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

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Abstract

Rice is the most important agricultural crop and staple food in Sri Lanka. With the growing population and changing climatic conditions, it is necessary to grow with increased yield potential. The objectives of this research were to identify F_3 crosses exhibiting superior root and shoot morphology, suitable for enhancing performance, and select superior plants for F_4 generation evaluation in breeding programs aimed at root improvement in upper catena conditions. A total of 150 progeny lines, comprising four rice crosses, relevant parents and standard tests were tested in a randomized complete block design with two replications. Data were analyzed using IBM SPSS statistical software. In the tested four crosses were recorded higher phenotypic coefficient of variance and genotypic coefficient of variance values for the number of tillers, number of effective tillers, root volume, root length, root width, number of roots, root dry weight, number of panicles, total panicle weight and seeds per panicle. (Cross 3) Ld 20-11-3/ Ld 21-6-18-2 cross showed better mean performance for plant height, culm height, flag leaf length, flag leaf width, root volume, root length, panicle length, no of panicles, total panicle weight, seeds per panicle. (Cross 4) Ld 20-15-14/ Ld 20-22-4 cross showed better mean performance for, no of tillers, no of effective tillers, root width, no of roots, and root dry weight. Among the four rice crosses, crosses 3 and 4 showed better growth, yield performance and root performance, therefore crosses 3 and 4 have the potential to develop rice lines with better root structure in future rice breeding programs.

Keywords: Crosses, Genotypic Coefficient of variance, Morphological characteristics, Phenotypic coefficient of variance