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IMPACT OF SALINE WATER IRRIGATION ON DATE PALM (PHOENIX DACTYLIFERA) ASSOCIATED BULK SOIL BACTERIAL COMMUNITIES IN OASES AGROECOSYSTEMS OF UAE

by

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Online via Zoom

Zoom meeting link: [https://uae.ac-](https://uae.ac-ae.zoom.us/j/82016281121?pwd=ak1XbmprdfBUQnRZOWszWU91VHdyUT09)

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Abstract

Irrigation of date palm (*Phoenix dactylifera*) with saline groundwater is routinely practiced in the arid agroecosystems of United Arab Emirates (UAE), due to freshwater scarcity. Saline groundwater irrigation is known to deposit salts in the top layers of soil and increase soil salinization. However, how increasing soil salinization affects the belowground bacterial communities, is not well investigated. I collected soil samples from 14 different date farms where irrigation water source was either non-saline water or saline groundwater. Soil bacterial communities were identified using 16S rRNA gene metabarcoding. I found that bacterial diversity (including Shannon diversity, richness, and evenness) didn't vary between irrigation sources (non-saline water vs saline groundwater). However, distinct soil bacterial communities were observed between irrigation water sources, and they were significantly related to the irrigation water electrical conductivity. Of total 5155 OTUs, 21.3% were uniquely present in the soil while saline groundwater irrigation and 31.5% while non-saline water irrigation, and only 47.15% OTUs were shared. The abundance of Proteobacteria was higher in soil while saline groundwater irrigation, and pattern contrasted for Actinobacteriota. Compositional shift at genera level was also evident, wherein abundance of Subgroup_10, *Novibacillus*, *Bauldea* and *Mycobacterium* was higher while saline groundwater irrigation and *Microvirga*, *Marmoricola*, *Ammoniphilus* and *Lysinibacillus* abundance was low. *Mycobacterium* and *Steroidobacter* were the key indicator taxa while saline groundwater irrigation and *Solirubrobacter* and *Sorangium* were indicator of non-saline water irrigation. The results of this study indicate that soil determine colonization of bacterial communities under different irrigation water sources (non-saline water and saline groundwater irrigation) and it is influenced by salinity of irrigation water. The project results revealed that salinity of irrigation water selects distinct bacterial communities in soil, which are essential for maintaining soil health in oases agroecosystem of arid environments.

Keywords: Bacterial communities; Date palm (*Phoenix dactylifera*), Irrigation sources; Metabarcoding; Oasis agroecosystem, Soil salinization