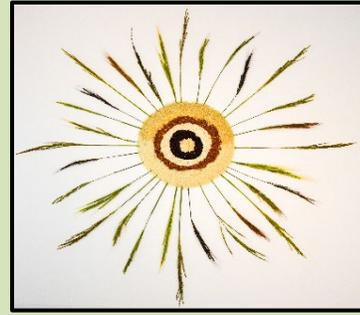




**Dale Bumpers National Rice Research Center
USDA-ARS
Stuttgart, Arkansas**



APRIL 2022

MONTHLY RESEARCH HIGHLIGHTS

For More Information: Dr. Yulin Jia, Acting Research Leader/Center Director
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- **Technology Transfer**

- ✓ **Interactions with the Research Community**

On April 4th, Dr. Shannon Pinson was invited, as an expert on genes and mechanisms for reducing rice grain arsenic concentrations, to participate in a USDA NIFA workshop (virtual) designed to share knowledge and identify knowledge gaps related to toxic elements in food crops and their products.

On April 7th, Dr. David Flesher, ARS Agricultural Engineer (Beltsville, MD), and Dr. Michele Reba, Acting Research Leader of ARS Delta Water Management Research (Jonesboro, AR), presented their research updates and discussed pending gaps with DB NRRC scientists and National Program Leader Dr. Jack Okamura through online discussion.

On April 12th, Dr. Anna McClung provided small, packaged samples of Riceland rice for use on an event on April 26. This was part of the University of Arkansas for Medical Sciences (UAMS) program on culinary medicine that was conducted by Ms. Alyssa Frisby. On April 26, Ms. Frisby and other UAMS staff prepared a grain-based salad for forty students as a demonstration of a healthy food at the J.A. Fair K8 Preparatory School, a magnet school, located in Little Rock which opened in August 2021. The small samples of milled rice from Riceland along with homemade trail mix were provided to the students to take home as part of an effort to demonstrate rice as part of a healthy balanced diet to these young people.



Photo taken on April 26, 2022, at J. A. Fair K8 Preparatory School, a magnet school, located in Little Rock, Arkansas.

On April 14th, Dr. Laximi Yeruva, Research Leader of ARS Arkansas Children's Nutrition Center (Little Rock, AR), presented 'Research update and vision of Children's Nutrient Center' for possible collaborative opportunities with DB NRRC through online seminar.

On April 21st, Dr. Arlene Adviento-Borbe, Research Agronomist of ARS Delta Water Management Research (Jonesboro, AR), presented 'Assessing irrigated cropping systems for reduced GHG emissions and improved crop and water productivity in the Lower Mississippi River Basin' to DB NRRC scientists through a virtual seminar as a part of brainstorming of DB NRRC project plan development.

On April 27th, Dr. Shannon Pinson provided information to Dr. Sarah Beebout, National Program Leader of USDA National Program 216 - Sustainable Agricultural Systems, regarding rice grain elements grown flooded and unflooded.

On April 27th, Drs. Anna McClung and Shannon Pinson were invited speakers for the joint USDA and US FDA all day public meeting entitled "Closer to Zero", an initiative to lower exposure of infants and toddlers to toxic elements like arsenic, lead, mercury, and cadmium in food. Dr. McClung presented "Mitigating Arsenic in Rice, A Path Forward", and Dr. Pinson presented "Plant Genes and Mechanisms that Regulate Arsenic Uptake, Transport, and Accumulation in Rice Grains". The meeting had more than 900 registrants and was attended by nearly 400 industry representatives and crop researchers.

On April 28th, Dr Ted Wilson and his team members, of Texas A&M AgriLife Rice Research Center at Beaumont, Texas shared their updates and views to DB NRRC scientists and National Program Leader Dr. Jack Okamura to explore possible collaborative opportunities in the future through online discussion.

✓ **Rice Germplasm Distributed**

During the month of April, 316 rice genetic stocks were shipped to researchers in Belgium, Germany, and the United States.

- **Education and Outreach**

Jace Everette was raised in White Hall, AR, not far from the Dale Bumpers National Rice Research Center (DB NRRC). From early on he always enjoyed math and science. This led to the University of Arkansas at Pine Bluff where he graduated Magna Cum Laude with his Bachelor of Science degree in Chemistry. During the time at UAPB his interest in nutrition and medicinal chemistry led him to study naturally occurring compounds found in plants. He performed research in Dr. Richard Walker's lab measuring the radical scavenging capacity, or antioxidant capacity, of naturally occurring and synthesized compounds. Different rates of reaction and overall antioxidant capacity were studied using various wet-chemistry evaluation procedures (the ORAC, ABTS, Folin, and DPPH assays). He co-authored two papers with Dr. Walker in the Journal of Agricultural and Food Chemistry: "Comparative Reaction Rates of Various Antioxidants with ABTS Radical Cation" and "Reactivity of Various Compound Classes Towards the Folin-Ciocalteu Reagent". Various Zn complexes were synthesized and analyzed as potential radioprotective compounds. He then took a temporary position in Dr. Alexei Basnakian's lab at the Veteran's Hospital in Little Rock, AR, in the Division of Nephrology within the Department of Internal Medicine. There he tested the uptake by human cell cultures of zinc complexes he synthesized and evaluated the impact of these complexes on the rate of cell death after exposure to radiation. He went on to earn a Master of Science degree in Chemistry from the University of Arkansas at Little Rock, AR while teaching labs and serving as a teaching assistant. After graduating he went on to teach in the chemistry department at UAPB, before working as a technician in the Department of Agriculture. There he co-authored other papers while collaborating on various projects and eventually talked with Dr. Ming Chen about the research she was conducting on rice grain chemistry at the DBNRRC in Stuttgart, AR. He took his current position with ARS as a biological science technician and has been working with her for the past nine years. The focus of the research he has been conducting at the DBNRRC centers around rice accessions with improved nutritional value. This includes analysis of antioxidants found in the bran of whole grain rice, and rice with higher amounts of slowly digestible and resistant starch which lowers the glycemic index of the rice and can also improve gut health by acting as dietary fiber.



Dr. Ming-Hsuan Chen retired from ARS on April 1, 2022, after 21 years of federal service. Dr. Chen earned a B.S. in Food Science and Nutrition from Chinese Culture University, Taipei, Taiwan; a M.S. in Agricultural Chemistry from California State University, Fresno, CA; and a Ph.D. in Entomology (Insect Molecular Biology program) from Texas A&M University, College Station, TX. Dr. Chen began her career with USDA-ARS in 2001 as a Research Chemist in Rice Research Unit, Beaumont, TX and in 2012 after that unit's closure, moved to Dale Bumpers National Rice Research Center in Stuttgart, AR. Since joining ARS, Dr. Chen has authored/co-authored over 47 peer-reviewed journal articles, several of those in high impact journals such as Carbohydrate Polymers, Food Chemistry, Plant Genome, Journal of Agricultural and Food Chemistry, and Nutrients, and has received over 2100 citations. Dr. Chen has devoted her time with ARS on two aspects of rice grain quality research: rice grain functional properties and health beneficial quality of whole grain (brown) rice. She played a leading role in identifying genetic variants in starch synthesis genes that are associated with critical functional properties and developed genetic markers linked to these traits. These markers were the foundation for establishing marker-assisted-selection technology in US Rice Breeding Programs and have been broadly used for developing new varieties for conventional and specialty uses. She has endeavored to improve the health beneficial quality of whole grain rice as a means to combat the rising incidence of chronic diseases that are impacted by diet. She explored diverse global rice varieties and identified those that have superior health beneficial properties and extend market shelf life. Dr. Chen and her collaborators discovered that pigmented red and purple rice possess anti-cancer, anti-diabetic, and gut-health promoting properties and determined the major flavonoids attributing to these effects and their underlying mechanisms. Two of these varieties were recently commercialized in the US and, in 2021, were part of the first export of rice products from southern US to China. In addition, she launched research that is the basis for developing rice varieties that are high in resistant starch, a dietary fiber, that lowers glycemic index, improves colon health, and benefits consumers monitoring weight control and glucose metabolism.

In addition to basic research, Dr. Chen has had tremendous impact on the development of new rice varieties by evaluating hundreds of breeding lines each year to assure new releases developed by US breeding programs meet or exceed industry expectations for grain quality critical to domestic and foreign markets. Dr. Chen has received numerous awards and was a recipient of the 'Distinguished Rice Research and Education Team Award' presented by her peers at the 38th Rice Technical Working Group Meeting in 2020.



Photo taken at 38th Rice Technical Working Group Meeting in Feb 2020, Orange Beach, Alabama. Pictured left to right: Dr. Yulin Jia, Melissa Jia, Drs. Jeremy Edwards, Anna McClung, Christine Bergman and Ming Chen.

See the web version of all DBNRRC research highlights at:

<https://www.ars.usda.gov/southeast-area/stuttgart-ar/dale-bumpers-national-rice-research-center/docs/monthly-research-highlights/>