and celery production in low desert region.	Oli Bachie, UCCE Imperial County, 442-265-7700, obachie@ucanr.edu
Biochar and bioengineered carbon for remediation of marginal land. Determine if this "bioengineered carbon" form of biochar really will make marginal land productive if incorporated prior to planting.	Milton McGiffen, UC Riverside – Botany and Plant Sciences, 951-827-5989, milt@ucr.edu
Response of Phaseolus beans to combined high temperature and drought under field conditions. The main objective is to evaluate and compare the variation among and within elite lines of 3 species of Phaseolus beans under drought and high temperature conditions.	Jorge Carlos Berny Mier y Teran, UC Davis – Plant Sciences, 530-752-7743, jcberny@ucdavis.edu