WATER TRANSMISSION PROPERTIES AS AFFECTED BY CROPPING AND TILLAGE SYSTEMS

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ABSTRACT

Farming practices including cropping and tillage systems affect the soil water transmission properties such as continuity and distribution of the pores, bulk density and hydraulic conductivity. The soil water transmission properties were studied on a silty clay loam soil, moderately calcareous, Typic Ustchrept. The soil was under two cropping systems (wheat-rice and wheat-maize) for the last five years and hence tillage systems at Guppian wala and Chander Kot, district Sheikhupura, Punjab, Pakistan. Soil cores were collected from four genetic horizons (Ap, AB, Bw and Bt) to measure the bulk density and water retention. The water retention was measured at 0.5, 5, 10, 30, 100, 500 and 1500 kPa to calculate the pore size distribution and unsaturated hydraulic conductivity. Measurements showed that soil under wheat-rice had a layer (at 10-20 cm) of higher bulk density (1.71 Mg m^{-3}) and lower K_{sat} (38 mm day^{-1}) as compared to the wheat-maize system (1.52 Mg m^{-3} and 91.4 mm day^{-1}). Total porosity of all the horizons (except AB) of the both sites was same. But puddling reduced the volume of pores >30 μm (drainage porosity) and increased the volume of pores <0.3 μm (residual porosity) and did not affect the porosity retained plant-available water in the wheat-rice system.