

Abstract

Effect of Straw Mulch and Irrigation on Sunflower and Maize Cultivation in No Tillage Systems of Coastal Heavy Soils [†]

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Abstract: Three constraints affect the growth of crops in the *Rabi* (dry) season in southern Bangladesh: these are the clay nature of the soils which decreases the infiltration of water, the conserving of soil moisture with the increasingly dry conditions and the accumulation of salts on the soil surface through capillary from saline groundwater. Field experiments were conducted in the salt-affected areas of southern Bangladesh. The objectives of the study were to: (i) evaluate the effect of straw and irrigation frequency on crop growth and yield in maize and sunflower, and (ii) determine the combined effect of straw and irrigation frequency on the salinity, osmotic potential and moisture of soils. The experiment was carried out in farmers' fields with eight treatments and was replicated three times during the dry (*rabi*) season of 2018–2019. There were two rice straw treatments (with or without straw), and 4 irrigation frequencies (at intervals of 5–7, 10–12, 15–17 or 20–25 days). Maize and sunflower seeds were sown by dibbling in no-tilled systems. The results showed that rice straw significantly affected the crop growth and yield, increasing the yield of maize and sunflower by 22% and 4.3% compared to treatments of without residue. The irrigation treatments also significantly affected crop yields. There was no interaction between straw levels and irrigation. The causes of these effects appeared to be improved water relations: rice straw and more frequent irrigations both reduced the salinity and osmotic potential of soils compared with treatments without straw while the soil moisture was greater in rice straw treatments and increased with the increased soil layers. We conclude that straw mulching and irrigation management practice could be used in coastal saline of heavy soils to reduce soil salinity, osmotic potentials thereby increasing crop yields in no-tilled systems.

Keywords: Coastal zone; irrigation frequency; dibbling method; rice straw; soil salinity; zero tillage



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