

**EFFECT OF SOIL MOISTURE STRESS AND FOLIAR APPLICATION
OF ZINC ON SOME MAIZE VARIETIES
III SOIL WATER RELATIONS
BY**

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ABSTRACT

The present investigation was carried out at Sakha Agricultural Research Station, Kafr El-Sheikh Governorate Ministry of Agriculture during the three growing successive seasons (1988, 1989, and 1990 seasons) to study the effect of soil moisture levels, foliar application of zinc sulphate and maize varieties on the water relation of maize plant i.e. water consumptive use, water uptake, water use efficiency and the crop coefficient (kc). The main result could be summarized as follows:

1- Seasonal consumptive use amounts increased as the availability of soil moisture increased in the root zone. Soil moisture stress induced a reduction in the consumptive use. Maize cultivars and zinc levels had no obvious effect on water consumptive use. The daily consumptive use increased gradually as plant growth increased and reached its maximum at about silking and seed formation.

2- The relation between consumptive use in cm (x) and maize grain yield in kg/feddan (y) for all moisture treatments was linear. The grain yield of maize increased 65.24 kg/fed. by increasing one unit (cm) of seasonal consumptive use of maize. The correlation coefficient for the two variables was significantly positive and equal 0.999.

3- Maize plants extracted about 83.33% of its water needs from the upper foot.

4- The highest water use efficiency value (1.40 kg/m³ of water consumed) was recorded when maize plants were irrigated at 40% depletion in available water. Water efficiency of T.W.C 310 cultivar was higher than the other cultivars. The highest water use efficiency was obtained by applying zinc sulphate at 0.3%.

5- The average values of seasonal crop coefficient (kc) of maize for the three growing seasons were 0.88, 0.89, 1.07 and 1.12 for Penman, Radiation, modified Blaney-Criddle and the class A pan methods, respectively.

6- It could be concluded that the calculated value of 0.88 for (kc) could be used in calculating the consumptive use of maize in North Delta area as estimated by the aid of Penman or Radiation methods.

INTRODUCTION

Irrigation is used to maintain the soil moisture profile in the root zone to field capacity and fully satisfied evapotranspiration requirement of each crop on