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COMPARATIVE EVALUATION OF ENZYMATIC ACTIVITIES AND ION UPTAKE IN TWO GENOTYPES OF CLUSTER BEAN (*Cyamopsis tetragonoloba* L.) GROWN UNDER SALT STRESS

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Abstract

Soil salinity is a serious environmental concern with profound effects on humanity. Despite the extensive research on this problem, identification and development of the tolerant crop genotypes remains the most effective and environmental friendly approach. An experiment was conducted to find out the effects of soil NaCl stress on dry biomass, antioxidant enzymes, ionic concentrations and yield attributes of cluster bean. Two cluster bean genotypes (BR-90 and BR-2017) were grown in pots filled with soil under six different levels of NaCl stress i.e. control, 2.5, 5.0, 7.5, 10.0 and 12.5 dS m⁻¹. In case of BR-90, antioxidant enzymatic activities peaked at 2.5 dS m⁻¹ and gradually declined afterward. Whereas, in genotype BR-2017, enzymatic activities remained unaffected (CAT and APX) or gradually increased (SOD and POD) with increasing salinity levels which indicated a more effective antioxidant enzymatic defense system. Increased soil NaCl levels lead to a reduction in yield components as well as the concentrations of K⁺, Ca²⁺ and their ratios with Na⁺ ions in both genotypes. In terms of yield parameters, both genotypes performed relatively well up to 5.0 dS m⁻¹. The performance of BR-90 was non-significantly better on the yield front. Overall, the cluster bean genotypes (BR-90 and BR-2017) can be cultivated in areas with the moderate problem of salinity.

Keywords: antioxidant enzymes, cluster bean genotype, ion contents, NaCl salinity toxicity, yield per plant

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