



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

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1. Recently Accepted Publications

ARS Anticipated Product: Plants tolerant to environmental changes or extremes.

Wang DR, Bunce JA, Tomecek MB, Gealy D, McClung A, McCouch SR, and Ziska LH. 2016. Evidence for divergence of response in Indica, Japonica, and wild rice to high CO₂ x temperature interaction. *Global Change Biology* doi:10.1111/gcb.13279

Although carbon dioxide (CO₂) is recognized as a greenhouse gas that is associated with global warming, it is also the source of carbon for photosynthesis and plant growth. Some research has indicated that crops may have increased yield as a result of higher CO₂ levels associated with climate change. However, most climate change projections include increases in CO₂ as well as temperature. Thus, it is of interest to understand how crop productivity will respond to changes in these two important factors for plant growth. In this study, 11 globally diverse rice varieties were evaluated at current and projected CO₂ concentrations under four temperature environments to determine the impact on grain yield. It was discovered that rice grown under projected increases of CO₂ was more sensitive to high temperature stress and had lower yields as compared to rice grown at current CO₂ levels. The overall results indicated that rising temperature negated CO₂ stimulation in rice yield for all of the varieties studied; and could, for certain varieties, actually reduce yield relative to current conditions. The study also revealed the benefit of introducing genes from wild species of rice into cultivated rice that would result in greater ability of new cultivars to adapt to a changing environment.

2. New Significant Research Collaborations

International

USA

A collaboration of DB NRRC with North Carolina State University has been established to investigate physiological and molecular properties of seeds and germinated seedlings grown with and without abiotic stress.

A collaboration of DB NRRC with the Louisiana Agricultural Experiment Station has been established to validate new blast resistance genes and develop user friendly DNA markers for rice breeding in the southern USA.





3. New Awarded Grants

The project titled "Development of practical diagnostic methods for monitoring rice bacterial panicle blight disease and evaluate rice germplasm for resistance" is funded by Arkansas Rice Research and Promotion Board at \$62K from April 1, 2016 to March 30 2017. This project has been an ongoing collaborative project with University of Arkansas Cooperative Extension Service since 2012.

4. Technology Transfer

a. Formal Events:

To Non-research stakeholders

To Research Community

Anna McClung and Georgia Eizenga of the Dale Bumpers National Rice Research Center, Stuttgart, Arkansas participated in the Rice Crop Germplasm Committee meeting on Mar. 1 in Galveston, Texas.

On March 1, Yulin Jia presented an invited presentation on rice blast resistance genes and blast disease management at a research symposium as part of a USDA/NIFA grant project with Kansas State University. Anna McClung presented an invited talk at an organic rice symposium on managing grain arsenic uptake in organic rice production systems as part of a USDA/OREI grant. Both symposia were presented in conjunction with a research meeting being held in Galveston, TX and were well attended by some 50- 70 industry liaisons, rice farmers and university scientists.

March 1- 4, 2016 all scientists and several technical support staff of the Dale Bumpers National Rice Research Center, Stuttgart, Arkansas, attended the Rice Technical Working Group meeting in Galveston, Texas. Topics presented by USDA/ARS scientists included use of resistance genes for disease management, physiological factors that limit arsenic accumulation in rice grains, genetic mapping of genes linked with milling quality, genetic variation in resistant starch concentration in rice varieties, identification of genes associated with seedling cold tolerance, use of wild progenitor species of rice to dissect yield enhancing traits, identification of genes for yield under reduced water use, finding weed suppressive traits in rice, and tools for high throughput rice phenotyping and data storage.

On March 11, Dr. Yulin Jia gave a seminar entitled 'Selection, Adaptation, and Divergence of Plant Innate Defense Systems' as a graduate credit for Cell and Molecular Biology program of University of Arkansas- Fayetteville. A total of 52 graduate students attended the seminar.





b. Informal Contacts:

March 5, Dr. Yulin Jia provided information to a foreign research assistant in Egypt through email for conducting dissertation research on "Breeding rice for drought tolerance".

March 7, Dr. Yulin Jia advised a private company in the USA through email on commonly found blast races and resistance genes controlling rice blast races in the USA for development of blast resistant hybrid rice.

March 10, Dr. Anna McClung met with an Arkansas farmer interested in marketing specialty rices. Cooked rice samples of 6 different varieties were provided for sensory testing and a discussion of agronomic production practices.

March 23, Dr. Anna McClung met with a local Arkansas farmer interested in growing organic seed rice. A discussion of suitable rice varieties and sources of seed were discussed.

c. New MTAs

d. Germplasm Exchanged:

During March, 615 rice accessions from the Genetics Stocks *Oryza* (GSOR) collection were distributed to researchers in the US, Belgium and China. Seedstocks for commercial production of ARS developed specialty rice varieties were provided to farmers in South Carolina, Arkansas, Maryland, Pennsylvania, and Texas.

5. Educational Outreach

6. Awards/Honors

