939/D

Phenotypic Screening of Rice Varieties for Blast Resistance towards Developing DNA Markers Linked to Resistant Genes

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Rice blast is a serious disease affecting rice growing regions in Sri Lanka and in the world, caused by the fungal pathogen *Pyricularia grisea*. Blast is considered as a major disease of rice because of its wide distribution and destructiveness in environments conducive to the disease. The use of resistant varieties is considered to be the best way to control the rice blast disease caused by *Pyricularia grisea*. Phenotypic screening is an effective mechanism in breeding blast resistant varieties. In the present study, a total of 34 rice varieties were selected for phenotypic screening which included several Sri Lankan rice varieties known to be resistant and susceptible to blast and IRRI recommended rice varieties. The selected rice varieties were established in the upland blast screening nursery at the Rice Research and Development Institute (RRDI) at Bathalagoda according to a complete randomized statistical design. Disease infection was induced by using dry leaf spore suspension after two weeks of nursery establishment. The required high humidity level was maintained by covering the nursery to create moisture chambers which favour fungal growth and sporulation. The infection process was continued till the typical blast lesions appeared in the rice leaves. All rice lines were scored for blast by using the International Rice Research Institute stipulated Standard Evaluation System. Based on the scoring system the rice varieties were grouped into six major classes (Highly Resistant (HR), Resistant (R), Moderately Resistant (MR), Moderately Susceptible (MS), Susceptible (S),and Highly Susceptible (HS). Lesion shape, color, size, number of lesions, percentage of the lesions per leaf were taken as parameters for scoring. The experimental data were analyzed and the mean values were used to determine the susceptibility or resistance of rice varieties. The total of 15 varieties that were used for the phenotypic screening were susceptible to the fungal infection. The rest of the varieties remained resistant to the rice blast. Tetep, Bg359, Bg304, IR64, Bg352, Bg357 were found to be highly resistant to the rice blast disease, while LD125, Bg94/1, Bw276-3, Bw451, Bw400, H7, Bg34-6, H10, IRRI119 were highly susceptible. Most of the resistant varieties that were reported as resistant in a previous study had retained their resistance over the years. However H7, H10, Bg403, Bw78, Bw400, Bw276-3 which had been identified as resistant in the previous study were found to be susceptible. Loss of resistance could be due to the emergence of virulent races within pathogen population and also due to narrow genetic diversity for blast resistance within these varieties. This study was carried out to develop the F2 population for marker aided selection of rice blast resistant genes in Sri Lankan rice germplasm.

Keywords: Blast resistance, *Pyricularia grisea,* phenotypic screening, F2 population, marker aided selection

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