

The study's main objectives were to investigate the leaf water potential responses of three bean varieties to water stress during flowering with a view to making recommendations on their agricultural suitability for the semi-arid environments of Kenya. The experiments were conducted over two seasons at KARI/ICRISAT experimental field station located at Kiboko in southeast Kenya. The selected beans were: the high-yielding Kenyan varieties Mwezi moja and Rose coco (*Phaseolus vulgaris* L., var. GLP-1004 and var. GLP-2, respectively) and a 'minor pulse' Tepary bean variety (*Phaseolus acutifolius* A. Gray var. *latifolius*). These three bean varieties were grown under optimum water and nutrient conditions for 65, 70 and 60 days, respectively, the periods required for each to reach physiological maturity. At the critical stage of flowering, irrigation was withheld from half of the bean plots to induce water stress, and the diurnal leaf water potentials measured on stressed and non-stressed plants. Differences in leaf water potentials between the treatments were apparent. Tepary beans maintained higher leaf water potential (LWP) and showed more pronounced diurnal responses than Mwezi and Rose beans under both water stressed and non-water stressed conditions. However, LWPs in the last two bean varieties decreased more rapidly and much earlier in the morning than in Tepary, and their percentage yield reductions from the optimum following the induced water stress were also higher. The short growth cycle of Tepary bean together with its maintenance of a high LWP and good yield performance under water stress could be interpreted to mean that this variety is more adaptable to a semi-arid environment than Mwezi and Rose beans.