

## SUMMARY

### Arkansas Rice Research and Promotion Board - 2005

**TITLE:** Continued Evaluation of Blast Resistance Genes in Rice Wild Relatives (*Oryza* spp.) and Unique *O. sativa* Accessions Utilizing DNA Markers

**INVESTIGATORS:** Georgia C. Eizenga, Fleet N. Lee and Yulin Jia

**COOPERATOR(S):** Wengui Yan, James W. Gibbons, Karen A. K. Moldenhauer and J. Neil Rutger

**FUNDING AREA:** Genomics

**STATUS: ONGOING** (Year 2 of 3 year project for 2004-2007)

#### **PROGRESS:**

Resistance to U.S. blast races and sheath blight was identified in three *O. nivara* accessions. – Progeny from these *O. nivara* accessions crossed with Ahrent are being increased to the BC<sub>2</sub>F<sub>3</sub> for evaluation of blast resistance and selection. BC<sub>1</sub>F<sub>1</sub> seed was obtained from crosses between these three *O. nivara* accessions and blast susceptible lines, M201, Farmbuster (RU9101001) and/or Bengal. Some of these crosses will be advanced to the BC<sub>2</sub>F<sub>2</sub> or BC<sub>3</sub>F<sub>2</sub> as mapping populations to identify the blast resistance genes with molecular techniques and screen for blast resistance.

Thirteen *O. sativa* accessions were resistant to the new blast isolate, IE-1k-Banks, and lab isolate IB-33. – These accessions were selected from the 34 *O. sativa* accessions previously identified as potential sources of new and novel blast resistance (*Pi*-) genes from approximately 1,000 accessions screened for blast resistance. Seven of these 13 *O. sativa* accessions were selected based on grain type, yield and relatedness, and crossed with LaGrue which has no known blast genes. These crosses are being advanced to the F<sub>2</sub> generation and selected populations will be used to further identify the blast resistance through blast inoculation and molecular marker analyses. In addition, the backcrossed lines will be available to the breeders (i.e. Moldenhauer and Gibbons) for selection and incorporation into the breeding program. The seven accessions also have been given to Moldenhauer for making crosses in her breeding program.

Six different backgrounds were found in the 91 blast resistant *O. sativa* accessions originally selected based on field screening – and no accession had the same background as US rice varieties. The presence of DNA markers associated with known blast genes already in US cultivars (*Pi-b*, *Pi-ta*, *Pi-k<sup>h</sup>*, *Pi-k<sup>s</sup>* and *Pi-z*) was evaluated. Discovery of 11 additional DNA markers that had not previously been associated with blast resistance traits will assist in identification of novel blast resistance genes in the seven *O. sativa* accessions. A similar analysis of the *Oryza* spp. accessions implicated an additional seven chromosomal regions as sources of blast resistance genes.

Results were presented at the UA RREC field day on August 10, 2005. Also, the study of the relatedness between the *O. sativa* accessions was accepted for publication in a scientific journal and two other publications are being submitted for publication regarding the *O. sativa* and *Oryza* spp.