



Productivity and profitability of sorghum-wheat cropping system in saline soils as influenced by conservation agriculture practices

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Received: 15th November, 2020

Accepted: 19th October, 2021

Abstract

A study was initiated for evaluation of sorghum-wheat system productivity and profitability with tillage, deficit saline irrigation and mulch under saline conditions during 2015-2017. The experiment was conducted in split-plot design with three replications. Three tillage treatments viz. reduced tillage-zero tillage (RT), conventional tillage-conventional tillage (CT) and zero tillage-zero tillage (ZT) were taken in main plot and combination of rice straw mulch (0 and 5 Mg ha⁻¹) and saline irrigation (EC 8.0 dS m⁻¹) with 100, 80 and 60% water requirement of wheat was applied in subplots. The deficit irrigation (60%) with mulch showed significantly greater soil moisture content compared to no mulch counterpart in RT and ZT. The ZT recorded lower EC_e compared to RT and CT. The deficit irrigation (60%) recorded the lowest value of EC_e. Mulch reduced the salt load and increased the available N, P and K content in the soil compared to no mulch. The system productivity (SP) of sorghum-wheat cropping system was 3.8% greater ($P < 0.05$) under rice straw mulch. The deficit saline irrigation at 60% showed the maximum SP compared to 100 and 80% water requirement. Net return and benefit cost ratio was also higher for the improved management practices involving reduced tillage, deficit irrigation (60%) and mulching. Therefore, under limited freshwater availability in salt-affected soils, deficit irrigation with mulching and reduced tillage was found most beneficial option for increasing productivity and profitability of sorghum-wheat cropping system.

Keywords: Conservation agriculture, Cropping system, Saline irrigation, System productivity