Effect of Carbonates and Gravel Contents on Hydraulic Properties in Gravely-Calcareous Soils

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ABSTRACT

Gravely calcareous soils cover approximately most of arid and semiarid areas in Jordan, their hydraulic characteristics haven’t been completely understood. This research assesses the effect of carbonates and gravel contents on soil-water movement and retention. Soil morphology and laboratorial analyses in association with developed pedotransfer functions were used to provide a clear vision about gravel effect on water flow rate and distribution. Results indicated that gravel and carbonates increase the saturated infiltration rate by 0.7 mm hr⁻¹ and 3.1 mm hr⁻¹, respectively, and increase the hydraulic conductivity by 1.3 mm hr⁻¹ and 5.2 mm hr⁻¹, respectively. A strong relationship was revealed between gravel and soil matrix adherence with hydraulic properties, where gravel, if present in loose form, will enhance the bypass flow at saturation condition, while it may act as a barrier for water conductance at unsaturated condition if present in adherent form with soil particles.

Keywords: Soil Pedality, Hydraulic Conductivity, Infiltration Rate, Gravel Content, Carbonates Content.