



November 2015

**Highlights from the Dale Bumpers National Rice Research Center
Stuttgart, AR**

**For more Information Contact: Dr. Anna McClung, Research Leader
anna.mcclung@ars.usda.gov**

1. Recently Accepted Publications

ARS Anticipated Product: New uses for current crops.

M.-H. Chen and C.J. Bergman. 2015. Vitamin E homologs and γ -oryzanol levels in rice (*Oryza sativa* L.) during seed development. Cereal Chemistry “First Look”.
<http://cerealchemistry.aaccnet.org/doi/pdf/10.1094/CCHEM-07-15-0152-R>; posted 11/23/2015.

Rice bran contains vitamin E compounds (tocopherols and tocotrienols) and γ -oryzanol. These fat-soluble antioxidants have gained significant attention due to their potential health benefits and ability to increase vegetable oil stability. Aiming at further understanding the development of these phytochemicals in rice and evaluating the potential of harvesting rice for their optimum concentration, changes in the levels of these phytochemicals were examined during seed development. Rapid accumulation of tocopherols, tocotrienols and γ -oryzanol occurred during early seed development. During the middle stage of seed development, the levels of tocopherols decreased sharply, the levels of tocotrienols either stayed the same or decreased slightly, while γ -oryzanol continued to accumulate till maturity. The levels of these compounds remained constant from maturity to 15 days post-maturity. In conclusion, rice grain used for nutraceutical and functional food applications should be harvested during its immature stage in order to obtain the highest amount of tocopherols, while the amounts of the tocotrienols and γ -oryzanol can be optimized by harvesting grain at maturity.

2. New Significant Research Collaborations

International

USA

3. New Awarded Grants

4. Technology Transfer

a. Formal Events:





To Non-research stakeholders

To Research Community

On November 14-18, Drs. Anna McClung, Georgia Eizenga, Shannon Pinson, and Jo Heuschele of the Dale Bumpers National Rice Research Center, Stuttgart, AR, attended the Tri-society [Crop Science Society of America (CSSA)-American Society of Agronomy-Soil Science Society of America] annual meeting in Minneapolis, Minnesota. Dr. Eizenga made an invited symposium presentation entitled “Unlocking the Variation Hidden in Rice Germplasm Collections with Genomics”. Dr. Pinson spoke on “Accumulation of Arsenic in Leaves and Grain Are Affected By Variety and Soil Arsenic”. ARS post-doc Dr. Jo Heuschele presented a poster titled “Rice Varietal Differences in Arsenite Metabolism”. Dr. Anna McClung presented three posters: “Greenhouse Validation of Yield Component Transgressive Variation Effects of Wild Oryza Species Introgressions in an Elite US Rice Cultivar; Genetic Architecture of Grain Chalk in Rice and Interactions with a Low Phytic Acid Locus; and Rice Breeding Trends over 30 Years for Predicting Response to Climate Change”.

On November 20th, Dr. Anna McClung participated in the thesis defense for MS student Elizabeth Castillo at the Arkansas State University, at Jonesboro, AR. Her research focused on evaluation of recombinant inbred lines from a mapping population and accessions in the Rice Diversity Panel 1 for seedling levels of vitamin C (ascorbate acid) which has been associated with stress response. Her research was directed by Dr. Argelia Lorence at ASU and was partially funded by USDA ARS and grant funds from the National Science Foundation (Eizenga and McClung).

b. Informal Contacts:

From November 30th, a visiting scholar Mr. Xinglong Chen, a PhD candidate from China Agricultural University (CAU), Beijing, China will participate in a team investigation involved in the epidemiology of rice blast fungus *Magnaporthe oryzae* at Dale Bumpers National Rice Research Center (DB NRRC) in Stuttgart, Arkansas under supervision of Research Plant Pathologist Dr. Yulin Jia and Dr. James C. Correll, Department of Plant Pathology, University of Arkansas as a portion of his PhD dissertation with CAU. Mr. Chen’s visit will be an example of co-supervising a PhD student between members of American Phytopathological Society (APS) and Chinese Society of Plant Pathology (CSPP). Mr. Chen’s studies in the USA will be funded by China Scholarship Council.

Rice plants from experiments being conducted in DBNRRC greenhouses were shipped to St. Louis, MO for use in a ‘photoshoot’ for a Purina Dog Food advertisement.





c. New MTAs

d. Germplasm Exchanged:

During November, 1,253 rice accessions from the Genetics Stocks *Oryza* (GSOR) collection were distributed to researchers in the US and Belgium.

Some of the recipients of GSOR seed stocks have acknowledged the source of these materials in publications that have resulted from their research use. An example of these journal articles is *Crop Science* (2015) 55:2620-2627.

5. Educational Outreach

November 9, 2015 Drs. Pinson, McClung and Heuschele plus 10 support staff hosted 60 4th-grade students, two teachers, and 10 parents from Cross County Elementary Technology Academy in Cherry Valley, AR. This visit culminated their “Rice is Life” study segment, which began in the classroom several weeks prior to the on-site visit with the students using a set of 25 rice seed samples from the NPGS world collection of rice to study world geography and the importance of rice in feeding the world’s population. Students dehulled and milled rice samples, extracted DNA, and experienced the different flavors and textures of rice that are preferred by various cultures around the world. They learned the meaning of “germplasm” and how the USDA NPGS is a repository of thousands of not-yet-known genes that can be used to protect U.S. agriculture from new pests and other agronomic and marketing pressures in the future. The students filled out a short survey regarding what they learned and enjoyed from the visit. The event was highlighted in the local Stuttgart Daily Leader newspaper.

<http://www.stuttgartdailyleader.com/photogallery/AR/20151110/PHOTOGALLERY/111009996/PH/1>

6. Awards/Honors

