Morphological Evaluation of Selected Vegetative Traits of Sorghum (*Sorghum bicolor* (L.) Moench) Landraces in Sri Lanka

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Sorghum (*Sorghum bicolor* (L.) Moench) is an important cereal crop known for its adaptability to diverse environmental conditions and its potential in food and agricultural systems. In Sri Lanka, sorghum landraces are cultivated across different agro-ecological regions; however, their morphological variation remains insufficiently characterized. This study aimed to evaluate vegetative growth traits of selected sorghum landraces and compare them with the standard variety ICSV 112 to identify promising genotypes. Sorghum landraces were collected from Mahailuppallama (ICSV 112, Sweet Sorghum, Sorghum 8949, EF FOEHN), Kuliyapitiya (WUIL1aS_2601), Peradeniya (WUWM2bS_2601), Polonnaruwa (WUDL1cS_2601), and Jaffna (WUDL4S_2601, WUDL4S_2501). The experiment was conducted using a generalized augmented randomized complete block design (*ex situ* analysis). Morphological characterization was performed following ICRISAT descriptors. Quantitative traits such as plant height at four and six weeks after planting and basal tiller number were recorded, while qualitative traits including plant pigmentation were also observed. Quantitative data were analysed using analysis of variance (ANOVA) under a general linear model, and mean separation was performed using Fisher's Least Significant Difference (LSD) test at the 5% significance level, while qualitative traits were analysed using frequency distribution and hierarchical cluster analysis based on Gower distance and Ward's method. The results revealed significant differences ($P < 0.001$) among the sorghum varieties for plant height at both growth stages. WUIL1aS_2601 exhibited the greatest plant height, while the WUDL4S_2501 recorded the lowest plant height. Basal tiller numbers did not differ significantly, although some genotypes (WUWM2bS_2601, WUDL1cS_2601, WUDL4S_2501) produced relatively higher tiller numbers than ICSV 112, suggesting genetic variation that may be useful for future breeding studies. Cluster analysis grouped the nine varieties into three distinct clusters, confirming phenotypic diversity. Overall, WUIL1aS_2601 exhibited superior vegetative growth performance and warrants further evaluation under field conditions. The study highlights the potential of sorghum as a climate-resilient crop. These landraces may represent valuable genetic resources for future breeding programs targeting adaptation to drought-prone environments.

Keywords: basal tillers, cluster analysis, germplasm evaluation, morphological characterization, *Sorghum bicolor*