

**INFLUENCE OF TILLAGE DEPTH AND ORGANIC  
RESIDUE PLACEMENT ON CALCAREOUS SOIL  
PRODUCTIVITY UNDER IRRIGATION FREQUENCIES  
WITH HIGH SALINE WATER.**

BY

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**ABSTRACT**

A field experiment was conducted at Ras Suder experimental station of DRC, South Sinai, during 1998/1999-winter season. The aim of this experiment is to study the effect of tillage depth and application method of organic residue on calcareous soil productivity, under different irrigation frequencies with high saline water. The treatments were; two irrigation frequencies (7 VS 14-day interval); two tillage depths (20 and 30-40cm depth); three methods of applying organic residue, i.e., (surface, mixed & layer), beside the control (without applying residue). The treatments were arranged in a split split plot design with five replicates.

Wheat production was affected significantly by the imposed treatments. The grain & straw yields of wheat crop increased significantly due to tillage depth; application method of residue and/or irrigation interval. The N, P, K, Fe, Mn and Zn contents of wheat grains and straw were significantly increased due to the studied treatments. The highest yield was obtained by mixing (5 ton/fed.) organic residue and plowing calcareous soil at 30-40cm depth under 7-day irrigation interval. This was actually reflected in increasing usage efficiency values for both water and NPK by wheat plants.

Tillage and/or organic residue under the two studied irrigation periods have affected soil properties. The soil pH, EC, SAR & ESP values as well as the concentrations of soluble  $\text{Ca}^{2+} + \text{Mg}^{2+}$ ,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Cl}^-$ ,  $\text{HCO}_3^-$ , &  $\text{SO}_4^{2-}$  were decreased with different magnitudes in the tillage with organic residue treatments under both irrigation frequencies. The extractable amounts of N, P, K, Fe, Mn and Zn in the studied calcareous soil were positively affected by the imposed treatments.

In conclusion, incorporating organic residues, along with tilled the soil to 30-40cm could be recommended as a best management practice for calcareous soil irrigated with high saline water. Incorporating organic residue may be a feasible means of realizing the yield potential of wheat crop under conditions of calcareous soil and saline irrigation water.

***Key words: Tillage depth, Organic residue, Saline water, Calcareous soil, Irrigation frequency, and Wheat plants.***