

GENETIC PARAMETERS OF ROOT AND SHOOT MORPHOLOGY OF SIX F1 CROSSES FOR IMPROVEMENT OF RICE

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Rice (*Oryza sativa*) is cultivated as a wetland crop in all districts of Sri Lanka. Above-ground plant characteristics are paid much attention with respect to the grain yield of rice. However, in the wet zone, (WZ) most of the problems that limit the grain yield of rice are associated with soils, therefore, poor root growth of rice plants in the WZ has been observed. The objectives of this study were to develop rice varieties with better root structure, to evaluate shoot and root characters of F1 crosses, and to identify transgressive sergeants for subsequent generation's evaluations for root improvement in the breeding programme. Six rice crosses and their parents were tested in a RCBD with 02 blocks. The volume displacement method was used to determine the root volume of the plant and the root pulling technique was used to determine the strength of the root system. Data were analysed, using ANOVA and Duncan multiple range test was derived from SAS statistical software to compare the tested crosses. Cross, Ld20-12-12/Ld20-15-14 showed better performances for plant height (126.85 ± 2.0 cm), culm height (92.15 ± 1.5 cm), flag leaf length (41.3 ± 0.8 cm), number of effective tillers (13.49 ± 0.4), number of panicles (12.15 ± 0.3), panicle weight plant-1 (42.7 ± 1.7 g), root volume (61.65 ± 2.1 mL), number of roots (312.9 ± 9.3), shoot dry weight (41.11 ± 1.3 g) and root dry weight (16.24 ± 0.5 g). Cross Ld21-2-13/Ld20-14-12 had better mean performances of root length (26.6 ± 0.4 cm) and flag leaf width (2.24 ± 0.04 cm). Crosses Ld20-12-12/Ld20-15-14, Ld21-2-13/Ld20-14-12 recorded positive heterosis and heterobeltiosis for important yield-related characteristics and morphological characteristics. Among the six crosses, Ld20-12-12/Ld20-15-14 and Ld21-2-13/Ld20-14-12 showed better growth and yield performance when compared with their respective parental lines. Therefore, Ld20-12-12/Ld20-15-14 and Ld21-2-13/Ld20-14-12 have the potential to develop rice lines with better root structures in future rice breeding programmes.

Keywords: Crop improvement, F1 crosses, Heterosis, Rice breeding