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Effect of drip irrigation on squash (*Cucurbita pepo*) yield and water-use efficiency in sandy calcareous soils amended with clay deposits

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Abstract

Water research studies in Saudi Arabia clearly showed sever depletion of groundwater. Therefore, the scientifically applied research program related to water saving and conservation in agriculture is essential, where agricultural activities account for more than 85% of the total water consumed. This study aims to investigate the effect of four irrigation levels, two irrigation methods and three clay deposits on water-use efficiency (WUE) of squash and the distributions of salts and roots in sandy calcareous soils. A field experiment was conducted at the college experimental station in 2002 and 2003. It consists of three clay deposits, three rates (CO = 0, C2 = 1.0 and C3 = 2.0%), four irrigation levels (T_1 = 60, T_2 = 80, T_3 = 100 and T_4 = 120% of Eto) using surface (IM1) and subsurface (IM2) drip irrigation.

Results indicated that squash fruit yield was significantly increased with the increase in irrigation water level for each season. Generally, WUE values were increased as linearly with applied irrigation water and decreased at the highest irrigation level. Types of clay deposits significantly affected fruit yields compared with the control. The yield increase was 12.8, 8.35 and 6.4% for Khulays, Dhruma and Rawdat clay deposits, respectively. The differences between surface and subsurface drip on fruit yields and WUE were also significant. Results indicated that moisture content of subsurface-treated layer increased dramatically, while salts were accumulated at the surface and away from the emitters in subsurface drip irrigation. Intensive root proliferation is observed in the clay-amended subsurface layer compared with non-amended soil. The advantages of subsurface drip irrigation were related to

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