Evaluation of Root and Shoot Morphology of Four Rice Crosses of F_3 Generation in Lower Catena Soil Conditions

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Abstract

Rice (*Oryza sativa* L.) is the staple food of over 21 million people of Sri Lanka and it is mainly cultivated as a wetland crop in Sri Lanka. Regarding grain yield in rice, more attention is paid to traits of above-ground plants. However, without well well-grown fully functional underground portion, plants cannot perform well. This study attempted to evaluate the root and shoot morphology of the F_3 generation of four rice crosses under lower catena soil conditions, and to identify better root characteristics of root improvement in future breeding programs. In this study, progeny lines, which include 320 lines derived from four rice crosses, along with their respective parent plants and standard checks were tested in Randomized Complete Block Design (RCBD) with 02 replicates. SAS and SPSS statistical software used to compare the tested crosses data were analysed. Cross 2 (Ld 20-14-12 x Ld 20-15-14) and cross 4 (Ld 20-15-14 x Ld 20-22-04) were recorded better morphological mean performance in root volume, root width, number of roots, root dry weight, number of tillers, flag leaf length and width, number of panicles, total panicle weight and seeds per panicle when compared with their respective parents under lower catena soil conditions. So, cross 2 and cross 4 have more potential to develop rice lines with better root structure in future rice breeding programs. Overall comparison between the four crosses recorded a higher Genotypic Coefficient of Variance (GCV%) and phenotypic Coefficient of Variance (PCV%) for root morphology. Cross 1, cross 2, cross 3 and cross 4 recorded significant positive correlations for important root-related characteristics and other morphological characteristics.

Keywords: Genotypic Coefficient of Variance, Morphology, Phenotypic Coefficient of Variance, Rice Crosses