

**Arkansas Rice Research and Promotion Board  
Annual Progress Report, 2004**

**TITLE:** Molecular Analysis of Genes Resistant to the Rice Water Weevil

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**STATUS:** (Year 1 of 3 year proposal)

**OBJECTIVE:** To identify, map, and tag genes that provide resistance to the rice water weevil, *Lissorhoptus oryzophilus* Kuschel.

**PROGRESS:**

**Hire Guangjie Liu as Visiting Scientist:** Guangjie Liu was hired as a visiting scientist on July 11, 2004 for this project. Dr. Liu is from the China National Rice Research Institute (CNRRI).

**Genetic Analysis for a Gene-mapping Population:** The recombinant inbred lines (RIL) of Zhe 733 (water weevil tolerance) and Kaybonnet *lpa-1* (water weevil susceptible) were grown in the greenhouse. Rice leaves of 294 available lines were harvested and cut into 2-3 cm lengths, then stored at  $-8^{\circ}\text{C}$ . Still-frozen leaves were hand-ground to a powder in liquid nitrogen. The DNA was from all 294 leaf-samples in a procedure that requires 48 hours for completion for each group of 40 samples.

After extraction the quality of each DNA sample was examined by gel electrophoresis for each group of 20 samples. Then, a spectrophotometer was used to measure the quantity of DNA present in each qualified sample. Based on the DNA qualification and quantification procedures, 258 DNA samples were qualified for molecular analysis. So far, 52 SSR (simple sequence repeats) markers have been amplified in the 258 DNA samples (13,416 reaction products). The PCR (polymerase chain reaction) products have had the base pairs sequenced on an ABI 3700 DNA analyzer. Plans are for more SSR markers (up to 98 more) to be screened before next planting season.

Prior to next planting season and through a complicated manual comparison and statistical analysis of the genetic variation in the qualified RIL population, as few as 50 lines will be selected as representatives of the mapping population. A field study will be used to present selected lines for rice water weevil infestation and injury in 2005. Field data will then be compared to the genetic data for identification of a source(s) of resistance to rice water weevil injury.

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