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Evaluation of morphological variations in randomly selected fifteen traditional yard long bean (*Vigna Unguiculata* L.) accessions

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Abstract

The yard long bean is an essential nutritious legume that belongs to the family Fabaceae. It is widely grown in South Asia for its immature pod and is a popular crop in Sri Lanka. Evaluation of morphological variability of traditional yard long bean accessions could reveal the genetic potential of the germplasm. In the present study, fifteen traditional yard long bean accessions collected from different Sri Lankan locations were characterized. The study was carried out at Thelijjavila research station according to a randomized complete block design (RCBD) with three replicates with ten plants in each replicate. Four qualitative characters (growth habit, flower colour, pod colour, and seed colour) and nine quantitative traits (plant height, days for first flowering, number of pods per peduncle, number of pods per plant, pod length, pod width, pod weight, pod yield, and number of seeds per pod) were evaluated using IBM statistical software 22. ANOVA, principal component analysis (PCA), cluster analysis and 2D scatter plot were used to evaluate the morphological variation among accessions. Dunkan's Multiple Range Test (DMRT) grouping among the accessions exhibited a significant variation among the accessions. Plant height, days for first flowering, number of pods per peduncle, number of pods per plant, pod length, pod width, pod weight and number of seeds per pod varied between 112-284 cm, 34-41, 1.4-1.8, 2.2-8.4, 22-75 cm, 1.1-1.8 cm, 8-35 g per pod, 11-19, respectively. *TJ-150* recorded the highest pod yield per plant (289.8 g per plant), followed by *TJ-Rathu* (276.9 g per plant) and *TJ-151* recorded the lowest pod yield (51 g per plant). Three principal components were extracted from the nine assessed traits explaining the total cumulative variance of 79.31% while principal components PC1, PC2, and PC3 explained 38.6%, 27.2% and 13.3% of the variance, respectively. Five morphologically distinct clusters were gained at cluster distance five. The presence of the accessions on all four quadrants of the 2D-scatter plot visualized a broad diversity available among the accessions. According to Pearson's correlation analysis, the number of pods per plant (r = 0.516), days for the first flowering (r = 0.5), average pod weight (r = 0.47), and the number of seeds per pod (r = 0.432) had the highest positive correlations with pod yield per plant (g/plant) at 0.05 significant level which emphasizes the yield determinants of yard long bean. The findings of the study will be helpful for future breeding programs in yard long bean improvement.

Key Words*:* Accession, Diversity, Morphological trait, Yard long bean, Yield attributes

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