



February 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: Higher yielding plants.

S.R.M. Pinson, Y. Wang, and R.E. Tabien. 2015. Mapping and Validation of Quantitative Trait Loci Associated with Tiller Production in Rice (*Oryza sativa* L.). Crop Science doi: 10.2135/cropsci2014.09.0644; Posted online at First Look 26 Feb. 2015 <https://www.crops.org/publications/cs/view/first-look/crop-2014-09-0644-ora.pdf>

An increase in early tiller production is desired in rice not just to increase yield potential, but also to enhance ability to shade and suppress weeds. Unfortunately, tillering patterns are difficult to select under field conditions because tiller production and survival are highly sensitive to many environmental cues that are not easily controlled under field conditions. Taking advantage of the fact that such confounding factors are more easily controlled in greenhouse studies, we evaluated the number and timing of tillers produced by progeny of two mapping populations. Nine QTLs that had been previously identified as associated with tillering were validated in this study, demonstrating their robustness across diverse genetic backgrounds and growth conditions. Breeders can conduct marker assisted selection using DNA-tags associated with these tillering QTLs to improve yield potential in rice.

Li, J., Sun, Y., Liu, H., Wang, Y., Jia, Y and Xu, M. 2015. Natural variation of rice blast resistance gene Pi-d2. Genetics and Molecular Research 13: 10582-10596. DOI <http://dx.doi.org/10.4238/2015>.

We examined the origins of rice disease resistance genes by taking a closer look at one major rice blast (*Magnaporthe oryza*) resistance gene, Pi-d2. DNA sequence variation of this gene was found in 35 rice cultivars, *Oryza sativa*, and 6 wild rice accessions. Pi-d2 was found in accessions of *O. rufipogon*, a putative progenitor of cultivated rice, suggesting that Pi-d2 originated in wild rice before the formation of subgroups in cultivated rice. This study demonstrated that wild rice is a source of resistance genes for rice blast disease. These findings will help us discover critical portions of resistance genes and allow us to develop novel strategies for controlling blast disease.

2. New Significant research collaborations





International

Dr. Fantao Zhang, professor at the College of Life Sciences, Jiangxi Normal University in Jiangxi, China, joined the USDA-ARS DBNRRC for one year starting Jan 29, 2015. He is collaborating with Dr. Shannon Pinson to research genes affecting rice tiller production. Dr. Zhang's visit is being funded by the China Scholarship Council.

USA

3. New awarded grants

4. Technology Transfer

a. Formal Events:

To Non-research stakeholders

Participation in meeting with USDA/OSEC in Washington, DC regarding status of research on mitigating arsenic in rice.

To Research Community

One presentation was made at the Weed Science Society of America meeting held in Lexington, KY, Feb. 9-12 on development of a mapping population to study weed-suppressive traits including allelopathy.

A presentation was made at the XII International Rice Conference for Latin America and the Caribbean held in Porto Alegre, RS, Brazil, Feb. 23-26, 2015 regarding new opportunities for the specialty rice market.

b. Informal Contacts:

10 contacts with news media regarding: development of a movie regarding the life of Dr. Hank Beachell, first ARS rice breeder at Beaumont, TX; importance of Carolina Gold heirloom rice currently being grown in South Carolina.

1 contact with organic rice company regarding hosting organic workshop in August.

Several researchers of the DBNRRC participated in a teleconference with US rice breeders about how genomic data can be used to enhance their breeding efforts.





One researcher from DBNRRC participated in a phone and email discussion with Dr. Nilda Burgos from the University of Arkansas, Fayetteville advising greenhouse growing conditions, fertilizer and pest control for weedy red rice seed production.

One researcher from DBNRRC participated in an e-mail conversation with Norah Hummel, undergraduate student, University of Washington advising appropriate 'modern' and 'old' rice cultivars to use in study of (endophytic) microorganism effects on physiology and ecology (ecophysiology) of rice plants at elevated CO₂ levels.

One contact to transfer genetic markers for disease resistance genes.

c. **New MTAs**

None





d. Germplasm Exchanged:

10 elite breeding lines developed at DBNRRC were distributed to southern rice breeders for evaluation in the 2015 Uniform Regional Rice Nursery.

1,124 GSOR accessions were sent to researchers in the U.S., France and Sweden.

5. Educational Outreach

Three of the DBNRRC research staff made presentations at the Stuttgart High School as part of Future Farmers of America all day program. Presentations were made regarding research conducted at DBNRRC, genetic markers, hybrid vigor, and careers in agricultural science.

Three researchers from DBNRRC participated in the "Real Men Read" program at the Park Avenue Elementary School. The objective of the program is to provide positive male role models for children and highlight the importance of being able to read. The program is targeted to minority children and Hispanic and African-Americans made up 75% of the classes. In addition to reading short books and poems, each of the researchers spoke about their work as a scientist, about rice farming, and the from "field to table" concept of food.

One researcher from DBNRRC conducted a hands-on seed biology experiment at the Meekins Middle School in Stuttgart. This was in support of the 'Alternate Learning Education' program that targets children with learning challenges. The students participated in a study to evaluate seed germination in response to different levels of watering.

6. Awards/Honors

None

