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PHYSIOLOGICAL AND YIELD RESPONSES OF MUNG BEAN (*Vigna radiata* (L.) WILCZEK) GENOTYPES UNDER IRRIGATED AND RAINFED WATER REGIMES DURING THE MINOR RAINY SEASON (*YALA*) IN THE LOW COUNTRY DRY ZONE OF SRI LANKA

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Mung bean (*Vigna radiata*) is a popular food legume and commonly grown as a rainfed crop or with supplementary irrigation in the minor rainy season (*Yala*) of the dry zone, where unexpected terminal droughts are becoming prominent due to climate change. Therefore, this field study evaluated the physiology and yield related performances of some mung bean genotypes under two water regimes during the *Yala* season in the dry zone as a part of selecting stress tolerant crop genotypes to sustain yields.

The experimental site was the Field Crops Research and Development Institute (FCRDI), Maha Illupallama, where three breeding lines (MIMB 901, MIMB 902 and MIMB 903) and two recommended varieties MI6 and Ari were grown under two irrigation regimes (irrigated and rainfed) in *Yala* 2012. Both irrigation treatments received water according to the recommendation of the Department of Agriculture up to 14 days after sowing. Thereafter, irrigation was stopped for the rainfed regime while recommended irrigation was continued for the irrigated treatment. The experimental design was a split plot design with three replicates with water regimes in main plots and genotypes as sub plots. Soil moisture was determined gravimetrically over the growth period. Unit leaf net photosynthetic rate (P_n), actual transpiration rate (T_r) and stomatal conductance (G_s) were measured using a LICOR 6400 Portable photosynthesis system at flowering. Seed yield was measured at the harvest. The data were analyzed using analysis of variance procedures and least significant difference (LSD) at 0.05 probability was used for mean separation.

The soil moisture contents of the rainfed plots were significantly lower than those of the irrigated plots and reduced with time because the cumulative rainfall obtained during the growing season was very low (2.3 mm). Thus, the rainfed crops faced a terminal drought which significantly reduced the P_n, T_r, G_s and seed yield in all mung bean genotypes. The genotype × irrigation interaction was significant in all these parameters. In the rainfed regime the seed yield of MIMB 901was highest (~1.2 Mt ha^{-1}) while ARI, MI6 and MIMB 903 were moderate (~1.0 Mt ha^{-1}). Interestingly, MIMB 903 achieved this moderate yield with a lowest actual transpiration rate and stomatal conductance which help to conserve soil moisture. MIMB 902 was affected by drought to the greatest extent and produced the lowest yield (~0.7 Mt ha^{-1}) with moderate values of physiological performance. These valuable traits need to be further investigated before adoption to screen the drought tolerant mung bean genotypes; because accurate determination of physiological parameters is difficult since imposing a specific level of water stress under open field conditions is a challenge.