

Screening of selected Sri Lankan rice varieties under non-phosphate fertilizer condition

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Phosphate deficiency tolerance (PDT) is one of the significant traits in improving rice varieties. The present study was conducted to screen traditional and improved rice varieties developed by Rice Research and Development Institute (RRDI), Batalagoda (Bg) for PDT under greenhouse and field conditions. In the first season at RRDI, Batalagoda, 11 rice varieties with four replicates and in the second season at University of Peradeniya, 30 varieties with three replicates were screened. Two levels of phosphate concentrations, no phosphate application, P₀ (5 Kg/ha or less present in soil) and the application of recommended phosphate concentration, P₃₀ (30 Kg/ha) were used. Eleven rice varieties in the first season and 20 varieties in the second season were screened for PDT in a field where no fertilizer has been applied for last 30 years at RRDI. Morphological data such as plant height was measured at every two weeks interval. All plants were harvested at flowering stage and number of tillers and shoot dry weight was taken at flowering stage for both green house and field grown plants. Soil (growth medium) was collected from each pot and from the field at flowering stage, soil available phosphorous was measured and plant phosphate content was measured. Out of the traits studied, the major trait to assess P-deficiency tolerance was the plant dry weight. From the screening results, all varieties can be grouped in to four classes as highly tolerant (HT), tolerant (T), sensitive (S) and highly sensitive (HS) to phosphate deficiency. Out of the all varieties studied, H4, MAS, Murungakayan and Sudu heenati were the highly tolerant varieties phosphate deficiency whereas Bg 352, Bg 357 and At 354 were the highly sensitive. After selecting the tolerant and sensitive varieties, crosses were made between highly sensitive and highly resistant varieties for further molecular analysis. At the end, attempts will be made to discover molecular markers linked with PDT to be used in the marker assisted selection in rice breeding.

Key words: Marker assisted selection, *Oryza sativa*, phosphate deficiency tolerance

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