

Effect of Three Halophyte Species on Some Soil Properties and Potassium Forms in Salt Affected Soils

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Abstract

Potassium (K) is an important cation in saline soils of arid lands, and its content, distribution and availability may be affected by native plants. To study the effect of halophyte species on different K forms in Koria region located in western Darab (Fars province), three dominant halophyte species including *Juncus gerardi*, *Halocnemum strobilaceum*, and *Salsola rigida* were selected. Sampling was done from soils in canopy and between plants at the depth of 0-15 (surface) and 15-30 cm (subsurface) in triplicate. Soil physical and chemical properties including soil texture, organic matter, calcium carbonate, pH, cation exchange capacity, saturation percentage and electrical conductivity and different K forms including soluble, exchangeable and non-exchangeable were determined. Results indicated that organic matter, CEC, pH, and EC were affected by plant species. *Juncus gerardi* increased exchangeable K and decreased soluble K, but it had no effect on non-exchangeable and HNO₃-extractable K. *Halocnemum strobilaceum* significantly increased soluble, exchangeable and HNO₃-extractable K in surface and subsurface soils rather than soils between plants. This finding may be due to K uptake by plants from subsoils and also transfer of soluble K from soils between plants to roots. *Salsola rigida* had no effect on K status. Generally, soils between plants had more soluble and exchangeable K in surface than subsurface horizon. The studied halophyte species showed differences in growth and development pattern, soluble salts and K absorption and secretion, grazing by livestock, returned organic matter to soil, soluble salts and K reserves in their organs, and water uptake and thereby water and K diffusion from soil far from rhizosphere to roots, which may have different effects on K distribution in soils. *Juncus gerardi*, as regards effects on decreasing salinity and soluble K and increasing exchangeable K, may be recommended as a suitable species for remediation of the studied soils.

Keywords: *Juncus gerardi*, *Halocnemum strobilaceum*, *Salsola rigida*, Darab, Mineralogy.

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