

Genetic Diversity of Selected Sri Lankan Traditional Rice (*Oryza sativa* L.) Varieties

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Abstract

A large number of traditional rice accessions belong to Sri Lanka, which may serve as a valuable genetic resource for the improvement of rice mainly in terms of biotic and abiotic stress resistance and nutritional upgrades. However, these varieties are rapidly being disappeared due to replacement of agronomically improved inbred varieties. The utilization of traditional rice germplasm in rice quality improvement is currently being practiced upon morphological features. A detailed understanding of the genetic structure and diversity of traditional rice accessions is vital for efficient utilization of rice genetic resources and identify potential parents. In the present study, 33 SSR markers were used to assess genetic diversity and relatedness among 31 rice accessions including 151 individuals from plant genetic resource centre, Sri Lanka. All 33 loci displayed polymorphism (66.7-96.9 %) among the 31 accessions, 387 alleles identified with an average of 11.72 alleles per accession. Moderately high genetic diversity was found for accession 4770 ($H_E = 0.561$), while the accession 3947 recorded the lowest ($H_E = 0.344$) diversity. The AMOVA results indicated that 34% of the variation distributed among accessions, 59% among individuals and 7% within individuals, indicating a comparatively high level of genetic differentiation among individuals of selected rice accessions. Structure analysis results illustrated that all 31 accessions were genetically structured into fifteen well-separated groups, high ΔK peaks were recorded at $K=15$, $K=5$, $K=19$ and $K= 2$, respectively. Accessions viz. 12818, 2504, 2340 and 3470 showed low admixture while 2087, 4236, 3440 showed a moderately high rate of admixture. UPGMA results indicated accessions: 4236, 4595, 2119 were differentiated from all other accessions. This genetic diversity assessment at the molecular level provides reliable information to avoid duplication of traditional rice accessions/varieties in the gene bank at plant genetic resource centre and selection of germplasms to develop new rice varieties. Therefore conservation of traditional rice genetic resources for future breeding programs is vital important.

Keywords: Genetic diversity, Indigenous rice, Rice landraces, Rice genetic resources, SSR markers

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