

ASSESSMENT OF GENETIC RELATIONSHIPS WITHIN RICE GERMPLASM USING RANDOMLY AMPLIFIED POLYMORPHIC DNA (RADP)

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Sri Lanka possesses a wide genetic pool of rice accessions, which is maintained at the Plant Genetic Resource Center (PGRC), Peradeniya and Rice Research & Development Institute (RRDI), Batalegoda. This includes wild species, traditional rices, new improved varieties and varieties introduced from other countries. This study was carried out to assess the genetic relationships or variations among some selected traditional rice varieties using RAPD markers and to evaluate their relationship with other new improved rice varieties and to assess the power of RAPD to delineate them.

Seventy-two rice varieties comprising traditional varieties, some newly improved varieties and a few IRRI collections were used in the experiment. DNA was extracted based on CTAB method with slight modification. A total of 60 primers (Operon) were screened in this study. Of the 60 primers initially screened, ten were selected as potentially useful for the assessment of genetic diversity. Presence or absence of each prominent and reproducible band was scored as 1 and 0, respectively. A dendrogram was constructed using the binary data matrix following Unweighted Pair Group Method with Arithmetic mean (UPGMA). The data were analyzed by SAS computer package (version 8.1).

The seventy-two rice varieties analyzed formed one major cluster P and a small cluster Q at the average genetic distance 4.15 level. The cluster P was further sub-clustered into R, S and T at the average genetic distance 3.92 level. The cluster B and R had mostly newly improved varieties along with few traditional varieties such as Sinnakaruppan and Suduruwee. Majority of the traditional varieties were clustered under group S and experimental lines were closely related to each other. Thus, this grouping likely reflects phylogenetic relationship among them. Cluster T had four BG varieties and MI 48 only. Under any one cluster, newly improved varieties had strong relationship with at least one traditional variety. The dendrogram revealed that the newly improved varieties are highly variable since they are having parents of diverse genetic origin. The traditional varieties had close relationship with each other as well as with newly improved varieties.

All varieties could be distinguished by the RAPD technique. The study demonstrates the apparent advantages of using RAPD in classification of rice germplasm.