

October 2016

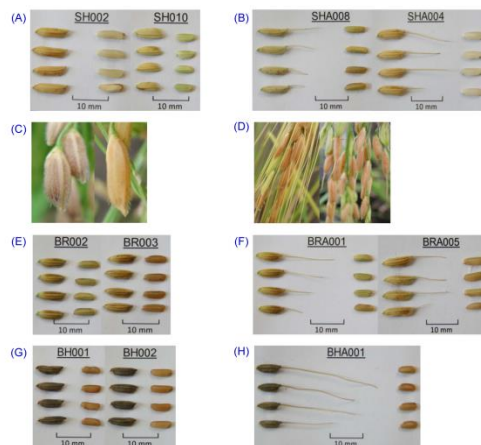
USDA-ARS
Dale Bumpers National Rice Research Center Highlights
Stuttgart, Arkansas

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1. Recently Accepted Publications

Yongxia Cui, Beng Kah Song, Lin-Feng Li, Ya-Ling Li, Zhongyun Huang, Ana L. Caicedo, Yulin Jia, and Kenneth M. Olsen. Little White Lies: Pericarp Color Provides Insights into the Origins and Evolution of Southeast Asian Weedy Rice. *G3* g3.116.035881; Early Online October 11, 2016, doi:10.1534/g3.116.035881.

Weedy red rice is a weed that causes losses in yield and quality in rice production fields. It is difficult to control because it is genetically very similar to cultivated rice. Different origins of weedy rice have been found worldwide. This study was conducted to determine the origin of weedy rice found in Malaysia. The *Rc* gene is responsible for red pigmentation of the pericarp that is found in most wild and weedy rice species and is associated with seed dormancy. The nonfunctional *rc* allele, conveying white pericarp, was favored during rice domestication and today is found in most cultivated varieties. Analysis of seed traits and associated genetic markers of 52 Malaysian weedy rice strains showed that they likely have at least three distinct origins: from the wild *O. rufipogon* species, from white-pericarp cultivated rice, and from red-pericarp cultivated rice. The *Rc* (red) allele may provide fitness benefits in weedy rice populations by conferring seed dormancy that allows the weed to persist. This may promote genetic crossing among weedy and cultivated rice populations. These findings are useful for the development of effective strategies to manage weedy rice in commercial rice fields worldwide.



2. Technology Transfer

a. Formal Events:

To Non-research Stakeholders

To Research Community

On October 11, 2016 Dr. Yulin Jia, Molecular Plant Pathologist, gave an invited presentation entitled “Analysis of rice blast resistance genes from domesticated and weedy species of rice” at 7th International Rice Blast Conference (7th IRBC), Manila, the Philippines. The IRBC has been held once every 3 years. This year 219 scientists and specialists from 28 countries attended the conference.

On Oct 12, 2016, Dr. Anna McClung, Research Geneticist, provided a report on the genetic marker analysis of 200 elite breeding lines developed by southern US rice breeders and included in the Uniform Regional Rice Nursery. The markers demonstrated which breeding lines possess various alleles for cooking quality, disease resistance and other agronomic traits. These results are determined by the Genomics facility at the DBNRRC, under the direction of Dr. Jeremy Edwards, Molecular Geneticist.

On Oct 17, Dr. Jinyoung Y. Barnaby, Research Plant Physiologist, presented an invited seminar entitled “Climate change adaptation and mitigation in agriculture” for the biosciences seminar series at University of Arkansas, Little Rock, AR.

On October 20, 2016 Dr. Yulin Jia gave an invited seminar entitled “Why does plant pathology matter for crop production” at the Rice and Sorghum Research Center of Sichuan Academies of Agricultural Sciences, Deyang, China.

On October 18, 2016 Dr. Yulin Jia gave an invited seminar entitled “Selection, adaptation, and divergence of plant innate defense systems”, at Sichuan Agricultural University Rice Research Institute and another invited seminar entitled “Opportunities and challenges for rice disease management” at Sichuan Academies of Agricultural Sciences, both in Chengdu, China.

On October 24, 2016 Dr. Yulin Jia gave an invited seminar entitled “Genomic toolboxes for improving disease resistance in rice – a case study in the USA” at Jiangsu Academy of Agricultural Sciences, Nanjing, China.

On October 24, 2016 Research Chemist, Dr. Ming-Hsuan Chen, presented an invited talk titled “Enhancing the health-beneficial qualities of whole grain rice” during the Recent Advances on Structure-Function Relations of Rice and Rice-Based Food Symposia at the 2016 American Association of Cereal Chemists annual meeting, held from Oct 23-26, 2016 in Savannah, GA.

b. Informal Contacts

On October 6, 2016 Dr. Shannon Pinson, Research Geneticist, advised Dr. Ken Foster of Kennan Corporation, Davis, CA on the reported effects of rice husks, as a soil amendment, on rice grain arsenic concentrations.

On October 26, 2016, Dr. Anna McClung, Research Geneticist, provided background information to representatives of a private seed company regarding blast disease susceptibility of commercial cultivars based upon DNA marker analysis.

c. New MTAs

d. Germplasm Exchanged:

During October, 266 rice accessions from the Genetics Stocks *Oryza* (GSOR) collection were distributed to researchers in the US.

3. Education and Outreach

On October 19, 2016 Dr. Yulin Jia, as a special invited guest examination advisor, attended 10 graduate thesis examinations of Sichuan Agricultural University, Chengdu, China. Current research progress on all major crop diseases, productivity and quality was reviewed.

On October 25 and 27, 2016, Aaron Jackson, Geneticist, gave guest lectures at Phillips Community College in Stuttgart, Arkansas for an entry level biology class. Topics included Mendelian genetics, inheritance of plant and animal genetic disorders, and population genetics. Hands on activities included solving Punnett squares to predict genetic probabilities, pedigree analysis of genetic disorders, and group projects to illustrate the driving forces behind population genetics.

On October 26, 2016, the DBNRRC received 90 tenth grade students from Watson Chapel High School, in Pine Bluff. The students participated in several hands-on demonstrations regarding research conducted at the center, including DNA extractions, starch chemical analysis, measuring photosynthesis in water stressed plants, measuring methane emissions, and making crosses for breeding and genetics studies. Over 70% of the students responded in a survey that their favorite sessions were the DNA extraction and starch chemical analysis. The event was summarized in the local newspaper website.

4. New Significant Research Collaborations

International

USA

