



"Gheorghe Asachi" Technical University of Iasi, Romania



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

Muhammad Akram¹, Mehwish Zahid¹, Abu Bakr Umer Farooq^{1*}, Muhammad Tahir¹, Hafiz Mohkum Hammad¹, Muhammad Sajjad¹, Rao Sohail Ahmad Khan², Natasha¹

¹Department of Environmental Sciences, COMSATS University Islamabad, Vehari Campus, Pakistan
²Center of Agricultural Biochemistry and Biotechnology, University of Agriculture, Faisalabad, Pakistan

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

Received: February, 2019; Revised final: May, 2019; Accepted: July, 2019
