

Genetic Diversity Analysis of Minicore Collection of Rice (*Oryza sativa* L.) Germplasm for Drought Resistance

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ABSTRACT

Drought stress is a complex one of all the abiotic stresses affecting the rice - the staple food crop at least half of the world population. Considering the wealth of rice germplasm available, the extent of genetic diversity for the targeted traits and the possibility of simulating selection environments, an attempt was made to screen a set of rice mini core collection of International Rice Germplasm Centre (IRGC), International Rice Research Institute (IRRI), Philippines for drought stress. A set of 221 rice accessions were evaluated under irrigated and drought stress conditions for the traits associated with yield and drought tolerance. The SSR marker data made available on these accessions were used to assess the structure of the population for its future association mapping studies for drought resistance and other agronomically important traits. The traits days to 50 per cent flowering, plant height, total number of tillers, number of productive tillers, panicle length, plant biomass and single plant yield differed significantly among the genotypes under both control and stress conditions. Single plant yield recorded highly significant positive correlation with drought susceptibility index (0.99), whereas it exhibited significantly negative correlations with panicle exertion (-0.179), spikelet sterility (-0.291) and drought susceptibility index (-0.684). All the 50 SSR markers evaluated were found to be polymorphic with minimum of four alleles (RM507) to maximum of 27 alleles (RM1). Cluster analysis using seven different quantitative traits as operational taxonomic units (OTU) resulted in grouping of accessions into one major cluster with 217 accessions forming six sub-clusters whereas the marker data from 50 SSR marker loci revealed six distinct clusters. The marker data analysed using the software Structure to establish the relationship between the accessions based on allele sharing revealed the formation of three different sub-populations with different levels of allele sharing. Under drought stress condition three entries each from Bangladesh (DA29), (SR26B), Chengri Murali, China (Ai-Chiao-Hong, Ma Gu Zi He and Xi Gu Zao) and India (ARC 12071, ARC 10319 and Shankar) recorded higher yields.

Keywords: Rice, drought tolerance, genetic diversity, germplasm
