

Y C E D A

2021
Annual
Report



THE UNIVERSITY OF ARIZONA

Yuma Center of Excellence
for Desert Agriculture

DesertAgSolutions.org

FROM THE DIRECTOR

What a year 2021 has been for us all! At YCEDA, we continue to push forward, expanding our efforts to impact the pressing problems of our investors and stakeholders in the desert agriculture industry. In addition to our major efforts on Irrigation and Soil Salinity Management, Fusarium Wilt of Lettuce, INSV, Workforce Protection through COVID Sewage Testing, Melon Trials and Soil Health as outlined in this report, there are many other areas we are impacting.

Food Safety is always critical, and more technology is urgently needed. We have partnered with the Western Growers Center for Innovation and Technology and the Center for Produce Safety to host "AgTechX Food Safety" – a year-long effort to accelerate technology for prevention and rapid diagnostics.

Broadband connectivity everywhere is a necessity whether it's drones, automated equipment, in-field or satellite remote sensing, or mobile Apps. YCEDA has led the way on multiple efforts to expand fiber-optic infrastructure to rural areas throughout Yuma County. We also represent agriculture in various media and public policy arenas – bringing science to the narrative about Ag issues the public cares about.

With the ongoing support of our investors and the university, our staff will continue our dedicated efforts to nimbly respond to key issues identified by our stakeholders. Our Small Research Grants program allows us to attract researchers to work in desert agriculture by providing seed funding for research and proof of concept. We wouldn't be as effective as we are without collaboration, and our door is always open to discussing new problems and new ways to address them. There's nothing we can't solve – together!

Wishing you all the best for 2022...

PAUL E. BRIERLEY
YCEDA Executive Director



FUSARIUM WILT OF LETTUCE

Fusarium wilt of lettuce mitigation continues to be a priority for YCEDA and we have brought in new expertise to assist Yuma growers. 2021 was the sixth year that YCEDA-managed field trials were conducted. These trials have grown over the past three years and three goals have emerged:

1. *Provide information to growers to inform planting decisions*
2. *Facilitate the breeding of new tolerant and resistant varieties*
3. *Test advanced cultural and chemical control strategies*

In the 2021 trials, forty iceberg and thirty-eight romaine varieties were planted, and to facilitate breeding efforts, forty-three advanced breeding lines from UC Davis and six from the USDA-ARS were planted in demonstration plots for breeders to evaluate. All lines are available to breeders for integration into their programs. In collaboration with UArizona Cooperative Extension, small plot trials were conducted to independently evaluate advanced varieties from public and private breeding programs. A field day in early December provided trial results and allowed attendees to walk through our trial plots. We planted one trial evaluating a chemical control treatment using commercial application methods, and a non-chemical control method will be evaluated in 2022. Results from our trials will be published and presented at educational events.

Two important projects are in progress with collaborators from the University of California and Arkansas; one evaluates biosolarization as a method

to remove the Fusarium wilt pathogen from the soil and the other is evaluating the pathogen population in Arizona and California to detect changes that could impact the lettuce industry. Nearly \$400k in funding has been awarded to fund this research. We expect to have results from these projects starting in the second half of 2022.

IRRIGATION & SOIL SALINITY MANAGEMENT

Achieving the proper water and salt balance is critical for agricultural sustainability in arid climates. Over the past five years, YCEDA has collaborated with researchers from UArizona, USDA, and NASA on a multi-million dollar irrigation and soil salinity management project. The data collected provides a unique and robust set of crop water use and soil salinity measurements over seventeen of the major cropping rotations in the Lower Colorado River Basin. UArizona and USDA scientists are working on publishing research results, which will help inform agronomic and public policy decisions regarding water use.

Additionally, an irrigation and soil salinity management mobile App, DesertAgWISE, is in development to assist growers in making field-specific irrigation decisions utilizing the dataset, weather, and satellite data. DesertAgWISE tracks irrigation and rainfall and recommends optimal timing and amount of future irrigation. It also tracks soil salt balance over multiple seasons, providing estimates of water required for leaching excess salts. We appreciate the partnership of USDA-ARS, USBR, commodity councils, irrigation districts, and UArizona CALS Communications and Cyber Technologies in these efforts.



*For more information
on YCEDA and our projects,
visit DesertAgSolutions.org*

This project is an ongoing collaboration with the UArizona Water and Energy Sustainable Technology (WEST) Center, Arizona Department of Health Services, Yuma County, and key stakeholders throughout the Yuma community. All told, the original donation has turned into over \$2MM of support for equipment, supplies and personnel. As the pandemic wanes, we plan to use these new laboratory capabilities to address public health issues beyond COVID as well as food safety and plant pathology concerns.



MELON VARIETY TRIALS

YCEDA partnered with Texas A&M and UArizona scientists on a five-year USDA-funded project aimed at improving consumer appeal (taste and smell) and food safety for domestic melon production. We have grown melon variety trials at the Yuma Ag Center from 2018-2021 with eighteen experimental varieties. We sent those and more than 1500 ready-to-harvest melons from commercial fields, with corresponding environmental samples, to research laboratories in Texas and Tucson for food safety and consumer preference testing annually. Lab analysis will be completed in 2022, and research results are being published to help breeding programs improve the safety and appeal of U.S.-produced melons.

INSV PROJECTS

When Impatiens Necrotic Spot Virus (INSV) was first found on lettuce in Yuma in March 2021, there was little known about how long the virus would persist in the desert and how it might impact future crops. INSV has many hosts, including weed species found in the Yuma area. In cooperation with Dr. John Palumbo (UArizona) and Dr. Daniel Hasegawa (USDA-ARS), YCEDA conducted an informal weed survey in the spring and summer. Weeds were collected weekly until the virus had not been detected for several weeks in July. In September we started our survey again with funding from the Arizona Iceberg Lettuce Research Council. Two thousand weed samples were collected and tested for INSV before the Yuma lettuce season and no INSV was detected. The results of our survey suggest that INSV did not persist in the desert environment over the summer. Weeds will be monitored for disease throughout the season to determine what weeds are potential reservoirs for the virus and therefore are a risk to a lettuce crop in adjacent fields. Our goal is to understand the dynamics of INSV before it becomes a significant problem in the desert.

COVID MONITORING

In response to a special donation from Jesus Tovar of T&P Farms to help the Ag workforce get back to work safely for the 2020 desert produce season amid the pandemic, YCEDA jumped into action -- ultimately creating a microbiology lab for community-wide wastewater surveillance of COVID-19 and hiring national experts as visiting researchers. This tool enables detection of SARS-CoV-2 in wastewater several days prior to infected individuals displaying symptoms and becoming contagious.

Our team collected and analyzed wastewater samples twice weekly throughout 2021. Findings were communicated within twenty-four hours. In a packing house or salad plant, this allows for clinical testing and isolation of infected employees before they infect co-workers. In a municipal setting, it provides lead-time for public health officials and impacted communities to prepare for expected surges in COVID-19 cases.

We initiated a collaboration with the Translational Genomics Research Institute (TGen) to incorporate monitoring for emerging variants, and we are working on obtaining funding to bring genetic sequencing capabilities in-house, as well as expanding our monitoring capabilities beyond COVID to other threats.



SOIL HEALTH

We continue to develop projects and apply for funding for projects that address the needs of the desert agriculture industry. One important area that we are focusing on is soil health. We have assisted researchers with project development and grant writing for several projects on soil health and we will continue to search for opportunities in this area.

SMALL GRANTS PROGRAM

One of the ways YCEDA attracts research and technology development and implementation to desert agriculture is by providing rapid funding for short-term research and proof-of-concept projects. To date, we have funded nine projects covering topics such as food safety, soil health, irrigation management, automated disease phenotyping, new crop trials, and AgTech communications infrastructure.

YCEDA INVESTORS

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BARD VALLEY DATE GROWERS ASSOCIATION

> BARKLEY AG ENTERPRISES, LLC

BRAGA FRESH

> D'ARRIGO BROTHERS CO., of CALIFORNIA

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