



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



JUNE 2019

MONTHLY RESEARCH HIGHLIGHTS

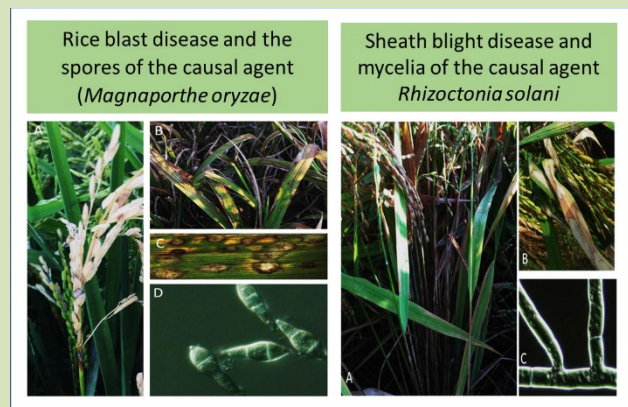
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● **Recent Scientific Publications**

This addresses USDA-ARS Research Goal: Improved plant breeding techniques that apply knowledge from genetic interaction with environment and management factors.

Jia, Y., Jia, M.H., Wang, X., and Zhao, H. 2019. A Toolbox for Managing Blast and Sheath Blight Diseases of Rice in the United States of America [posted on June 11 2019], IntechOpen, DOI: 10.5772/intechopen.86901. Available from:
<https://www.intechopen.com/online-first/a-toolbox-for-managing-blast-and-sheath-blight-diseases-of-rice-in-the-united-states-of-america>

Rice blast disease caused by the fungus *Magnaporthe oryzae* and rice sheath blight disease caused by the fungus *Rhizoctonia solani* are two major hurdles for stable rice production worldwide. Presently, fungicides are still needed to manage these two devastating fungal pathogens. After two decades of research efforts, a toolbox has been assembled with the following components: (1) insight into pathogen genomic identity and pathogen avirulence (*AVR*) genes that can be used to enhance plant breeding; (2) new mapping populations, germplasm and genetic stocks that can be used as starting materials to identify effective host resistance (*R*) genes; (3) user-friendly disease evaluation methods that can be used to accelerate the identification and utilization of *R* genes; (4) validated effective *R* genes that are readily available for improving genetic resistance; (5) host genetic markers that can be used to accelerate the development of new resistant germplasms/cultivars; and (6) an improved understanding of resistance mechanisms that can facilitate the engineering of resistance in commercial varieties. Appropriate employment of these tools in breeding and crop protection will reduce production costs and create an environmentally benign, sustainable rice production system.



- **Technology Transfer**

- ✓ **Interactions with the Research Community**

On June 5th, Dr. Jeremy Edwards attended the Institute of Food Technologists (IFT19) Expo in New Orleans, LA and presented an invited talk "CRISPR-Cas9 opportunities for accelerating conventional breeding and enhancing rice grain quality" at the CRISPR: Practical Applications and Health Implications workshop organized by Dr. Christine Bergman. The IFT annual conference is attended by food professionals from around the globe specializing in research, ingredients, safety and quality, technology, equipment, processing, packaging, manufacturing, suppliers and buyers, policy makers, and academics.



On June 12th, Dr. Anna McClung provided seed of two cultivars differing in cooking and milling quality traits to a researcher in Arkansas.

On June 20th, seed of 11 commercial varieties were provided to a researcher in Colorado interested in resistance to bacterial infection.

On June 26, Dr. Yulin Jia provided blast resistance gene information to a researcher in a US company for their research and variety development.

- ✓ **Rice Germplasm Distributed**

During the month of June, 169 rice accessions from the Genetics Stocks Oryza (GSOR) collection were distributed to researchers in the United States and Hong Kong.

- **Education and Outreach**

On June 14th, 26 young women participated in a hands-on event at the USDA-ARS Dale Bumpers National Rice Research Center. They were 7th-9th graders participating in a summer STEM (Science, Technology, Engineering, and Mathematics) program that is coordinated through the Museum of Discovery in Little Rock. The students learned how to transplant rice with Dr. Anna McClung, observe different grain characteristics from rice varieties grown around the world with Dr. Georgia Eizenga, used imaging technology to study root architecture with Dr. Shannon Pinson, learned about genes that control cooked rice flavor and texture with Ms. Lorie Bernhardt, and performed photosynthesis measurements on greenhouse grown plants with



Ms. Tiffany Sookaserm. The event was highlighted on the front page of the local Stuttgart Daily Leader Newspaper on June 18th.



On June 19th, 80 adult educators participated in National Ag in the Classroom Day hosted by the Arkansas Farm Bureau. They were presented with an overview of some of the main research issues confronting USA and global rice production and how DBNRRC is addressing these (Anna McClung). They learned about how coding is used in genomic analysis (Trevis Huggins, pictured), the art of isolating pathogens and inoculating plants to evaluate for resistance (Yulin Jia), and variety differences in cooked rice texture and flavor that impact market value (Lorie Bernhardt). Information regarding breeding rice that uses less water that was presented at the meeting was highlighted in a June 27th article in Farm Week Now



<https://farmweeknow.com/story-challenges-lead-conservation-practices-arkansas-rice-fields-5-191574>

A new educational exhibit has been established at the World Trade Center in New York City by Zojirushi America Corp. Reaching over 250,000 people daily, the exhibit has several varieties of rice growing in constructed paddies. One of these is the heirloom rice variety Carolina Gold that is credited with the establishment of the USA rice industry. Dr. Anna McClung has been the provider of purified seed for commercial production of this niche market variety for 15 years.

<https://www.prnewswire.com/news-releases/zojirushi-sponsors-a-rice-paddy-growing-in-nyc-300863918.html>

