

ABSTRACT

In the present study, compartmentalization of Na^+ and K^+ in different plant parts such as leaves, shoot and root in an indigenous *Prosopis cineraria* (L.) and invasive *Prosopis juliflora* (Swartz) DC tree species at seedling and adult stages were studied. Four different treatments of NaCl were applied i.e., 2.92 g kg⁻¹, 5.85 g kg⁻¹, 11.7 g kg⁻¹ and 17.5 g kg⁻¹ and compared with control, lacking any addition of NaCl in pot grown seedlings, using garden soil as growth medium. The objective was to investigate growth i.e., number of branches, number of leaves, length of above and below ground parts, fresh and dry weight of above and below ground parts (g), leaf mass per area (LMA), specific leaf area (SLA); anatomical features such as stomatal density and density of xylem vessels in the shoot; physiological parameters i.e., chlorophyll content, stomatal conductance (g_s), photosynthetic rate (A), rate of transpiration (E), intrinsic water use efficiency and relative water content (%) in the two species exposed to NaCl treatment. Compartmentalization of sodium and potassium in different plant parts i.e., leaves, shoot, and root was assessed after eight months at the seedlings harvest. While, for adult trees samples collected from Harappa and Toba Tek Singh, sodium and potassium was also assessed in three different seasons i.e., winter, summer and monsoon. Results showed that high levels of Na^+ (17.5 g kg⁻¹) significantly impacted the growth, physiological and anatomical parameters. For both species, maximum Na^+ was compartmentalized in roots and the minimum in leaves. Similarly the maximum amount of K^+ was compartmentalized in the leaves and minimum in the root of both species. The $\text{K}^+:\text{Na}^+$ was significantly decreased in *Prosopis cineraria* than *Prosopis juliflora* with the increase in salinity application. For adult trees, compartmentalization of Na^+ was maximum both in leaves and shoot during winter season and minimum during monsoon season in both species. Compartmentalization of K^+ was maximum in shoot during monsoon season and minimum during summer season. While compartmentalization of K^+ was maximum in leaves during summer season and minimum during winter season. It is concluded that both the species, although with different native ranges of distribution do not show different strategies to compartmentalize Na^+ in their above and below ground

parts. This study would be helpful in maintaining the plantation of both species in different habitats with different levels of salinity.