

Genotyping and Phenotyping of Selected Resistant Rice Germplasm for Blast Disease under Local Conditions

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Magnaporthe oryzae, the causative organism of rice blast disease, causes 10-30% annual yield losses worldwide. Panicle blast is the most severe form, causing 100% yield losses. This study aimed at identifying blast resistant genes/QTL alleles in selected rice germplasm and screening the same for leaf and panicle blast resistance in local environments. *Magnaporthe oryzae* strains, isolated and Koch's postulated previously, were sub-cultured and identified by *Pot2* based PCR before inoculation. Two local Mega rice varieties Bg352 and At362, and international germplasm Usen, Zenith, and Raminad were studied. Pachchaperumal was used as the susceptible control. Potted rice plants at seedling (21 days) and heading stages were screened in triplicate for leaf and panicle blast. Rice plants inoculated by spraying a mycelium suspension of the two-pathogen isolates were kept in humid chambers to facilitate disease development. Rice varieties were genotyped using gene-specific markers or linked SSR markers for *Pita/Pita-2*, *Pi54* and *Pikh* genes/QTL alleles. Optimum growth of *M. oryzae* was observed on oatmeal plates containing 7.5 g/L of glucose. Upon inoculation, panicle blast symptoms were observed on Bg352 and At362, however, no symptoms were observed on Usen, Zenith, Raminad and Pachchaperumal. Symptom development was not consistent in the replicates in any of the varieties, therefore, these observations need to be verified. *Pita/Pita-2*, *Pi54* and *Pikh* resistance genes/QTLs were observed in Usen, Raminad, and Zenith respectively. *Pita/Pita-2*, and *Pi54* were amplified in At362 and Bg352. Bg352 predicted allelic variation in *Pikh* but the QTL was not amplified in At362. Sequencing of these genes/QTL from the local varieties could reveal further allelic variations. Verification of resistance phenotypes of Usen, Raminad and Zenith and identification of allelic variations will assist in identifying potential donor parents for blast resistance in rice crop improvement.

Keywords: *Magnaporthe oryzae*, Panicle blast resistance, *Pi54*, *Pikh*, *Pita/Pita-2*,

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