RESPONSE OF WATER USE EFFICIENCY TO SOIL MANAGEMENT PRACTICES AND WATER TABLE LEVELS

By

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ABSTRACT

Shereen Ahmed Hamed Saad: Response of Water Use Efficiency to Soil Management Practices and Water Table Levels . Unpublished Ph.D. thesis, Department of Soil Science, Faculty of Agriculture, Ain Shams University, 2014.

Two experiments were carried out in eighteen double wall concrete lysimeters of the size 1.25 m × 1.25 m and 1.25 m deep using the cultivar Faba bean (*Vicia Faba* L.) and Corn (*Zea mays* L.) during, 2010 and 2011 seasons, respectively as a test plants to estimate the contribution of water table to meet the water requirements, the impact soil management practices including compost; and the interaction effect of both of them on yield of either faba bean or corn crop. The lysimeters were connected to a tank with Marriotte siphon and a piezometer to maintain the water table level at the desired depths, which consisted of 50, 70 and 90 cm from the soil surface. There were two compost treatments, which consisted without compost and with compost treatments. The amount of compost was 20 Ton per feddan, which mixed with the 30 cm depth from the soil surface.

The results of this study showed that there is no high difference between the values of actual evapotranspiration (Et_a) for both faba bean and corn crops under the three levels of water table. It slightly increased with increasing water table depth. As well as, 70 cm water table level showed that it can be consider suitable conditions. At this level, the amount of water was meet the requirements of both faba bean and corn crops which cause a significant high values of its water use efficiency (WUE) , water economy (WE), total and available nutrients N, P, K, Fe, Mn and Zn status in the soil profile and different organs of these two crops and also a maximum grain yield. Compared to a high water table level 50 cm or a deep water table level 90 cm where, the crop depends basically on the water irrigation requirements. As well as, compost application is very important, these favorable significant effect ascribed not only for its plant providing by enhancing the growth or by increasing availability of nutrients to its nutritional requirements without any undesirable impacts on the environment but also, for improving physical, chemical and biological soil properties consequently that can led to the enhances soil water storage in the rooting zone which led to enhancing the yield,

water use from water table , water use from irrigation water, Et_a, WUE and WE of faba bean and corn crops.

We should put into considerations also that, the effect of interaction between both the water table levels and compost treatments, where there are significant differences between the treatments. 70 cm water table level with compost showed the highest values, while 90 cm water table level without compost treatments showed the lowest values of all the parameters under study.

Key Words: Water table contribution, Compost, Crop water requirements, Faba bean, Corn, Nutrient content.

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