



THE UNIVERSITY OF ARIZONA

Yuma Center of Excellence
for Desert Agriculture

SOLUTIONS

TO DESERT AG'S PRESSING PROBLEMS

20
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ANNUAL
REPORT

DesertAgSolutions.org

FROM THE EXECUTIVE DIRECTOR



YCEDA has been hard at work for 4 years now. With the generous support of industry donors and the University of Arizona, we are growing and producing more results than ever!

In 2018 we hired an Associate Director for Applied Research & Development and a Farm Attendant. They join Sr. Program Coordinator Sonnet Nelson, Media Specialist/Drone Operator Rosa Bevington and myself. As you can see in this annual report and on our website, www.DesertAgSolutions.org, we continue to expand our portfolio of projects and put results into the hands of growers.

Collaboration and innovation are our hallmarks and have been key to our effectiveness. Taking cues from our donors via the YCEDA Advisory Council, everything we undertake is done with the intent to produce results that are relevant to growers. Donor money is leveraged many times over with grants, research contracts, research partnerships and in-kind contributions. Our collaborators range from USDA to the Bureau of Reclamation, from the Western Growers Association to AgTech companies, and from university researchers to industry experts.

We have a great team in place, and look forward to even more usable results in 2019. Thank you for your support and direction. Together, we will continue to make a difference for the desert agriculture industry!

Paul E. Brierley

DATE POLLINATION

YCEDA has been working closely with the date palm industry and the University of Arizona-Yuma Engineering Department over the past three years to devise a solution to a pressing need of the date palm industry: how to pollinate trees with less pollen and less labor. We have been researching the efficacy of automating the date tree pollination process utilizing drone technology.

This year we expanded the project to include partnerships with the University of Arizona's College of Engineering, McGuire Center for Entrepreneurship, and Tech Launch Arizona. YCEDA is sponsoring three senior engineering design teams and a 2-semester graduate level business course with the goal of developing and implementing a commercializable remote/autonomous system for pollinating date palm trees. A total of 18 students from the College of Engineering's Senior Design Program and McGuire Center for Entrepreneurship have formed the Go To Market Initiative. The students will test their device this spring after a rigorous design review and development process with oversight from YCEDA and Bard Date Company.



MELONS

YCEDA is working with researchers at the University of Arizona School of Animal and Comparative Biomedical Sciences (UA-ACBS) and Texas A&M University to develop melon varieties that appeal to consumers with better flavor and aroma while minimizing food safety risks, using marker-assisted breeding technologies. The 4-year, \$4.4M USDA Specialty Crop Research Initiative project titled "Table to Farm: A Sustainable, Systems-based Approach for a Safer and Healthier Melon Supply Chain in the U.S." is headed by a team of specialized melon researchers and breeders at Texas A&M.

YCEDA is growing test varieties at the Yuma Ag Center to evaluate which cultivars are best suited for Arizona. Samples of these

melons as well as melons from commercial fields, with accompanying air, water and soil samples to look for contamination pathways, are sent to UA-ACBS researchers for food safety evaluations such as shelf life and survival of bacteria and fungi on the melon rind, and to Texas A&M for flavor and aroma testing. Natural plant-based antimicrobials are being tested against chemicals such as chlorine, and have been found to be very effective at reducing the surface bacteria while maintaining organic certification.

FUSARIUM WILT

Fusarium wilt of lettuce continues to be a primary disease concern for Arizona lettuce growers as more fields not previously known to harbor the pathogen are discovered each year. YCEDA is working on several fronts to mitigate and manage this and other soilborne diseases.

In September 2018, we initiated our fourth season of commercial field trials with Dr. Mike Matheron to assess disease resistance of commercial and precommercial lettuce varieties. Chemical and biological crop protection products and seed treatments are also being tested in these trials as potential tools for managing Fusarium wilt of lettuce.

Research on developing advanced DNA-based methods of detection and quantification of Fusarium in soil and plant tissue is ongoing in the lab of Dr. Barry Pryor. Collaborative studies with Trace Genomics, a company that focuses on microbial analysis of soil, has produced some of the first data on population levels and distribution patterns of Fusarium in field soil. These data are critical in the development of robust soil sampling protocols for soil testing that may allow producers to predict disease pressure prior to making planting decisions. In addition, funding from the Arizona Department of Agriculture's Specialty Crop Block Grant Program will enable continued research on novel methods of detecting

Fusarium DNA in plant tissue and soil, increasing both the sensitivity and specificity of detection over currently available methods.

We also continue our work with Earth Knowledge and the USDA National Lab for Agriculture and the Environment to collect historical data that will lead to big data analysis and the development of a decision tool to help mitigate soilborne disease through soil health and other factors.

IRRIGATION & SOIL SALINITY

Accurate water use and soil salinity measurements in today's cropping systems are critical for managing irrigation requirements and maintaining soil health. YCEDA partnered with University of Arizona and USDA scientists, Bureau of Reclamation, Irrigation Districts, Commodity Councils, NASA and others to measure water applied, evapotranspiration, and soil salinity levels in order to generate a unique dataset that can be used to create irrigation management tools for lettuce, spinach, wheat and melons.

\$2M has been brought to bear on this issue over three years. We have obtained data from grower fields using eight Eddy Covariance Systems, two sets of Large Aperture Scintillometers, airborne sensors and advanced satellite imagery.



DURUM WHEAT

YCEDA is collaborating with University of Arizona researchers Dr. Michael Ottman, Dr. Pedro Andrade-Sanchez, and Dr. George Frisvold on "Nitrogen Management and Water Footprint for Arizona Durum Production", a research study sponsored by Barilla. Nitrogen is the main mineral nutrient required for wheat production in Arizona. Field trials will be conducted in Spring 2019 to test and calibrate

new Nitrogen management tools and validate their economic sustainability for farmers. Additionally, growers will be incentivized to use Nitrogen sampling for application decisions. The project will also calculate an updated water footprint of Durum wheat production in the Desert Southwest using localized meteorological, hydrological, and agronomic data to more accurately reflect local production conditions. YCEDA will work with Barilla, university researchers, and the Durum production industry to disseminate the knowledge gained from this study and solicit feedback on other desirable topics for future research projects to address high-priority issues and bring new tools to Durum wheat producers in the Southwest.

WELCOME TO THE YCEDA TEAM



We are pleased to welcome aboard two new staff members to assist with our growing portfolio of projects.

Dr. Stephanie Slinski, YCEDA Associate Director, Applied Research and Development, is a plant pathologist with experience working with citrus, conifers and vegetable crops. She most recently worked as a research project manager for the citrus industry in Florida. Dr. Slinski has a Ph.D. in Plant Pathology from the University of California, Davis and degrees in Microbiology and Horticulture from the University of Massachusetts.

Martin Porchas, YCEDA Farm Attendant, works half-time for YCEDA and half-time for our research collaborator, Dr. Andrew French, at USDA-ARS. He assists with research activities such as field trials, data collection, field sampling, and deploying ECV systems.

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