2020 ANNUAL REPORT

THE UNIVERSITY OF ARIZONA

Yuma Center of Excellence for Desert Agriculture

DesertAgSolutions.org

2020 IN THE REARVIEW MIRROR

I want to start with a great big thank you to our donors and stakeholders. While 2020 was a year we are all glad to see in the rearview mirror, it was also a year that everyone involved with growing and putting food on the table should be very, very proud of. Unlike a lot of industries, you didn't retreat to a home office or find yourselves with extra time to pursue a new hobby. You put your heads down against all the new challenges on top of the ones you have always faced and did what you always do: provide the world's most plentiful, safest and nutritious food supply to your fellow citizens without missing a beat. Kudos to you and THANK YOU for all that you did in 2020 – a year we will all remember.

Here at YCEDA, we too put our heads down in 2020 to respond alongside you to new challenges -- carrying through on our mission of solving your most pressing problems as never before. While continuing and expanding our work on irrigation and soil salinity management, Fusarium wilt, food safety, AgTech including drones, remote sensing and rural broadband connectivity, we also responded to the global pandemic in a very unique way. Building off of a special donation from Jesus Tovar of T&P Farms, we procured $775,000 from Yuma County and the State of Arizona to equip and staff a wastewater-based epidemiology laboratory to give advanced warning of COVID infections through wastewater detection. YCEDA has become a valued resource to help municipal and public health officials keep the community safe for our agricultural workforce.

We can only respond to unexpected threats like this because we are a donor-funded and donor-focused public-private partnership. Created to be uniquely responsive to industry needs and impactful with usable results, our story is one of growth and impact. Your donations directly support our work, and we look to you to inform us about your most pressing needs and work alongside us so that we know our solutions can immediately be put to use by you.

While we exist solely on private donations, we receive extraordinary in-kind infrastructure support from the University of Arizona. Donor funds pay our professional staff and operating costs, which are leveraged many times over to provide maximum impact to the desert agriculture industry. In short, we couldn't do what we do without our donors. Our growing donor base is a testament to our successes.

How are your dollars utilized?

• Employing professional staff that is at your disposal, focused solely on ascertaining industry needs, partnering for maximal impact, and moving faster than other university entities. Our staff has grown from one to nine with expertise in project management, grant writing, field research, crop production, environmental biology, remote sensing, lab operations, outreach and media production, and human health. Over half of our staff are grant-funded, greatly leveraging donated funds. In 2020 we added our first Visiting Researcher, an expert in utilizing wastewater-based epidemiology to mitigate COVID-19 community spread who has put YCEDA at the forefront of this emerging field.

• Our Small Grants Program funds proof-of-concept and fast-turnaround pilot research. Being the grantor rather than grantee allows us to drive the agenda and build quick-response teams. Most importantly, it means we can ensure work is done quickly, efficiently, and with specific tangible outputs. It also means we can get the best expertise in the world, when needed and only as long as needed, to respond quickly to industry needs while facilitating longer-term research collaborations.

How are donor dollars leveraged for maximum impact?

• Over $3M of grant funds has been received for research projects. Almost all research takes place in grower cooperator fields, assuring it applies directly and unequivocally to your real-world bottom line.

• Top nationwide university and private sector researchers in crop disease, water management, soil health, remote sensing, food safety and other specialties have incorporated Yuma into their research programs thanks to our outreach and collaboration.

• Our Small Grants Program has funded researchers to solve food safety, water quality, soil health, water use, remote sensing and other issues. Many are addressing desert agriculture issues for the first time, with remote research enabled by YCEDA staff. The UArizona College of Agriculture and Life Sciences provides administrative and overhead support and also matches many of our grants, doubling our effectiveness. Our hope is that these projects lead to future applications for funding from external sources.

What are some of the usable results?

• Six years of Fusarium wilt of lettuce field trials have shown which breeding lines, pre-commercial and commercial varieties are resistant, and what products or cultural practices such as bio-fumigation, bio-solarization, or increasing soil health and microbial communities are effective. Our multi-pronged collaborative approach is helping producers mitigate losses from this devastating disease.

• A 5-year multimillion-dollar project has utilized in-field sensing, drones, and satellite imaging to measure precise crop

water use and soil salinity for over a dozen crops. A mobile App using models based on this data is being developed to allow producers to manage irrigation and track soil salinity balances. This will lead to new efficiencies and crop rotations, improve soil health and help preserve water rights in the policy arena.

• Food safety efforts include evaluation of a real-time pathogen detection biosensor, supporting water quality research, and partnering with the Western Growers Center for Innovation and Technology and the Center for Produce Safety to accelerate food safety technology. Making additional tools available to avoid foodborne outbreaks is a necessary game changer for the industry.

• We are facilitating adoption and utilization of AgTech, from drone imaging and labor automation to working towards reliable in-field broadband data coverage.

• We sponsor undergraduate and graduate student teams and support their transition into startup businesses offering needed services to the Ag industry.

• YCEDA responded immediately to the COVID pandemic by protecting the Yuma community and especially its agriculture workforce and jobs with early-warning COVID wastewater testing. Our work has prevented outbreaks at a date packing plant and a college dormitory. It has saved human lives, hundreds of jobs, millions of dollars and gained positive national political and media attention for the agriculture industry. It has also attracted a national expert researcher and funded a molecular biology laboratory that will be used for future research.

• With a strong website and social and traditional media presence, YCEDA has become the go-to source for research information, project results and media interviews, getting the right message to the public on key issues.

As I look back at 2020, I am proud of our industry, proud of our staff, and proud of YCEDA. Through a (hopefully) once-in-a-lifetime pandemic, we have faced down the threats and come through even stronger. Know that we stand beside you to put all available resources to work on the challenges that you face. I sincerely thank you for your continued support and collaboration. I know there is nothing that we can't overcome. Together.

Paul E. Brierley
YCEDA Executive Director

FUSARIUM WILT OF LETTUCE

We had a very productive year despite the challenges of 2020. Field trials were completed, several successful new collaborations were developed, and new research projects are planned for 2021 and beyond.

Fusarium wilt of lettuce (FWOL) is a growing problem in Arizona and California and a priority for YCEDA. We planted two field trials evaluating commercial iceberg and romaine cultivars and hosted a field day to allow growers to observe the performance of these cultivars to help with their planting decisions. Robert Masson (Yuma County Cooperative Extension) assisted with trials to evaluate pre-commercial cultivars from private breeding programs in order to accelerate the process leading to the release of new varieties with tolerance or resistance to growers. We look forward to working with him again next year. The more people helping to develop solutions for this disease, the sooner we will have management recommendations for growers.

Because new resistant cultivars are needed to prevent or reduce losses from FWOL, we are working with Dr. Richard Michelmore (UC Davis) and Dr. Germán Sandoya (University of Florida) to advance their breeding programs. This season we evaluated more than fifty of their lettuce breeding lines and cultivars in our trials. By supporting these programs, we hope to speed up the release of new cultivars to growers and new breeding material to private breeding programs. Additionally, we planted nearly one hundred wild-type lettuce varieties from around the world in partnership with Dr. Sandoya. Results could supply new genetic material to breeding programs for the development of resistant lettuce.

An effective crop protection product could play a supporting role in protecting against FWOL. We tested two numbered compounds this year in a field trial that utilized commercial equipment and application methods. We will continue to support new products and technologies that can help reduce disease pressure in our 2021 field trials.

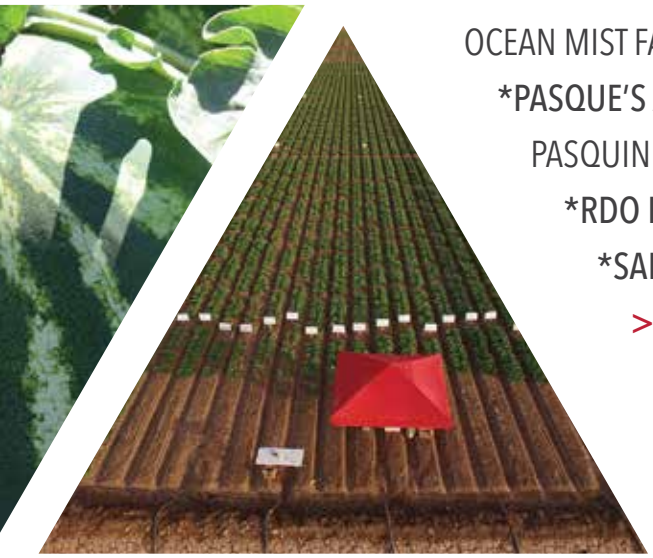
Reducing the amount of FWOL pathogen in the soil is the most effective way to avoid the disease. To this end we evaluated biosolarization, a method of soil disinfestation which combines solarization and anaerobic soil disinfestation. This has been shown to be very effective against Fusarium species, and it can be longer lasting than solarization alone. In our pilot study we saw positive results, and we recently started collaborating with Dr. Jim Stapleton (University of California), an expert in biosolarization, to help determine if this technique is feasible for growers in desert growing regions. We hope this can be used as an effective and economical method of reducing crop loss.

We received funding to conduct a FWOL population study with Dr. Jim Correll (University of Arkansas). This study will tell us if there are multiple races of *Fusarium oxysporum* f.sp. *lactucae* in Arizona, and if there is diversity correlated to disease severity. YCEDA is collecting samples from the Yuma region during the 2020-2021 growing season and Dr. Correll will evaluate the samples. We are working to secure funding to expand this study to include California samples.

Other Research

We are also engaging scientists and building new research programs. We have projects in development that we hope to see funded in 2021 including one on soil health led by Dr. Joey Blankinship (UArizona). This project would complement our FWOL program since improving soil health may help to suppress disease. I am also facilitating the development of projects to assist date and citrus growers. I encourage industry stakeholders to contact me to discuss concerns that I can help address. I look forward to continuing to address the needs of the desert agriculture industry through collaborative research over the next year.

Dr. Stephanie Slinski
YCEDA Associate Director
Applied Research & Development



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928.782.5873 6425 W. 8th St. Yuma, AZ 85364

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