



Impact of treated wastewater irrigation on long-term soil water retention

Sami Touil^{a,*}, Aurore Degre^b, Mohamed Nacer Chabaca^c, Maten Chahrazed Naziha^a, Richa Amina^a

^aUniversity of Djilali Bounaama Khemis Miliana, Ain Defla, Algeria, Tel. + 213 672 151913; Fax: + 213 27 556847; email: s.touil@univ-dbkm.dz (S. Touil)

^bGembloux Agro-BioTech, Biosystem Engineering, Soil–Water–Plant Exchanges, University of Liege, Passage des Déportés, Gembloux, Belgium

^cSuperior National School of Agronomy, El Harrach, Algiers, Algeria

Received 29 June 2021; Accepted 21 December 2021

ABSTRACT

This paper analyzed the impact of treated wastewater irrigation on long-term soil water retention. Irrigation with treated wastewater (TWW) constitutes a strategic opportunity for development of agriculture in semi-arid regions. For the sustainable management one of the challenges is evaluating its effect on the soil. The results of the current study indicated that TWW-irrigation leads to increased soil salinity at a depth of 0–0.20 m. In terms of the soil's ability to retain water, at the mid-period use (8 y), the TWW retention was reduced by 33% capacity at a depth of 0.10 m compared to soil irrigated by freshwater. The decrease was less significant (24% of retention) in the long term. The surface layer of the soil (0–0.10 m) irrigated by TWW retained less water than when irrigated by fresh water. Regarding the soil water retention curve, the impact of TWW becomes important at very high suction pressures (i.e., VHP > 1,000 cm) compared to lower suction pressures (i.e., HP: 10–1,000 cm). The results suggested that the use of TWW decreased the water retention at field capacity and wilting point values.

Keywords: Irrigation; Soil properties; Salinity; Treated wastewater; Water retention

* Corresponding author.