Publications

TR-432

Water Infiltration and Permeability of Selected Urban Soils as Affected by Salinity and Sodicity

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- Full Text

Soil sodicity is known to affect soil structural stability and permeability. However, the impact differs depending on salinity of irrigation water, soil types as well as irrigation management practices. This study examined water infiltration into two alluvial soils (Torrifluvents), and two upland soils (Paleorthid and Calciorthid, Aridisols) placed in greenhouse pots. For the first experiment, irrigation solutions simulating the Rio Grande water, city potable water, and two sources of reclaimed water (EC of 1.4 and 2.2 dS m^{-1} and SAR of 6 and 11) were applied twice a week at 1.7 cm per application for a total of 27 irrigation events

using 46 cm of water. No significant effect of water quality was detected in Delnorte gravelly loam (Paleorthid) and a small effect on infiltration into Harkey silt loam (Torrifluvent). However, the use of distilled water curtailed infiltration mainly in Harkey soil. In the second greenhouse experiment using a carefully crafted soil packing and water application protocols, the impact of water quality on infiltration into two Torrifluvents, Harkey silt loam and Glendale silty clay loam appeared after water application of 40 to 50 cm (16" - 20"). When saline solutions were applied as deep as 10 cm per application, the infiltration time nearly doubled when SAR of the solution increased from 1 to 6 or 12 in alluvial soils, but not in Turney silty clay loam (Calciorthid, Aridisol). When the irrigation depth per application was reduced to 7.5, 5.0, and 2.5 cm per application, the difference in infiltration rate was markedly reduced. The impact of elevated sodicity (SAR of 6 to 12) on infiltration can be an issue in alluvial soils, but unlikely in upland soils at irrigation water salinity of 1 to 2 dS m^{-1}.

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