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Diversity analysis of selected traditional rice accessions with representative four new improved rice varieties tested under low country wet zone of Sri Lanka

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Abstract

The genetic diversity analysis of indigenous rice accessions can be used to broaden the genetic base and identifying high yielding genotypes for rice improvement. Therefore, this study was carried out to understand the different morphological parameters among fourteen traditional rice accessions compared to four new improved rice varieties based on IRRI standard evaluation system of rice. Twenty-one days old seedlings were transplanted in the field as three row plots. Each row contains twenty-one single plants. The trial was laid out as randomized complete block design (RCBD) with three replicates. Data analysis was done by using SPSS with two complementary procedures i.e., complete linkage cluster and principal component analysis (PCA). At 5.34 distance in the dendrogram, two main clusters were observed except Bw 367 new improved variety (NIV) which showed completely different behavior. In the first cluster, except one variety (Bw 272 – 6b) all others are traditional varieties. Although it is a NIV it was derived using Kahata wee which is a traditional variety. Therefore, it had close characteristics to the group of traditional varieties. In the second cluster, 3 rice varieties were resulted and interestingly only one were traditional variety i.e., Pachchaperumal and two were new improved varieties i.e., Bw 364 and Ld 253. This result also revealed by the clear minus value in the scatter plot of PC1 vs PC2. Principal component analysis showed that the first three principal components (PCs) having eigen values greater than 1 accounted for 73.8%. The first PC individually explained nearly one third (33.9%) of the total variation whereas the first two principal components cumulatively explained the 59.0% of the total variation. The rice variety Bw 367 showed the highest positive PC 2 scoring reflecting the highest contribution from leaf length, leaf width, culm diameter, blade pubescence and collar colour. According to those characters Pachchaperumal, Bw 364 and Ld 253 were grouped together due to clear minus value. Using these findings, it is easy to use morphologically distinct varieties for better and accelerate results in plant breeding program with further analysis.

Keywords: Improved varieties, Morphological diversity, Rice, Traditional accessions

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