

Use of Clay Deposits in Water Management of Calcareous Sandy Soils Under-surface and Sub-surface Drip Irrigation

استخدام الرسوبيات الطينية في إدارة مياه الري للتراب الرملية الكلسية تحت ظروف الري بالتنقيط السطحي وتحت السطحي

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Abstract: The objective of this study was to investigate the effect of irrigation (levels & methods) and type of clay deposits on lettuce yield, water use efficiency WUE and the distributions of soil moisture and salts in the root zone of sandy calcareous soils. A field experiment was conducted at the college experimental station in 2002-2003. It consists of three clay deposits, three rates (0, 1.0, and 2.0%), and four total irrigation applied water levels, 360 mm (T1), 520 mm (T2), 635 mm (T3), and 822 mm (T4), using surface and subsurface drip irrigation. Results indicated that yield was significantly increased with the increase of irrigation level, whereas WUE significantly decreased with increase of irrigation level. The average yield increased by 9.30% in a high irrigation level compared to a moderate irrigation level, and decreased by 14.2% at the more stressed irrigation level. WUE decreased by 49.0% at a moderate irrigation level and decreased by 55% at a high irrigation level. Types of clay deposits did not affect the yield; however, the yield was significantly affected by amendment rates. The differences between surface and subsurface drip on yields and WUE were also significant. Results indicated that the moisture content of the subsurface treated layer increased dramatically, while salts were accumulated at the surface and away from the emitters in subsurface drip irrigation. The advantages of surface drip irrigation were related to the relative decrease in salt accumulation in the root zone area where the plant roots were active and the water content was relatively high.

Keywords: Drip irrigation, clay deposit, lettuce yield, sandy soils

المستخلص: هدفت هذه الدراسة إلى البحث في والتحقق من تأثير عملية الري من حيث المعدلات وطريقة الري (سطحية