Abstract

Soil water conservation through tillage is widely accepted as one of the appropriate ways of addressing soil moisture constraints in rainfed agriculture. A field experiment was conducted for 6 seasons (2007 to 2009) to evaluate the effects of 3 tillage practices namely ox-plough (OP), subsoiling-ripping (SR) and tied-ridge (TR) on soil physical and hydro-physical properties of a sandy loam soil. Soil surface roughness, bulk density (BD), total porosity, crust strength, saturated hydraulic conductivity, steady infiltration rates and soil water storage were evaluated. Results showed that, mean inter-row BD (1.51 Mg m$^{-3}$) and crust strength (3.05 MPa) with SR tillage were 7 and 15% greater ($P \leq 0.05$) than with OP, respectively. Inter-row infiltration rates for OP (7.9 cm h$^{-1}$) were more than two fold greater than for SR (3.6 cm h$^{-1}$) and TR (3.3 cm h$^{-1}$). Soil surface roughness with TR was significantly greater than with OP and SR tillage systems. Soil water storage for TR (222 mm) exceeded ($P \leq 0.05$) that for OP and SR by 30 mm (16%) and 32 mm (17%), respectively. This study concluded that, ripping soil along planting line that are prone to surface crusting without disturbing the soil between crop rows was not effective as a conservation tillage method.