I. INTRODUCTION

Maize is one of the most important cereal crops especially in Egypt, whether a great attention has been paid to increase its total production, particularly if it is used in the manufacture of bread. Whereas in the newly reclaimed desert area agronomic practices such as application of bio- organic and/or mineral fertilization, irrigation and new hybrids are used.

Irrigated agriculture takes place under water scarcity. Insufficient water supply for irrigation will be the norm rather than the exception, and irrigation management will shift from emphasizing production per unit area towards maximizing the production per unit of water consumed, the water productivity. To cope with scarce supplies, deficit irrigation, defined as the application of water below full crop-water requirements (crop evapotranspiration) is an important tool to achieve the goal of reducing irrigation water use. While deficit irrigation is widely practiced over millions of hectares for a number of reasons from in adequate network design to excessive irrigation expansion relative to catchment supplies, it has not received sufficient attention in research. Its use in reducing water consumption for biomass production, and for irrigation of annual and perennial crops is reviewed here. There is potential for improving water productivity in many field crops and there is sufficient information for defining the best deficit irrigation strategy for many situations. One conclusion is that the level of irrigation supply under deficit irrigation should be relatively high in most cases, one that permits achieving 60–100% of full crop evapotranspiration. Several cases on the successful use of regulated deficit irrigation (RDI) in fruit trees and vines are reviewed, showing that RDI not only increases water productivity, but also farmers' profits. Research linking the physiological basis of these responses to the design of RDI strategies is likely to have a significant impact in increasing its adoption in water-limited areas **(Fereres and Soriano, 2007).**

Today, there is a recognized and increasing use of humic acids for their beneficial impact on the growth and cultivation of crops particularly in organically-deficient soils. Humic substances consist of a heterogeneous mixture of compounds for which no single structural formula will be sufficient (**Baigorri** ***et al*****., 2009**).

Humic acid (HA) is not a fertilizer as it does not directly provide nutrients to plants, but is a compliment to fertilizer. Benefits include:

i) Addition of organic matter to organically-deficient soils.
ii) Increase root vitality.
iii) Improved nutrient uptake.
iv) Better formation and stability of soil aggregates.
v) Increased both water and fertilizer retention.
vi) Stimulate beneficial microbial activity (**Wahdan** ***et al.*** **2006**).

There is a long history of using humic and fulvic acids to improve nutrient uptake (**Mackowiak** *et al.,* **2001**). Humates possess extremely high ion-exchange capacities, which allow them to hold cations in a way that makes them more easily available to plant roots and thus improve micronutrient transfer to the plant's circulation system. HA is particularly effective when added with banded fertilizer at the time of planting. World population will be increasing and to reduce the food insecurity, crop production will have to be doubled. This can be fulfilled by expanding cultivable area and/or increasing soil crop productivity. Also, water is a vital factor for plant growth, development and productivity. So, maximizing crop production from water unit is a must (**Huang** *et al.*, **2007**).

The objective of this study was to investigate the effect of water stress and humic acid on growth, yield and its components of some maize hybrids (*Zea mays L.*) and their interaction.