



Salinity and Sodicity Influence Mutualistic Association of Beneficial Microorganism in Arid Soils

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Abstract

Azotobacter, phosphate solubilizing bacteria (PSB) and phosphate solubilizing fungi (PSF) population were assessed in soil under five different crop species grown in irrigated Indian arid environment. *Azotobacter* was most abundant in arid soil (5.6×10^4 CFU g⁻¹ soil) in comparison to PSB (1.9×10^4) and PSF (1.3×10^4). The population of these organisms varied among the crop species. Maximum population was recorded for *Cuminum cyminum* L. followed by *Brassica oleracea* L., *Capsicum annuum* L., *Triticum aestivum* L. and *Brassica juncea* L. Soil properties were significantly correlated with *Azotobacter* population. Of the various soil properties, pH and EC (1:2 soil: water) showed negative correlation, while organic carbon (OC), Olsen's P and NH₄OAc extractable K were positively correlated with *Azotobacter* population. Further, *Azotobacter* population decreased drastically with the increase in EC_{iw} and SAR_{iw} of applied irrigation water. In PCA biplot, *Azotobacter* population was aligned with OC, Olsen's P. *Brassica oleracea* was most efficient in hosting P solubilizers while *Cuminum cyminum* and *Brassica oleracea* were most efficient in forging mutualistic association with *Azotobacter*. Regression analysis indicated that about 50, 42, 42, 52 and 16 per cent variation in *Azotobacter* count was attributed to pH_{1:2}, EC_{1:2}, OC, Olsen's P and NH₄OAc-K, respectively.

Key words: Beneficial microorganisms, *Azotobacter*, Phosphate solubilizing microorganism, Mutualistic association, Arid soil, SAR, RSC