

SUMMARY

Arkansas Rice Research and Promotion Board – 2004

TITLE: Molecular Characterization of Blast and Sheath Blight Resistance Genes for Development of DNA Markers to Tag Blast and Sheath Blight Resistance

INVESTIGATOR (S): Yulin Jia, Fleet N. Lee, Georgia Eizenga, James Gibbons and Karen Moldenhauer

COOPERATOR (S): James Correll, Richard Cartwright, Yinong Yang, Melissa Jia and J. Neil Rutger

STATUS: ONGOING (Year 1 of 3 year proposal)

Hired Yeshe Wamishe-Postdoctoral Research Associate- Dr. Yeshe Wamishe was hired from University of Arkansas on April 1, 2004, and in addition, **Dr. Erxun Zhou** was hired at 50% time on July 2, 2004.

ANNUAL PROGRESS:

- 1) High through-put DNA preparation method: Assisted Virginia Johnson in development of an effective DNA preparation method using leaf disc for marker assisted selection.
- 2) Two major blast resistance genes were discovered: Pathogenicity tests of several mapping populations have identified two novel resistance genes in Zhe733 and Raminade Strain-3. A recombinant inbred lines (326) population of cross of Zhe733 with Kaybonnet low phytic acid mutant was used for establishing the linkage of resistance genes to chromosomal locations. One hundred fifty polymorphic markers were identified from a survey of 160 simple sequence repeat (SSR) markers. Resistance to virulent isolate IE1k (TM2) was conditioned by two dominant genes; each provides complete resistance. The genotyping data are being analyzed for establishing linkage. Additional crosses, Zhe733 with C101A51 and Zhe733 with Wells are being used to separate these two genes for fine mapping.
- 3) A molecular method for cultivar identification was developed: In cooperation with Riceland food, a set of SSR markers distinguishing major US rice cultivars were selected for testing unknown cultivars provided by Riceland. A method to prepare DNA from white rice for 20 SSR analysis was established for quick assessment of the origin of rice cultivars.
- 4) A molecular method was developed to distinguish the genetic makeup of rice blast fungus: This method involves using DNA primers specific to Pot2 transposon of *M. grisea* by Rep-PCR. Rep-PCR was used to detect the genetic diversity of the race shift isolate from Corning fields and provided the molecular data to clearly demonstrate the identity of the blast pathogen.

Postscript: This study did not receive continued funding beyond this year.