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“Filling gaps and removing traps  
for sustainable resource management”

## Phenotypic Diversity of Rice Landraces Collected from Ayeyarwady Region, Myanmar Using Agro-morphological Characterisation

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### Abstract

An investigation was conducted to determine the agro-morphological characterisation and relationship between rice accessions collected from the Ayeyarwady region for their utilisation in breeding programs. The use of agro-morphological traits, both qualitative and quantitative, is the most common and traditional approach utilised to estimate relationships between genotypes. In this study, 117 accessions were characterised for 13 qualitative and 15 quantitative traits as per IRRI rice descriptors. Qualitative traits were analysed using Shannon diversity and cluster analysis by NTSYS, whereas quantitative characters were subjected to principal component analysis (PCA) and coefficient matrix. The standardised Shannon-Weaver diversity index ranged from 0.41 (least polymorphic) for sterile lemma colour to 0.84 (highly polymorphic) for amylose content with an average of 0.7. Cluster analysis separated the different varieties into various groups. Truncating the tree at the Euclidean distance of 1.18 resulted in 15 clusters. In the truncated tree, 3 clusters had single accession, 5 clusters had two to three accessions, 6 clusters had five to eighteen accessions and the largest cluster had 44 accessions. Four accessions (TLNKYAUK, MSEIK, MSWE and KY-TUN) clustered together in the genetic distances (0.00) due to their similar qualitative traits. For analysis of 15 quantitative traits, the coefficient of variation was more than 10% for most of the characters, the highest one being the number of panicles per plant (24.54%). Correlation analyses among quantitative traits showed a strong positive correlation in some traits such as long and short sterile lemmas, grain length and length-width ratio, harvest index and yield. The principal coordinate analysis showed similar groupings as in the cluster analysis. PCA has revealed six major components (Eigenvalue > 1), which altogether explained 80.4% of the total variation. Component loadings for each principal component showed quantitative traits, such as grain width, yield and harvest index that were among the phenotypic traits contributing positive projections in three principal components that explained 54% of total variation in the characterised rice accessions. The present study indicated that diversity in agro-morphological traits were useful for preliminary evaluation for crop improvement programme and can be used for assessing genetic distance among morphologically distinguishable rice landraces.

**Keywords:** Agro-morphological characterisation, Landraces, Myanmar, *Oryza sativa*