

AgSURS - Reviewer 2 View

Abstract Title	ROOT AND SHOOT MORPHOLOGY AND ROOT STRUCTURE EVOLUTION OF ADVANCED BREEDING LINES OF RICE (<i>Oryza sativa</i> L.)
Abstract Body	<p>There is a need to develop rice varieties with higher yield and stress resistance to fight against the rising food security issues due to population growth and climate change. Rice breeding is the major path to fulfil this requirement. Generally, the above-ground traits are mostly used for screening in rice breeding programs. However, without well grown fully functional underground portion, plants cannot perform well. This study attempted to evaluate advanced breeding lines of rice by using both root and shoot characteristics, mainly focusing on root morphological characteristics. The objectives of this research were to identify rice lines with better root structures, to identify the genetic distance between tested lines, and to selection of better parents and breeding lines for high-yielding and preferred root improvement. In this study, 14 rice crosses with 108 advanced breeding lines, and 4 of their parents were tested and assessed using 22 morphological characters. Diversity assessments were carried out with principal component analysis followed by cluster analysis. Four major clusters were identified by K-mean clustering. Cluster 3 has better mean performance for root volume, root length, root width and number of roots, culm diameter, culm thickness, number of tillers per plant, number of panicles per plant, number of grains per panicle, root dry weight and shoot to root ratio. Lines included in cluster 3 named as Ld21-1-2-2, Ld21-1-4, Ld21-1-11, Ld21-1-12-2, Ld20-13-17-2-2, and Ld20-14-3 may be used as parents in future crossings in the breeding program to obtain the better yield performance with better root characteristics. Positive correlations were found between the yield per plant with root volume, root length, root width, root dry weight, culm height, culm diameter and shoot dry weight. Therefore, root volume, root length, root width, root dry weight, culm height, culm diameter and shoot dry weight could be used for the screening process of advanced breeding lines for developing high-yielding varieties. Screening process of advanced breeding lines for developing high-yielding varieties.</p>
Key Words (5 Words)	Cluster analysis, morphological characters, <i>Oryza sativa</i> L., root, yield
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Findings of this study (r2)	
Title of the abstract(r2)	
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