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

NOVEMBER 2019

MONTHLY RESEARCH HIGHLIGHTS

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- **Recent Scientific Publications**

  This addresses USDA-ARS Research Goal: Development of crop plants with enhanced nutritional quality

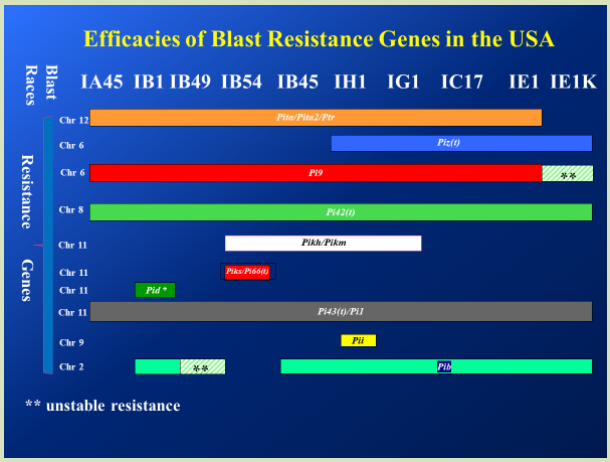
  Chen, M.-H., Bergman, C.J., Grimm, C.C., McClung, A.M. 2019. A rice mutant with a giant embryo has increased levels of lipophilic antioxidants – E vitamers and γ-oryzanol fraction. Cereal Chemistry https://onlinelibrary.wiley.com/doi/epdf/10.1002/cche.10242

  Consumption of whole grains has been linked to the reduced risk of developing several chronic diseases and the bioactive compounds in the bran and germ fractions of whole grain are thought to attribute to these protective effects. Among them the lipophilic antioxidants, tocopherols, tocotrienols and the γ-oryzanol fraction in rice bran, have been proposed to have positive health effects via their anti-inflammatory, antioxidative, anticholesterolemic, and anticarcinogenic properties. These lipophilic antioxidants in a giant embryo rice mutant derived from a tropical japonica variety Drew were determined to evaluate its potential to be grown as a specialty rice variety. The whole grain giant embryo mutant has higher tocopherols and γ-oryzanol fraction than its non-mutant wild type. It also produced higher bran fraction and higher lipid content than the wild type. This giant embryo mutant has the potential to be grown as a specialty rice variety for the purposes of isolating its bran, oil and lipophilic antioxidants for use by the food and cosmetic industries.

- **Technology Transfer**

  ✓ **<u>Interactions with the Research Community</u>**

On November 11th, Dr. Yulin Jia provided information on effective blast resistance genes for US blast races to a scientist from a US University for studying plant innate immunity.



The latest issue of Cereal Chemistry has highlighted one of our collaborative publications as the "Editor's Pick".

Armstrong, P.R., McClung, A.M., Maghirang, E.B., Chen, M.H., Brabec, D.L., Yaptenco, K.F., Famoso, A.N. and Addison, C.. 2019. **Detection of Chalk in Single Kernels of Long Grain Milled Rice Using Imaging and Visible/Near Infrared Instruments. Cereal Chemistry** DOI:10.1002/cche.10220.

On November 10-13, Dr. Georgia Eizenga attended the Crop Science Society of America meeting in San Antonio, Texas. She made an oral presentation entitled "The Genetic Basis of Cold Stress Tolerance in Rice at the Seedling Stage Identified in Two Independent High-Resolution Genome-wide Association Mapping Studies". The theme of the meeting was "Embracing the Digital Environment" and it was jointly supported by the American Society of Agronomy and the Soil Science Society of America with over 4,000 scientists, professionals, educators, and students attending.

Cold tolerant vs susceptible seedlings (Front. Plant Sci. 8:957)

✓ **Rice Germplasm Distributed**

During the month of November, 342 rice accessions from the Genetics Stocks *Oryza* (GSOR) collection were distributed to researchers in the United States and the United Kingdom.

- **Stakeholder Interactions**

On Nov. 4th, Dr. Anna McClung was contacted by a Minnesota company interested in developing instrumentation to measure starch content in rice. She provided reference materials regarding standards for determining amylose content.

- **Education and Outreach**

On November 5th, Dr. Barnaby was interviewed by a college student, Ms. Tristan Johnson, at Prince George's Community College, Largo, MD as a part of student's technical communication course. The questions included 1) how to utilize technical communication daily as a scientist at USDA, 2) what are the technical communication processes when completing a research project, and 3) what is a misconception or stereotype of being a researcher at USDA.

On November 8th, Dr. Jai Rohila presented a short overview of career and employment opportunities available in the USDA-ARS to about 75 senior students from DeWitt High School during its 21st Career Expo, sponsored by Phillips Community College - University of Arkansas (PCCUA), DeWitt, AR. USDA-ARS was one of the 19 job fair vendors present at the event. Dr. Rohila's provided general information on career choices available in USDA-ARS with several levels of education ranging from high school diploma, vocational education, B.S., M.S., to Ph.D. levels. He also described job opportunities available for students at the DBNRRC such as: summer employment, job shadowing, short-term lab projects, part-time jobs while studying at college. He distributed handouts explaining research activities at the center, contact information, and job applications to the interested students.

On November 8th, Dr. Yulin Jia participated in a telephone conference for the 6th Federal Asian Pacific American Council (FAPAC) 2019 career development program (CDP) graduation at USDA, Washington, DC 20250. Dr. Yulin Jia has been a mentor for CDP since 2016. Ms. Noelle Pinckney from Warehouse Commodity Management Division of

USDA was his fourth mentee, graduating among 14 others. FAPAC was founded in 1985 and is a nonprofit, nonpartisan organization representing the civilian and military Asian Pacific American employees in the federal and District of Colombia governments.

Seth Abugho, Ph.D. candidate in Agronomy at Texas A&M University, completed his dissertation defense on Nov. 11th regarding his research project "Evaluation of non-chemical weed management options in organic rice production". Dr. Abugho is working under the direction of Dr. Muthukumar Bagavathiannan in the Dept. of Soil and Crop Sciences and Dr. Anna McClung served on the graduate committee.

On November 19-21, Dr. Barnaby hosted a 3-day X-ray fluorescence (XRF) spectrometer training supported by Bruker Inc. The XRF application training covered fundamentals of x-ray spectrometry, sample preparation techniques, introduction of Quant Express and quantitative analysis (calibration and application), and the SPECTRA^{plus} software for wavelength dispersive x-ray systems through lectures and hands-on exercise. Ten USDA staff attended the training. Pictured USDA staff performing hands-on training.

On November 21st, Dr. Anna McClung was interviewed by journalist Ximena Greenhouse from the on-line "New Food Economy" regarding the sustainability of rice production in the USA considering factors associated with changing climate.

- **International Research Collaborations**

Dr. Yulin Jia as mentor and Dr. Jai Rohila as co-mentor will host a Borlaug fellow Dr. Annapurna Devi Allu, an Assistant Professor, Department of Biology, Indian Institute of Science Education and Research, India funded by the Borlaug International Agricultural Science and Technology Fellowship Program (Borlaug Fellowship Program), USDA- FAS Office of Capacity Building and Development. Dr. Allu will initiate a project at DB NRRC entitled "Identification of miRNA's involvement with the presence of blast resistance gene *Ptr* under water stress conditions" on Jan 6, 2020. Dr. Allu will work at DB NRRC for 3 months and the whole project will be completed by Jan. 2022.