

Rice Research and Promotion Board
Progress Report Rice Breeding and Genetics Technical Support
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2005

Molecular Aided Selection: The dominant blast resistance gene *Pi-ta* is at least partly responsible for the blast resistance found in the cultivars 'Katy', 'Kaybonnet', and 'Drew'. This resistance has broken down in some fields in Arkansas. *Pi-ta* does, however, provide resistance to an array of isolates found in the pathogen population. In order to pyramid *Pi-ta* with *Pi-z* and/or *Pi-b* (genes that confer resistance to the race shift isolate and some blast races that *Pi-ta* does not) we can use molecular markers closely linked to these genes coupled with minor or horizontal resistance genes to confer durable blast resistance to Arkansas cultivars. We have evaluated greenhouse blast reaction to field race shift isolates, and using molecular marker technology, our working germplasm bank for *Pi-ta*, and cook type with the RM 190 *Waxy* gene marker; identified parents with the appropriate genes; and are making crosses with these progenitors. This past spring, a selected group of 873 F₃ lines derived from 20 crosses composed of one parent with *Pi-ta* and the other with *Pi-z* were screened for the presence of the genes. They were selected in Puerto Rico on the basis of molecular data and are planted in panicle rows, 1350 of which are currently being screened with molecular markers. Without the markers we would be unable to do this. We are also routinely using the RM 190 marker for cook type, and will shortly be incorporating a series of SNP markers to fine-tune the molecular data at the *Waxy* locus. Another set of 2310 panicle rows were screened with markers, along with further evaluations of new parental lines, potential sources of new blast resistance genes, and genotyping of F₂ crosses between Francis sister lines and Cypress, Drew, and Wells that have shown phenotypic traits of the male parent and a potential segregation distortion.

Anther Culture:

Dr. Junda Jiang accepted a position with California Rice Foundation as short grain breeder. It was decided not to fill this position and concentrate resources on molecular aided selection. There are 1100 DH1 rows planted in 2005 of which 88 were selected for advancement to preliminary yield trials in 2006, and several DH lines were in yield trials this year. Results of yield trials are pending.