

Growth and Yield Potential of Quinoa genotypes on Salt Affected Soils

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Abstract : Quinoa a facultative halophyte crop plant is a new introduction in Pakistan due to its superior nutritional profile and its abiotic stress tolerance, especially against salinity. Present study was conducted to explore halophytic behavior of quinoa. Four quinoa genotypes (A1, A2, A7 and A9) were evaluated against high salinity (control, 100, 200, 300 and 400 mM). Evaluation was made on the basis of ionic analysis (Na^+ , K^+ and K^+/Na^+ ratio in shoot) and root- shoot fresh and dry weight at four leaf stage. Seedling growth i.e. fresh and dry weight of shoot and root increased by 100 mM salinity and then growth decreased gradually with increasing salinity level in all geno types. Mineral analysis indicated that A2 and A7 have more tolerant behavior having low Na^+ and high K^+ concentration as compared to A1 and A9. Same geno types as above were also evaluated against high salinity (control, 10, 20, 30, and 40 dS m^{-1}) in pot culture during 2012-13. It was found that increase in salinity up to 10 dS m^{-1} the plant height, stem diameter and yield related traits increased but decreased with further increase in salinity. Same trend was observed in ionic contents. Maximum grain yield was achieved by A7 (100 g plant^{-1}) followed by A2 (82 g plant^{-1}) at salinity level 10 dS m^{-1} . Next phase was carried out through field settings by using salt tolerant geno types (A2 and A7) at Crop Physiology Research Area Farm (non saline soil as control)/ Proka Farm (salt affected with EC up to 15 dS m^{-1}), University of Agriculture, Faisalabad and Soil Salinity Research Institute, Pindi Bhtiaan (SSRI) Farm (one normal as control and two salt affected fields with EC values up to 15 and 30 dS m^{-1}) during 2013-14. Genotype A7 showed maximum growth and gave maximum yield (3200 kg ha^{-1}) at Proka Farm which was statistically at par to the values of yield obtained on normal soils of Faisalabad. Geno type A7 also gave maximum yield 2800 kg ha^{-1} on normal field of Pindi bhtiaan followed by as obtained (2340) on salt problem field (15 dS m^{-1}) of same location.

Keywords : quinoa, salinity, halophyte, genotype

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